Becoming an Aided Communicator (BAC): Theory, Methods, Findings and Practical Implications

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Programme

09.30 Registration
09.50: Welcome

09.55: Introduction
Stephen von Tetzchner

10.00 Cognition and Cognitive Assessment
Kristine Stadskleiv

10.30 Lexical Development in Aided Communication
Kirsi Neuvonen

11.00 Conversations and Aided Communication
Martine Smith

11.30: Tea & coffee & networking

12.00: Aided Communication and Participation
Beata Batorowicz

12.30 After BAC – Participants' views on project participation
Catia Walter

13.00 Lunch

14.00 Parallel Discussion Sessions – Clinical and Research

15.30 Notes from Discussions in Plenary

16.00 Concluding comments
Stephen von Tetzchner

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Contents

Foreword

The presentations were a joint effort of all the members of the BAC team. The discussions were a joint effort of the BAC team and the attendees.

We want to thank everyone for their interest, time, contributions and willingness to consider the findings and implications of the BAC project.

We also express our gratitude to Communication Matters and the University of Leeds for arranging the BAC Study Day.

The Editors

Introduction to BAC: Theory, Methods, Findings and Practical Implications

Stephen von Tetzchner

Some children with little or no speech communicate using communication aids. Many aspects of aided language development are still not well researched and there is a need to study aided language skills in children for whom this is their primary mode of expressive language. The project *Becoming an Aided Communicator (BAC): Aided Language Skills in Children aged 5–15 years: A Multi-site and Cross-cultural Investigation* includes researchers from 16 countries (see list of main researchers at the end). The roots of the project go back to 2006 when some of the participating researchers started talking about the lack of larger projects that could give insights into both the typical course and the variation that exists in aided language development. One foundational idea was that the acquisition of aided language is a form of language development, although atypical. Teaching is necessary but aided language development is not primarily an educational activity and the understanding of aided language necessitates research into the communication of emergent aided communicators, especially children using graphic communication systems. The BAC group emphasizes that the development of aided communication is an achievement, not a deficit. This is also the reason for referring to children using communication aids as "aided communicators", rather than as individuals who have limited or no speech or as having complex communication needs (von Tetzchner & Basil, 2011).

Most studies of aided language are related to intervention (McNaughton & Light, 2015). These studies are important but mainly observe whether one or a few children learn what they are taught in training sessions and only rarely explore other aspects of aided language or how young aided communicators manage everyday conversations. An overall aim of aided language intervention is that the children and their communication partners should get beyond communicative routines and that the children should develop into autonomous communicators. The small number of studies of everyday use of aided language implied that an important empirical basis for designing and evaluating aided language interventions was lacking. One aspect of this is how aided language may enable children with severe motor impairments to participate actively in ordinary child and adolescent activities.

Constructivism is the main theoretical basis of the BAC study. Usage-based theories stress the importance of social mediation and co-construction and that children learn language from the language they hear or see but equally important is their own use of language (Lieven, 2016; Tomasello, 2003). Children's use of aided language is thus not just a translation of the spoken language they have heard, but a process where they are actively trying to solve communicative problems with graphic symbols and other expressive means. This is reflected in both the observed achievements and the challenges of young aided communicators. Children

learn language by participating in meaningful conversations and the scaffolding by more competent communication partners. Most parents of aided communicators do not have prior experience with conversations involving aided language and are therefore not very competent partners when their child starts to use aided language.

There are many routine exchanges in spoken language, such as *How are you* or *Thank you,* where comprehension barely depends on processing each word the other is saying. However, although used frequently, the essence of language is not these routine exchanges but rather the ability to convey information that is new to a communication partner who may need to infer complex meanings from longer aided utterances. There are few studies of aided communicators telling about events that are unknown to the other (e.g., Murray et al., 2018; Smith, 2003). Judging from the literature, aided communicators may have limited experience with this kind of conversation. In fact, although the very first review of aided language studies emphasizes conversations (Kraat, 1985), non-intervention studies of conversations involving aided language are still quite rare.

A further motivating issue for the BAC project was the lack of assessment of aided language comprehension and use. There is a range of instruments designed to assess spoken language comprehension and production in both children with typical development and children with difficulties of spoken language but few assessment instruments of aided language that are independent of spoken language (Geytenbeek et al., 2010). Most descriptive studies of aided language focus on educational settings and education aims, and tend to provide limited information about aided language use besides the specific intervention targets. There are many descriptions of graphic symbol instruction but very few descriptions of the children's developmental course of aided language and especially of aided language use in everyday life. The trajectories may deviate significantly from the course that seemed likely in early childhood (Lund & Light, 2006).

On this basis, the aims of the BAC project were thus to gain knowledge about the development and use of aided language, utterance construction, young aided communicators' use of their expressive means to solve communicative problems and fulfil their communicative intentions, and how different communication situations influence the language strategies used by young aided communicators. The intention was to study the use of graphic symbols as functional linguistic elements rather than written forms corresponding to the spoken language. The project is organized as multi-site national studies, with the same tasks and procedures, and national funding and ethical approval. Aided communicators constitute a very heterogeneous group, for example with regard to gross and fine motor abilities, comprehension and use of spoken language, and nonverbal cognition. In research, they are often treated as one group and the conclusions may not be equally valid for all the participants. The BAC project investigates aided communication in a select group of 5–15-year-olds with aided language as their main mode of communication. All of them had little or no intelligible speech and most had severe motor impairments, for the majority due to cerebral palsy. They were not considered intellectually disabled by their teachers and did not have a diagnosis of autism spectrum disorder. The aided communicators were assessed with available standardized language tests with national norms.

The development of the BAC tasks was a collaborative effort, involving extensive discussions within the project group to ensure that the tasks would be suitable for all the

countries involved in the project. They were designed to include different aspects of aided language comprehension and use, many of which are rarely addressed in aided language research. The comprehension part includes recognition of individual graphic symbols and a variety of tasks requiring understanding of sentences of different complexities, and stories. For example, which graphic symbol sequence best describes one picture, from a choice of four picture options; or from a choice of four graphic symbol sentences, which best describes the picture shown. All the comprehension tasks were made with the graphic system each child was using or had used prior to becoming a speller. None of them required comprehension of spoken language, except that the general instructions were given using spoken language. The production part includes naming of objects, description of objects without naming, description of static scenes on pictures and dynamic events on video, completion of pragmatic cartoons (what did he or she say?) and instructing partners to construct various toys. To ensure that the dyads had no prior experience with the material, drawings were made especially for the project by Janice Murray and the videos by the present author. The video of the Spider Sandwich story was adapted with permission from Grove (1995). The toys were collected by Elisabete Mendes and Lourdes Tavares. Communication partners in the expressive tasks included peers, familiar and unfamiliar adults, e.g., a parent, or member of school staff unknown to the young person. Most of the expressive tasks require the child to relay information and instructions that are unknown to the communication partner, and the partner has to engage in dialogue to infer the child's intended meaning from one or a few symbols. The communicative intention of the child was thus the starting point. The sensitivity of partners and the extent to which they dominated the joint problem solving varied across dyads. In addition, the children were asked about their views on friendships and engaged in two conversations with a parent, a peer and a teacher, who were not aided communicators. As there were no norms for the any of the tasks used, a reference group was included to observe how children with typical development performed on the same tasks. The reference group completed the tasks with teachers and peers, but not with parents.

Finally, parents and teachers were interviewed about the aid history of the child, the child's access to and use of communication aids in different everyday situations, the child's aided language competence and his or her educational history. They were also asked about their own aided language competence, support and training, and how satisfied they were with different aspects of the intervention. The aided communicators and the reference group were interviewed about their views on aided communication and their communication partners.

Results from the BAC project have been presented in a number of journal articles and book chapters. The articles in the special BAC issue of the journal *Augmentative and Alternative Communication* (von Tetzchner, 2018) represent a good introduction to the project.

A major aim of the BAC project is to encourage other researchers and practitioners to build on the ideas of the project. More details of the methods and published results may be obtained from the present author or one of the other researchers in the project.

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Extended Abstracts of Presentations

Cognition and Assessment

Kristine Stadskleiv, Hans van Balkom and Stephen von Tetzchner

Developing a language is a dynamic process involving a range of cognitive skills, in addition to social and relational skills (Butler, 2022; Christie & Gentner, 2012; Kristiansen et al., 2006; Tomasello, 2010). Language consists of a unique system of symbols and grammar that only humans use to communicate, and distinguishes human beings from other species. For children to be able to learn to comprehend and use spoken language, they must attend to the communication partner, divide the flow of speech into meaningful units, and categorize objects, people and events in the environment and understand their relevance to the speech sounds they hear (von Tetzchner, 2019). However, some children develop little or no speech and have to express themselves in a different modality. For children with severe fine motor skill impairments, this modality is mostly some form of communication aid. Becoming a competent aided language user is a form of language development, although atypical (von Tetzchner, 2018).

A young child cannot create language in isolation and all modes of language development require a language-supportive environment. Children using aided language typically grow up in families with spoken language and most parents are unfamiliar with aided language and need support and guidance to stimulate their child's aided language development (von Tetzchner & Stadskleiv, 2016). This also implies that children developing aided language typically are exposed to language input in a modality (i.e., speech) that is different from their own expressive production (i.e., aided language) (Smith, 2015).

Aided language development involves most of the same demands as spoken language development, as well as some unique demands. The format of aided language involves some sort of graphical representation, either it be symbols or letters presented on some form of communication aid, either a paper-based book or board or an electronic device (von Tetzchner & Martinsen, 2000). When communication aids include more items than the users can see on one page, they have to learn to navigate through the pages to find the items they need, while simultaneously keeping their intended message and plan for utterance construction in mind. Moreover, the use of graphic symbols implies that aided communicators have to rely on the set of lexical items offered by others, typically of limited size, and so it may take a long time to construct an utterance (Deliberato et al., 2018; Howery, 2018). The general and unique characteristics of aided language comprehension and use have implications for understanding aided language processes and for the assessment of children who may benefit from aided language intervention or who are already developing aided language. Reliable assessment of cognition and language in young aided communicators with restricted fine motor skills was a core aim of the BAC project.

The inherent characteristics of aided language imply that it is important to gain insights into the range of cognitive abilities and skills involved in aided language comprehension and use. This

presentation focuses on four areas: 1) comprehension of spoken and aided language, 2) visual-spatial cognition, 3) mind understanding, and 4) executive functioning.

Language comprehension

When children may be in need of aided language intervention, it is necessary to assess their comprehension of spoken language in order to ensure that the communication aid and its contents match their level of comprehension (Stadskleiv, 2015). For some children, this assessment can be made with standardized tests that require little motor involvement and no speech production, such as tests were the child shows comprehension of a word or a sentence by indicating the picture among several pictures that corresponds to the word or sentence. In the BAC project, vocabulary comprehension was assessed with the British Picture Vocabulary Scale (BPVS) (Dunn et al., 1997) or the Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn, 2007), depending upon availability of national norms. The Test of Reception for Grammar (TROG) (Bishop, 2003) was used to assess sentence comprehension.

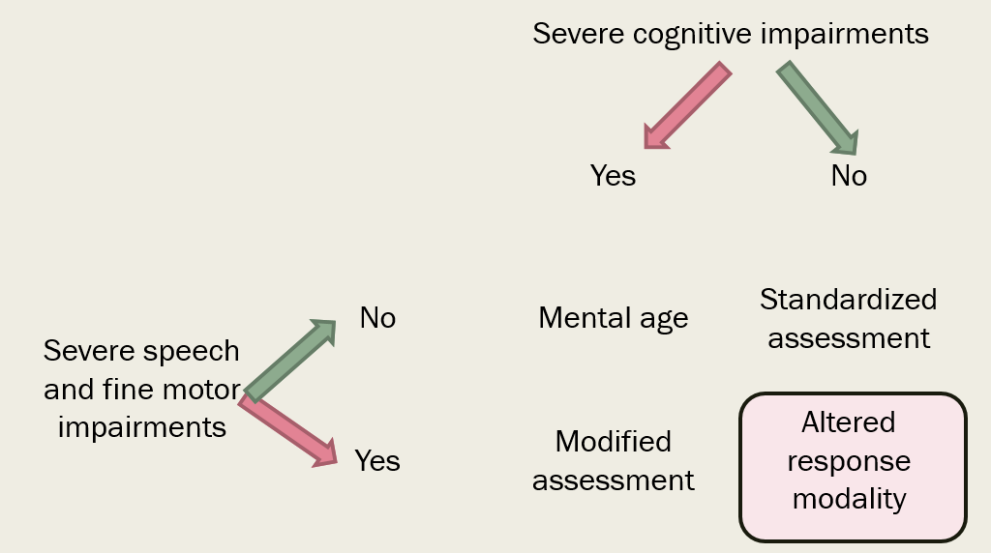


Figure 1.1. Overview of three accommodation approaches that may be used for when cognitive and motor impairments precludes standardized administration

Adaptive assessment

Some tests require rapid responses and skills like speech and manual dexterity (Strauss et al., 2006). In principle, there are three types of assessment accommodations that are made when children have more severe cognitive and/or motor impairments (see Figure 1.1 for an illustration). These approaches are used when the impairments are so severe that it is not meaningful to administer the age-appropriate standardized test in the standardized manner.

Firstly, if the child has more extensive cognitive impairments, but mild motor impairments, the typical approach is to choose a test normed for a younger age cohort if the test elements corresponding to the child's chronological age are way too difficult, i.e., adapting to mental (developmental) age. If the child has both extensive cognitive and motor impairments, it may be necessary to conduct what is known as a *modified assessment*. This implies that we are searching for evidence of developmental milestones that the child has reached, and making rather large concessions as to how the tasks are administered. The norms cannot be applied, but often it will be possible to give an estimate of a child's mental age. This approach is typically recommended with severe and profound intellectual disability. The third approach, *altered response modality,* is the one used when it is the severity of the motor impairments, and not the cognitive impairments, which precludes a standardized assessment approach. This would be the approach chosen for aided communicators in the expressive user group, such as for the participants in the BAC project.

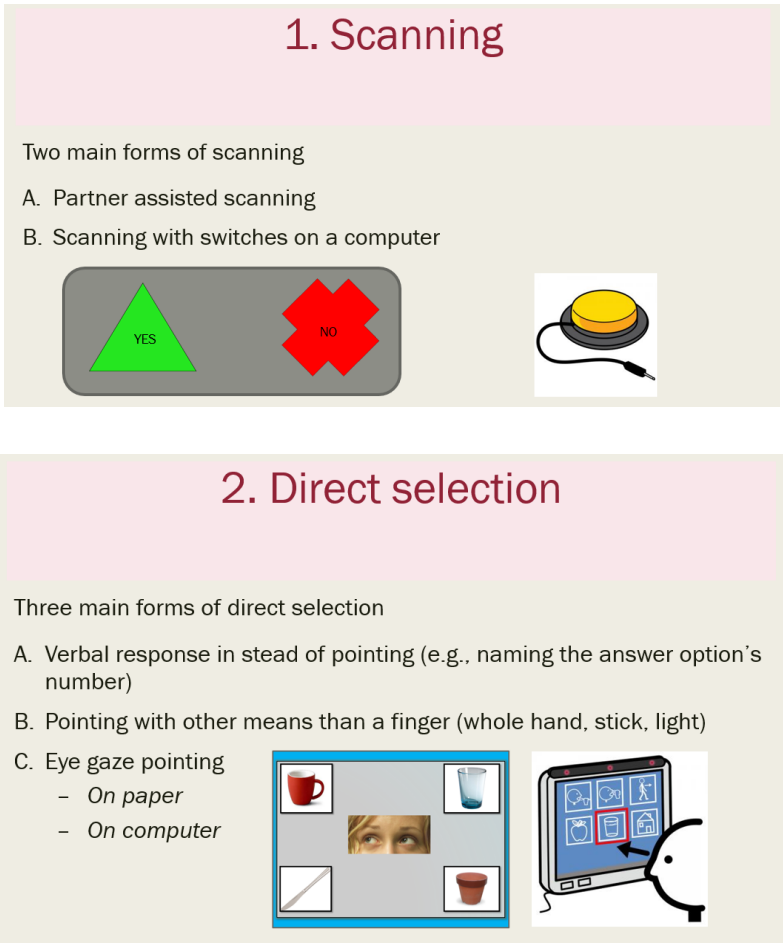


Figure 1.2. Altered response modalities in the form of 1) scanning or 2) direct selection

The purpose of these adaptations is to ensure that children get a fair chance of showing their cognitive skills. They are suitable for tests with a multiple-choice format, where the only

accommodation needed is to allow the child to indicate the answer in another manner than by pointing with a finger (Phillips, 1994). Alternative response modality implies that either some form of scanner or another form of direct selection than finger-pointing is used (see Figure 1.2 for an illustration). Some children may answer by using scanning, such as when the test administrator systematically scans through answer options that the child confirms or rejects, or by using switches to scan on a computer. The child may confirm or reject an answer option using for example graphic *YES* and *NO* symbols. The second form of alterative response modality, is to provide an alternative form of direct selection. Children with severe motor impairments cannot point reliably and therefore cannot use finger pointing as an answer option. They may be offered other means of direct selection such as vocalizing, pointing with a stick or a whole hand, or eye-gaze pointing, depending upon motor skills.

When typically developing children have answered tests using altered response modalities, test results have not been significantly different from when using finger pointing (see Fiske et al., 2002; Kurmanaviciute & Stadskleiv, 2017).

Assessment using tasks from the BAC study

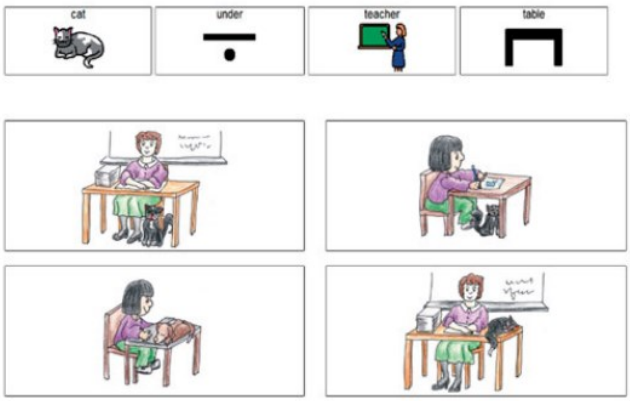
Some important areas in the assessment of children who need aided communication are less readily examined using standardized tests. BAC tasks were used to investigate aided language comprehension, visual-spatial cognition, mind understanding and executive functioning, and similar tasks and analyses may become part of a future assessment package.

Aided language comprehension

For children developing spoken language who are in need of intervention, there is little debate about the usefulness of assessing their comprehension of spoken language. However, for children who are developing aided language, comprehension and use of aided language are rarely assessed beyond a general description of the communication aid, rather than truly understanding their current language comprehension skills (Murray et al., 2019). To our knowledge, there are no standardized tests of aided language comprehension. In the BAC study, the children's comprehension of aided vocabulary was assessed using material developed by the team for *BAC Vocabulary Comprehension*. The format is similar to BPVS and PPVT: the children were shown a graphic symbol from the symbol system they were using, for example, Picture Communication Symbols (Johnson, 1985) or Blissymbolics (Bliss, 1965), and then asked to indicate which of the four drawings offered corresponded to that symbol (see Figure 1.3). Assessment of aided sentences were assessed in a manner similar to TROG, by showing the child sentences with graphic symbols and four drawings, where one corresponded to the sentence (see Figure 1.4a). The children were also shown one drawing and had to indicate which of four graphic sentences best corresponded to the picture (see Figure 1.4b).

Figure 1.3. Example from BAC Vocabulary Comprehension task, where child should identify which of the four drawings corresponds to the graphic symbol FALL

a)



b)

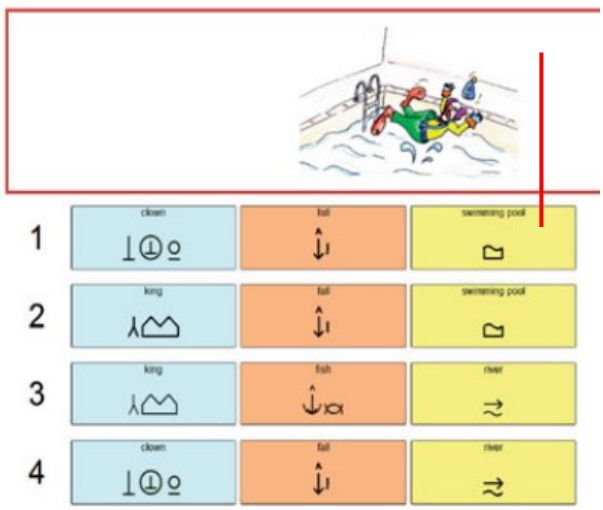


Figure 1.4. Examples from BAC Sentence Comprehension tasks, where child should identify a) which of four drawings that corresponds to aided sentence CAT UNDER TEACHER TABLE and b) which aided sentence from four alternatives indicates a CLOWN IN THE SWIMMING POOL

Some of the aided communicators in the BAC study did not complete all of the tasks. Table 1 shows that within the aided group, there were significant correlations between comprehension of spoken words, graphic symbols and sentence comprehension, as measured by results on BPVS/PPVT, BAC Vocabulary Comprehension and BAC Sentence Comprehension (Batorowicz et al., 2018).

Table 1. Spearman Rho correlations between the aided communicators' comprehension of spoken words.

	BAC Vocabulary Comprehension	BAC Sentence Comprehension tasks
BPVS/PPVT	.41**	.23
	(N=58)	(N=37)
TROG	.42**	.62**
	(N=41)	(N=25)

***p<.01*

Vocabulary assessed with British Picture Vocabulary Scale (BPVS) or Peabody Picture Vocabulary Test, (PPVT). Comprehension of spoken sentences assessed with the Test of Reception of Grammar, (TROG). Comprehension of graphic symbols assessed with BAC Vocabulary Comprehension. Graphic sentence comprehension assessed with BAC Sentence Comprehension tasks.

Visual-spatial cognition

The use of graphic communication systems makes demands on visual abilities. Advanced symbol systems such as Blissymbolics (Bliss, 1965) and writing systems involve perception of shape, orientation, and location. Children with cerebral palsy (CP), who constitute a large subgroup of aided communicators, have an increased risk of visual-spatial cognitive challenges (Ego et al., 2015). The BAC project explores visual-spatial perception in young aided communicators with standardized tests of visual perception and the *BAC Construction task* (Stadskleiv et al., 2018). In the BAC task, the child should describe a physical construction to a communication partner in such a way that the partner could make a similar construction from a range of similar parts. The partner could not see the constructions that the child was describing (see Figure 1.5 for an illustration). The tasks included loading a lorry with items, making a necklace (as per fugue example), building a tower of Lego and laying out a row of Dominoes. We found that aided communicators used fewer attributes to describe how to complete the models than the typically developing peers in the reference group, M(SD) 7.4 (4.3) vs 13.3 (4.3), p <.001. However, the groups were similar in the sense that describing the colour was most commonly offered and describing the shape the least common. The test scores that best predicted overall performance on this task were results on TROG, perhaps illustrating the importance of language comprehension for precise use of spatial vocabulary. An unexpected finding was the large variability within the aided group as to performance, where aided communicators using iconic symbol systems such as PCS scored significantly lower than children using Bliss/Minspeak or spelling (32% vs 67% vs 91% correct constructions). It was also the group using PCS who had the lowest mean scores on tests of verbal comprehension

(Stadskleiv et al., 2018). Leaving professionals to give good consideration to why they choose to start someone on a PCS system.

Mind understanding

Mind understanding is an understanding that oneself and others form mental representations of people, things and events. This includes an understanding of the fact that others may lack

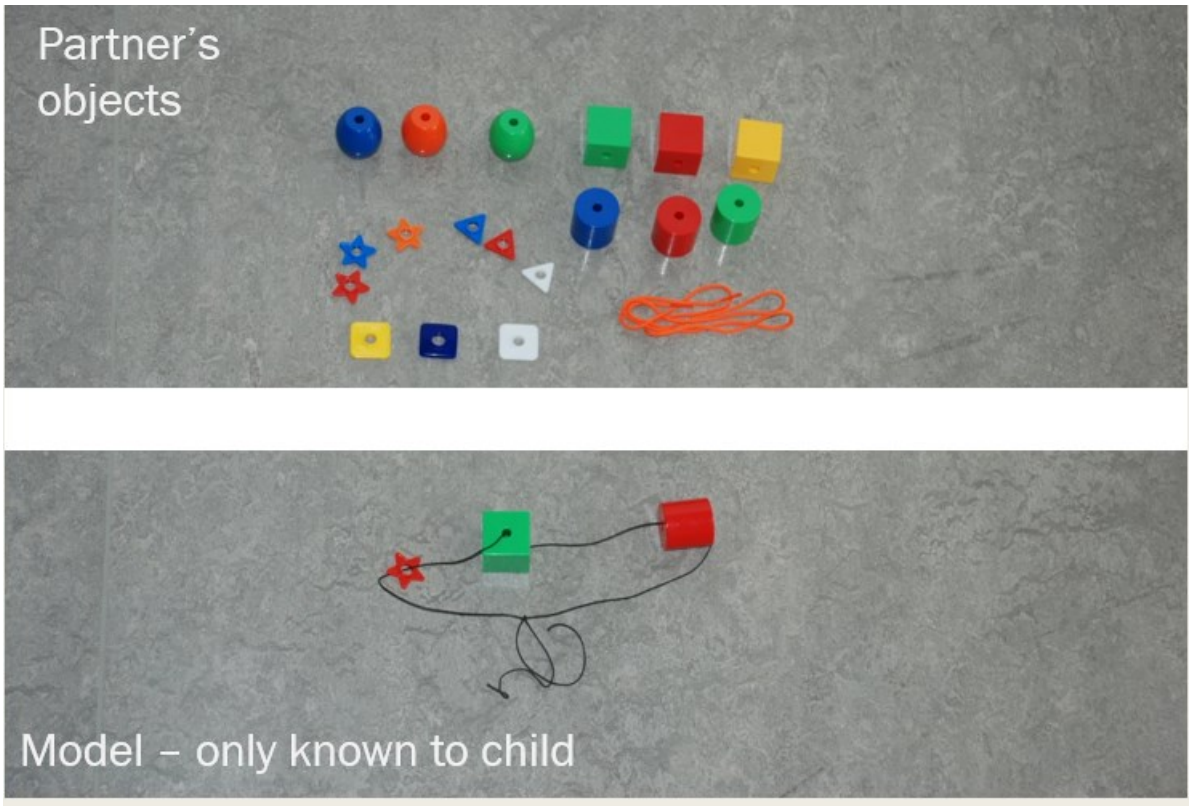


Figure 1.5. Example from BAC Construction task. The model (necklace) that the child should instruct the partner to construct is at the bottom and at the top the array of objects that partner could choose from. The partner could not see the child's model.

knowledge or have knowledge that differs from one's own, and that this knowledge will determine how the other person reasons and acts (von Tetzchner, 2019). Successful communication implies an ability to infer the intention of others, and studies report a relationship between language and mind understanding, both between early language skills and later performance on tasks involving mind understanding, and between early mind understanding and later language development (Milligan et al., 2007). In the BAC project, mind understanding was investigated with *BAC Description Without Naming.* In this task, the participants should describe, but not name, a picture of and object in such a manner that a communication partner could infer what object they described (see 1.6). The partner could not see the picture, and was therefore dependent upon the child's description in order to make the

inference. We categorized the clues provided by the child as precise, imprecise and incorrect, based on how easy they made it for the partner to make the inference (Stadskleiv et al., submitted). Precise clues, such as providing a superordinate category (i.e., *ANIMAL* for a picture of a horse) or function (i.e., *RIDE ON*) made inferences easy. Imprecise clues are correct, but non-specific, such as naming the colour (i.e., *BROWN*) and incorrect clues can be misleading (i.e., *BLUE*). The type of clues a child provided gave insight into what kind of information they understood their communication partner to need, thus revealing their mind understanding.

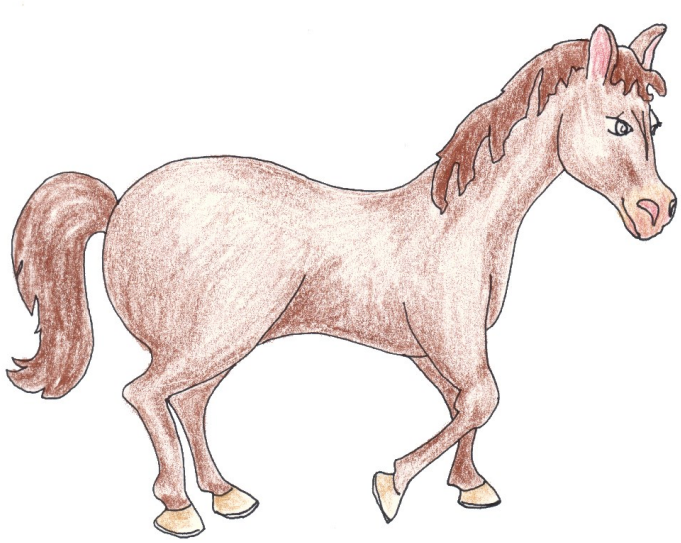


Figure 1.6. Example from BAC Description Without Naming

The task revealed the competence in aided communicators, as they provided the same percentage of precise clues as the peers in the reference group (40% vs 43%). Despite this, significantly fewer of the tasks were solved (64% vs 93%), indicating that there are other factors within the aided group that also contributes to the dyads outcome. One such variable might again be level of language comprehension, as percentage of correctly solved tasks were significantly related to test scores on TROG in the aided group r=.34, p<.01, but not in the reference group.

Executive functioning

Executive functions are thinking skills that assist with reasoning, planning, problem solving, and managing one's life (Blair, 2017). They are the basis for all forms of goal-directed activity, serve to regulate attention, plan and monitor the performance of voluntary actions, including language, and inhibit inappropriate action impulses. Studies have found statistical relationships between executive functions and language development (Kapa & Erikson, 2020; Kaushanskaya et al., 20917; Romeo et al., 2022). Operating a communication aid and navigating to find the

lexical items needed to express the intended meaning requires the ability to plan the construction of the utterance and accessing the aid. In the BAC study, BAC Construction (see Figure 1.5) was used to obtain a measure of planning and BAC Task: Description Without Naming (see Figure 1.6) as a measure of impulsivity. The results from the BAC Project suggest that using aided language is more taxing on executive functions than speech (Stadskleiv et al., 2014).

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Vocabulary Use in Aided Communication

Kirsi Neuvonen, Hans van Balkom,
Débora Deliberato and Stephen von Tetzchner

The words are the building blocks of spoken language and deciding which words to use is an essential process when a speaker makes sentences to express a particular meaning. It is a complex process underlying the vocabulary selection in spoken language, and the corresponding process is equally complex in aided language production.

The mental lexicon is often referred to as 'dictionary of mind' and stores information in lexical units. These units do not stand alone: they are connected to each other, enabling mutual network activation (Figure 2.1). Many researchers see the lexicon as an intrinsic deep and broadly branched semantic network. The lexical units are *nodes* and the different links between the units are *connections* (Aitchison, 2012). Children using aided communication will develop the similar structures but there are very few studies of the lexicon and vocabulary processes in children in this group.

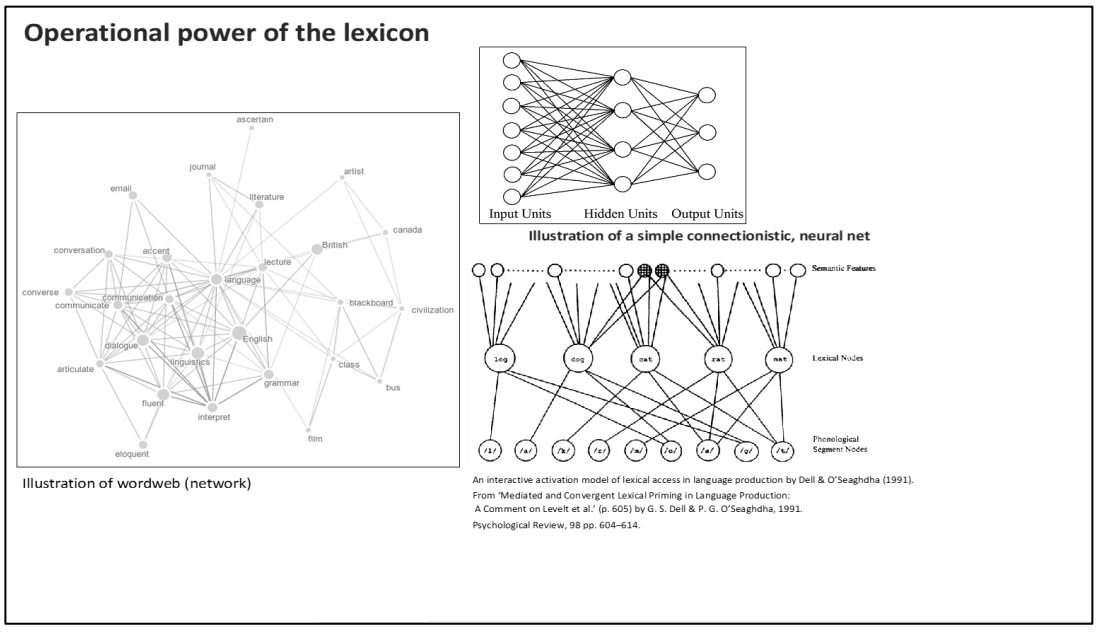

Figure 2.1. Example of connectivity network of lexical items

Word Grammar: Usage-based and lexicon-driven

Describing the lexicon (and language) as a network implies that the lexicon is part of a complex, interconnected functional structure. This approach has led to new explanations in several fields, such as phonological and phonetic awareness and working memory organization, lexical processing, word learning, cognitive science, word grammar in relation to constructivist and

usage-based grammar, computational linguistics, linguistic semantics (Bybee, 2011; Tomasello, 2003). The new methods and tools of network science are one cornerstone of research on lexico-semantic and linguistic networks; the other is the available linguistic data analysed by computer programs.

The theory of Hudson (2010) and Goldberg (2006) is representative of developmental cognitive linguistics, which sees the lexicon as the driving force in the organization of language. Word Grammar is based on the assumption that language and lexicon are organized as a network. The assumption is that the information represented in a sentence becomes incorporated (through learning) in the propositional definition of the word itself, where the main role of syntax is to combine the words (based on the propositional definition) in the correct way (see Figure 2.1).

Lexical network

An example of this lexical network model is described by Levelt (1994). The model shows how the propositional definition of a word, lexical item or concept (for example "sheep") directs and controls the semantic network connectives with other words, lexical items and concepts. Figure 2.2 shows a small fragment of a network. There are three levels of strata to be distinguished. The top, conceptual level contains concept nodes. The concept's semantic properties are represented by its network of labelled connections to other concepts. For instance, a sheep is a domestic animal, has wool as growth, and produces milk. Conceptual nodes can be activated by various means. The sheep node can, for instance, be activated by visual information, such as a visual image of a sheep. Some concepts, such as "sheep," are *lexical* concepts; they have a direct link to a node on the second level.

This second level is the lemma level. A *lemma* is the word that is chosen to represent the lexeme (Nation, 2015). Lemma nodes have syntactic properties. *Sheep* is of the category nouns and (in French) *mouton* is of male gender. *Goat* is also a noun lemma. In French *(chevre)* it has female gender. A lemma node can be activated by spreading activation from the conceptual level, but also by acoustic or visual input: listening to the word or reading the word.

The third level is the lexeme level. A lexeme is a word with its various inflections; for example, *boy* and *boys, run, runs* and *ran, or big* and *bigger* represent three lexemes. At the lexeme level, the nodes represent the word's sound form. In particular, they spread their information to a word's constituent phonemes. A lexeme node can be activated by an active lemma, but may also be activated directly by the word's written or spoken name.

The model is different from previous network models in that a word is represented by three nodes, rather than a single one: a lexical concept node, a syntactic lemma node and a lexeme or sound form node. The syntactic lemma node is missing in other models.

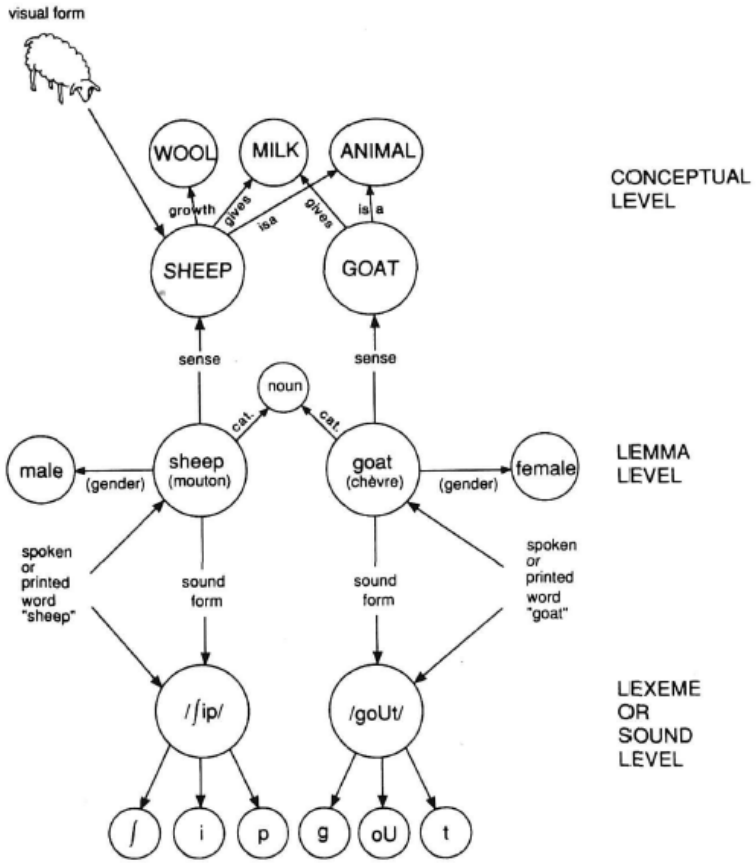

Figure 2.2. Fragment of lexical network (from Bock & Levelt, 1994)

In lemma selection, occasional selection errors tend to be of a semantic type, for example say *goat* instead of *sheep.* In Levelt's model, this is due to activation spreading within the conceptual level. As a consequence, the lemma *goat* will receive some activation when "sheep" is the active concept. However, the lemma *sheep* will usually get most activation. Because selection is probabilistic, there is a minimal probability of error. Because activation spreads over lexico-semantic links, misselections tend to be semantically related (lexical association) to the target. The Levelt-model may serve as an explanatory model for lexical retrieval and the multi-layered organization of language driven by the interconnected network of lexical elements, also in the production of utterances with graphic symbols (see Loncke, 2022).

Critical mass theory

Reviews afford evidence on the relationship between lexical development and the emergence of grammar, supporting a unified lexicalist view. Bates and Goodman (1997, 1999) reviewed a series of studies of individuals with various disorders, including traumatic brain injuries, cerebral palsy, Williams syndrome and Down syndrome, and concluded that lexicon and

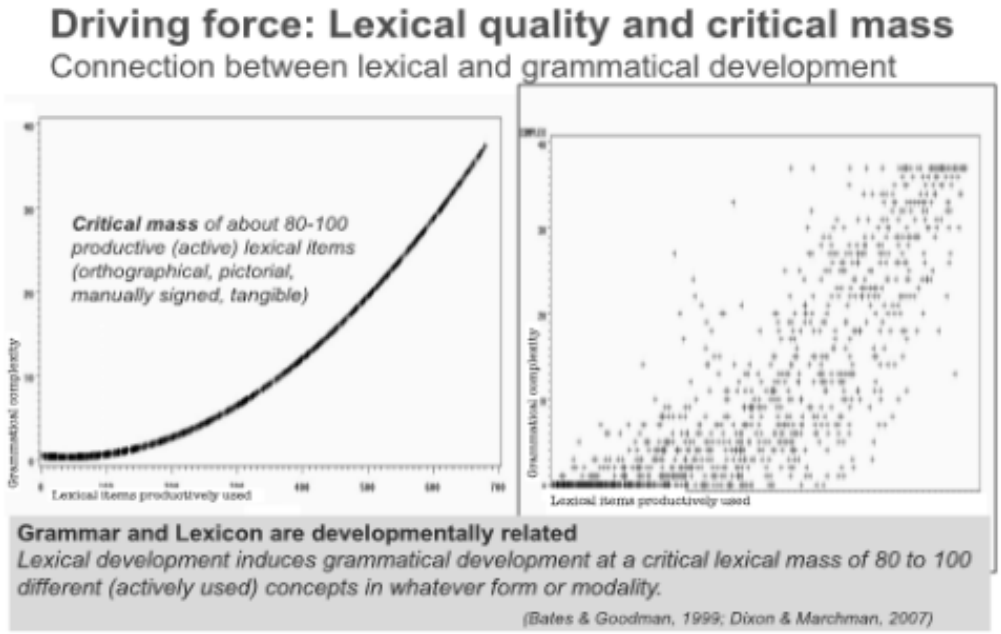

Figure 2.3. Development of lexicon and grammar

grammar do not emerge from different modules and that the lexicon is the driving force in language development (see Figure 2.3).

These studies include typical development in the period between 8 and 30 months, as well as early language development in the populations with disorders affecting language development. For example, vocabulary did not dissociate in early talkers or in children with focal brain injury. Grammatical development never outstripped lexical growth, even in the children with Williams syndrome. Grammar fell behind vocabulary development in children with Down syndrome, but this apparent dissociation may be explained for example by problems related to attention regulation, auditory processing, phonological working memory and word production. Similar findings have been reported for children developing AAC (van Tilborg & Deckers, 2016). The case for a modular distinction between grammar and the lexicon in language development thus seems to have been overstated and developmental evidence is more compatible with a radically lexicalist theory of grammar, that is, constructionist and usage-based grammars (Tomasello, 2003, 2010). Within this theoretical framework, the heterogeneous set of linguistic forms that occur in all natural languages (i.e., words, morphemes, phrase structure types) may be acquired and processed by a unified processing system comprising a common set of activation and learning principles.

The BAC study

Most of the children and adolescents involved in the BAC project have (neuro)motor disorders, mainly cerebral palsy, and experience limitations in mobility and other motor skills, including fine motor skills and speech. They were assumed to have age-appropriate or near age

appropriate spoken language comprehension and non-verbal cognition. Aided communication was their main form of communication and they had used a communication aid for at least one year, most of them several years. They supplemented the aided language with gestures, gaze and vocalization but both gestures and vocalization were limited due to the motor impairments. Most of the children used graphic symbols and some of them mastered spelling to various degrees.

Their lexical processing, vocabulary comprehension and production were investigated in several ways. Vocabulary comprehension was investigated with forced choice tasks similar to British Picture Vocabulary Scales (Dunn, Dunn, Whetton, & Burley, 1997) and Peabody Picture Vocabulary test (Dunn & Dunn, 2007) (see Stadskleiv et al., this volume). Vocabulary production was investigated with and naming of objects and observations of vocabulary constructions in tasks where they should describe static visual scenes or short video-taped events (Murray et al, 2018; Smith et al., 2018). The vocabulary constructions included meanings for which the aided communicators did not have a corresponding symbol in their communication aid and therefore had to construct a vocabulary item by combining items in their aid (Deliberato et al., 2018). The children and adolescents showed great creativity and a variety of strategies experiencing vocabulary constraints imposed by their aided system but the partners did not always understand these vocabulary constructions. However, the strategies and the solutions attempted by the young aided communicators shed considerable light on their lexical processing and vocabulary construction. and their consequences. For example, conversational constraints may occur when the mutual intentions and expectations of the conversational partners remain unclear or conversational turn exchanges proceed asynchronously and thus are not attuned to each other (Neuvonen et al., submitted). When many ambiguities or misunderstandings arise and corrective or supplementary language actions are required, this may hinder a coherent and smooth flow of the conversation, and impact the development of associative meaning attribution, as well as the scope (breadth and depth) of the lexicon.

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Conversations and Aided Communication

Martine M. Smith, Kirsi Neuvonen,
Janice Murray and Stephen von Tetzchner

In his children's book, *The Remarkable Rocket*, the author and poet Oscar Wilde (1854–1900) describes an interaction between a firework rocket, who perceives himself to be superior to all others, and a frog. In the interaction, the rocket struggles to get a word in edgeways. Finally, the frog bids farewell, saying "Well goodbye; I have enjoyed our conversation very much I assure you". "Conversation indeed!" said the Rocket. "You have talked the whole time yourself. That is not conversation".

Order and Structure in Conversations

The Rocket is probably not alone in having experienced this kind of frustrating conversation. The retort *"that is not conversation"* highlights a core feature of conversations: there is an order and structure to a conversation that requires some sharing of the conversational 'floor' between those involved. The exact nature of the sharing is unspecified; there are no set rules about how time must be divided between participants. In some conversations, participants may share speaker and listener roles in equal balance; in others, one participant may occupy most of the conversational floor in the speaker role. Participants' experience of and satisfaction with a conversation cannot be predicted based on amount of speaking time alone. In an oral examination, a student may dominate speaking time, but exit the conversation feeling very much lacking in control; in another conversation, one participant may dominate speaking time, sharing a deep worry or concern, with the other participant offering few words beyond affirming they have heard and understood, yet both may leave the conversation satisfied that they have equally shared in the conversation.

Participants can expect to experience a diverse range of conversational structures, but what is consistent across all conversations is an ebb and flow between speakers to greater or lesser degrees. Importantly, the ebb and flow is not marked solely by spoken words, but also by gestures, facial expressions, eye gaze and vocalisations. In *A Faraway* Island, the Swedish author, Annika Thor notes "A conversation is so much more than words: a conversation is eyes, smiles and the silences between the words".

Time and Timing in Conversations

However, the "silence between words" is a complex construct. A second feature of conversations is that the latching between speaker and listener roles is extremely finely tuned,

with silent gaps around half a second between utterance turns (Heldner & Edlund, 2010) and as low as 200 milliseconds on average in telephone conversations (Pouw & Holler, 2022). This speed is so rapid that managing to maintain smooth transitions and avoid speaking over each other is presumed to rely on listeners' being able to anticipate when a speaker may pause in order to predict when an opportunity to take a turn might arise, rather than simply reacting when a gap appears. This anticipation means that listeners must pay attention to both the linguistic information provided by the speaker, as well as their non-verbal communication, and both speaker and listener must finely tune all aspects of their communicative behaviours to each other.

The ability to effectively synchronize time and timing in conversations is not explicitly taught; rather it emerges across the developmental period through experiences of engaging in conversations. Smith and McMurray (2018) explored the changes in temporal structure of interactions between mothers and their children from the ages of 4 to 60 months, recording increasingly rapid mutual responses as children developed. However, they also noted that the ultimate outcome was not simply a linear increase in speed of responsivity or the expression of the maximum information in the minimum time, but rather the emergence of a mutually compatible rhythm, with infants' and mothers' responses tightly coupled to each other temporally. Maternal latency was a unique predictor of child latency and vice versa: both attuned to each other (p. 429), ensuring that conversational turns did not overlap and that gaps between turns were minimized.

Content in Conversations

Just as there is no prescribed distribution of speaker-listener roles in conversations, equally there is no prescribed content. Conversational topics can be as varied as the total number of conversations, but participants can be broadly expected to cooperate together (Grice, 1975) to ensure that the conversation can progress with mutual understanding, with all participants expected to have an opportunity to contribute to the focus of conversation.

Context and Conversations

Conversations take place between participants in specific contexts and contextual factors may influence both the conversational structure but also the conversational experience. The physical setting may prompt specific topics; the familiarity of the participants with each other and their prior experiences of conversations with each other may calibrate their expectations of how a new conversation may proceed. The topic of conversation may profoundly influence speaker-listener roles, as may the purpose of the conversation, from the point of view of all those involved. A conversation where the purpose is to achieve a specific outcome (e.g., agreement on a planned holiday) is likely to have quite a different dynamic to one where there is no particular end goal. The structure, timing and content of conversations are all therefore impacted by the context in which that conversation takes place. Given the overall complexity

of conversations, it is not surprising that becoming an effective conversational partner takes time and evolves over the childhood years.

Conversation Patterns and Aided Communication

Introducing aided communication into a conversational interaction inevitably impacts all aspects of the conversation. Aided communication takes far longer than spoken language (Kraat, 1985) and involves considerably more effort, both cognitively and physically (Higginbotham, Fulcher, & Seale, 2016; Murray & Goldbart, 2009; Smith, 2015). Both speaker and listener must accommodate to the unique temporal demands of aided communication (e.g., Clarke & Wilkinson, 2007). In addition, the vocabulary available within an aided communication system may poorly reflect the message that an individual wants to express and it may be difficult for a listener to interpret exactly what is meant by the person using aided communication. It is not surprising therefore that certain patterns of behaviour have been commonly reported in conversations involving aided communication. These include what is described as an asymmetry in structure, with natural speakers dominating the speaking time and occupying most of the conversational floor (Clarke & Kirton, 2003; Light, Collier, & Parnes, 1985). Those using aided communication have been described as being more likely to be in respondent roles within the conversation, rather than initiating topics or comments (e.g., Higginbotham et al., 2016) and are at least as likely to rely on unaided modes of communication as their aided system (Andzik, Chung, & Kranak, 2016). Navigating the timing demands of smooth conversational flow is particularly difficult, even for those who can use direct selection. Martin Pistorius eloquently describes this challenge in his autobiography *Ghost Boy* (Pistorius & Davies, 2011), saying:

> "A conversation with me is slow and takes time and a patience that many people don't have . . . people's voices move in a seamless cycle, sentences running one into another while they talk. But I interrupt the rhythm and make it messy. People must make a conscious effort to look at me and listen to what I have to say. They must allow me the space to speak because I can't butt in and many don't want to listen to the silence I create as they wait for me to input words into a computer . . . a conversation with me is as much about the silences as it is about the words, and I notice if my words are listened to or not because I choose each one so carefully." (p. 139)

Identifying what constitutes a 'conversational turn' in aided communication is also complicated as expression of ideas may involve several cycles of clarification and repetition, being gradually built up over several vertically stacked units, analogous to the early child conversations described by Scollon (1976). Speaking partners may feel compelled to fill the conversational gaps (Smith, McCague, O'Gara, & Sammon, 2016) and to direct the conversation to 'safe', known topics where they can be confident of being able to interpret what is being expressed using aided communication (von Tetzchner & Stadskleiv, 2016). Providing speaking partners with a clue (e.g., using a pre-stored phrase to flag that constructing a message may take time)

can help to calibrate expectations and offer greater balance within the conversation (Higginbotham, Bizantz, Sunm, Adams, & Yik, 2008).

These common themes have been reported across a wide range of participant groups, including young children with physical disabilities (Clarke & Kirton, 2003; Light et al., 1985), adults with acquired disabilities (Higginbotham et al., 2016) and adults without disabilities required to use aided communication (Smith et al., 2016).

Insights from the BAC Project

A number of studies from the *Becoming an Aided Communicator* project (von Tetzchner, 2018) have explored aspects of conversational participation. Findings from these studies are discussed below under three main headings: Structure, Timing and Content.

Insights on Structure

Drosopoulou and associates (2022) analysed data drawn from what were termed 'free conversation' tasks included as part of the overall data collection within the BAC project. In these tasks, aided communicators aged between 5 and 15 years interacted with a parent, a peer or a professional and were asked to converse about different topics:

- What would you do if you were very rich? (with peer)
- What would you like to do when you grow up? (adult)
- What is your favourite television programme? (with teacher or professional)
- Talk about things you like to do (with peer)
- Talk about anything you like to talk about (with parent and teacher or professional).

In total, data from 85 conversations were analysed. These data were drawn from conversations involving 35 individuals using aided communication and a total of 84 communication partners (31 peers, 6 parents and 11 professionals). Although the conversations were originally planned as dyadic interactions, often during data collection there were several other people also physically present. As a consequence, at times additional participants joined in the interaction. Drosopoulou and associates identified three different kinds of configuration of conversation participants: dyadic interactions (n=39); distinct multi-person interactions (n=32), where the main conversation was with one partner, but there were short sporadic episodes of interaction with another partner, and non-distinct multi-person interactions (n=14), where the aided communicator interacted with all participants with no clear main conversational partner.

In terms of the structure of the conversations that unfolded, overall the data supported many of the patterns that have previously been reported. The asymmetry commonly noted was evident. On average, speaking partners produced 10 times more initiations within the conversation than the aided communicators. Most of these initiations had strong summoning control and they were usually in the form of questions. Aided communicators were far less likely to initiate (see Figure 1). When they did, they rarely used to oblige such questions. In fact, across all the interactions, there were only two instances where more than one oblige was

produced by an aided communicator in the entire interaction. Instead, participants using aided communication used comments either to introduce a new topic or to provide complementary information on what the communication partner had said in the prior conversational turn.

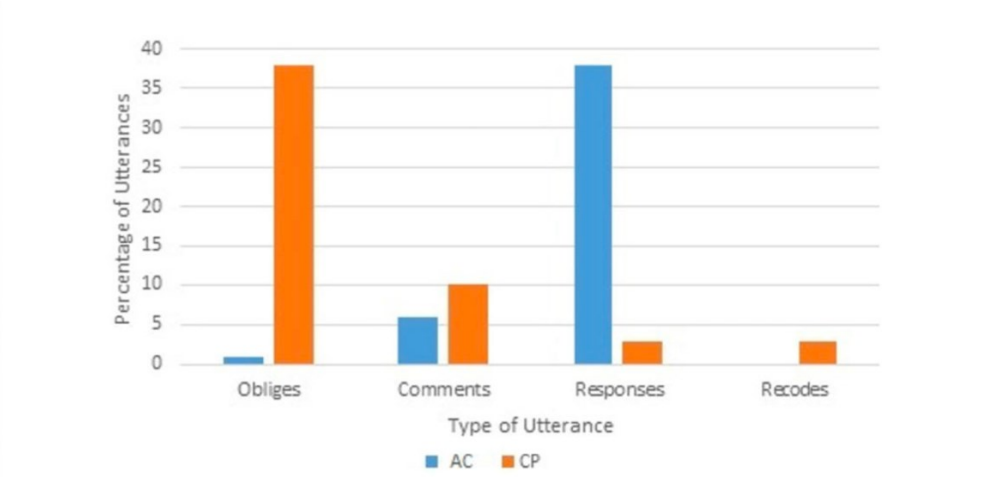

Figure 1: Distribution of conversational control and summoning power by partner in dyadic conversations (AC [with SSI]; CP, conversation partner).

In multi-person interactions, the turn-taking imbalance was even more profound. However, counter-intuitively, the conversational control pattern was relatively more balanced. Aided communicators produced more initiations and comments in interactions involving more than one communication partner, and partners also produced more comments and fewer obliges in these interactions. It is not clear why this pattern emerged. It is possible that communication partners using natural speech may have been less inclined to ask questions of each other and more likely to comment. This may have 'normalised' the conversation, reducing the overall proportion of questions.

It is tempting to frame the use of questions as evidence of a speaking partner 'dominating' and 'controlling' the conversational flow. However, obliges may have been used to signal recognition by the speaking partner of the importance of providing sufficient interaction opportunities for the aided communicator. They may have sought to minimize potential inter-turn gaps and support the progressivity of the discourse. For example, in the study by Smith and associates (2016), college students engaged in an intervention programme over several weeks, learning to use aided communication and switching roles between natural speaker and aided communicator in interactions. After each session they reflected on their experience as speaker and listener in these interactions. One participant reflected that in the role of natural speaker "I talked more to keep the conversation going and to make it easier; I felt like I should fill in the blanks for my partner when they couldn't find a word" (Smith et al., 2016, p. 275).

Insights on Time and Timing

Although many of the BAC studies report data on the time required to complete a range of tasks, two are highlighted here for the purpose of exploring time and timing in interactions. Murray and associates (2018) reported data from two tasks where the aided communicator was required to describe something to a communication partner who could not see what was being described. In one task, they described a complex picture scene and in the second they viewed a short video event and described that to a partner who was not present when the video was viewed. Data were reported from a total of 80 participants who used aided communication, as well as 56 reference peers, as they interacted with a range of communication partners. Perhaps unsurprisingly, the conversation involving aided communicators took far longer – on average 4 to 5 times longer to arrive at an agreed description. This slow pace of conversation has implications in terms of processing demands for everyone involved in the conversation – a theme returned to later.

Interactions relating to one of the video events was analysed in more detail by Neuvonen and co-researchers (2022). The video involved a billiard ball being potted into a pocket of the billiard table using a cue and another ball. As in the tasks analysed by Murray and associates, the time demands in this task were high. For the aided communicators (no reference peers were included) the average time required was 232 seconds (i.e., almost 4 minutes), but there was significant variability (*SD*=218), so that for some participants, the time taken was almost double – even for such a short event description. Furthermore, although the time taken correlated with the number of elements expressed, it did not necessarily correlate with scores for the ideas expressed or the number of ideas that partners could retrieve and recast. In other words, longer interactions did not necessarily yield more ideas or enable partners to interpret ideas more accurately. 'Success' on this task was more significantly related to age, and with scores on the communicative function and syntactic comprehension.

Insights into Content in Conversations

As noted earlier, it can be tempting to frame the interaction patterns of speaking partners, and specifically their disproportionate occupation of speaking time and the extent to which they engage in question-answer sequences, as indicating an intention to dominate and control interactions. However, it is only through detailed analysis of the specific content of interactions that it becomes possible to interpret these patterns.

Three papers based on *BAC* data are considered here. Smith and associates (2018) evaluated 45 narratives generated by 15 participants who used aided communication and compared them to narratives of 15 reference peers, the narratives being based on a video event description task. What emerged from the data was that the aided participants took far longer and generated significantly fewer elements than the reference peers. However, their strengths were in setting the topic and sharing the main information in an appropriate sequence. Speaking partners in the interactions varied in the extent to which they were able to interpret the relevance of the information provided, sometimes drawing on personal information about the aided

communicator and shared experiences, and sometimes relying on 'likely scripts' as a guide to understanding what the aided participant was trying to convey.

Somewhat similar findings were reported by Murray and associates (2018), who analysed both video event descriptions and complex picture scene descriptions. In their data also, the reference peers produced significantly more elements and more information than the aided participants. However, the groups did not differ in terms of the quantity of irrelevant elements or incorrect elements and only marginally in terms of idiosyncratic elements across both tasks. In other words, across both these students, aided participants did not have more incorrect communication attempts or irrelevant message components compared to their peers; they stayed on topic effectively but had a reduced range of effective message generation options available to them, particularly in relation to linguistic specificity.

It is not surprising that having reduced access to linguistic specificity sets up challenges for both the aided participant and their conversational partner. Negotiation and co-construction of meaning are part of all conversations, but they can occur with explicit overtness in conversations involving aided communication (Clarke, 2016). Co-construction can occur over several turns as speaking partners confirm, expand and recast until an agreed interpretation has been negotiated or the conversation topic has been changed. Detailed analysis of such explicit negotiations of meaning are relatively limited but one such study was reported by Neuvonen and associates (2022). In this study, the focus was on one of the video event descriptions, the billiard game as outlined previously. Data from 48 dyads were analysed in terms of the strategies used by the aided participant to convey what had happened and the extent to which those strategies enabled partners to retrieve an understanding of the event. Based on the kind of information conveyed four groups were identified. Group 1 (n=11) expressed the main information generally using exact vocabulary and their partners were generally able to easily recast that information, yielding a high accuracy score for both. In group 2 (n=20), fewer elements were expressed by the aided participants and those elements tended to be less exact, often categorised as superordinate labels or descriptions. Not surprisingly, partners were less successful in retrieving an accurate description of the billiard event, based on this more limited information. For the third group (n=11), both the quantity and the specificity of information provided by the aided communicators were reduced. This group relied more heavily on related or approximate words to describe the event and as a result, most of the partners (9/11) were unable to successfully interpret what had happened in the video. The final group found the task very difficult and either indicated they did not know how to describe it, or expressed an element the relevance of which could not be interpreted.

In at least one instance in this study, an element that seemed 'irrelevant' in the context of the discussion was interpreted quite differently once the communication partner had had a chance to review the video. Knowledge of the event enables the partner to decode and interpret the clue, prompting her to exclaim "Oh actually she told me. She pointed over there – we have that game on Wii". This example highlights the essence of the interpretive process – the meaning of any symbol does not reside statically in the word, symbol or icon. It is interpreted in the moment through active cognitive engagement with the act of problem solving. (see also Neuvonen et al., this volume). Given the challenges this kind of interpretive process poses in interactions involving aided communication, it is not surprising that in the study by Neuvonen and associates (2022), age was an important influencing variable and contributed most to

success in general. It is likely that this relationship is complex, as age mediates many factors that might enhance success, including growth in vocabulary, increased meta-communication skills, increased persistence, growth in literacy skills and general life experience from which to draw.

Conclusions

The BAC study includes rich data on conversations between children and young people using aided communication and a range of communication partners. It is important to note that these conversations were triggered by specific tasks (even if the trigger was simply an instruction to talk about a particular topic) and that the impact of the task can create expectations, anxieties and constraints that each play out in terms of the subsequent interactions. Conversations occur in a context – and the context is not neutral. The data presented so far indicate that many of the patterns previously reported from small studies are also evident across this larger sample, and considerable variation. They also highlight the nuanced approach that is important in interpreting these patterns, the importance of reflecting on the time demands and how those play out and the active 'work' that is undertaken by all those involved in attempting to reach mutual understanding. The implications of these nuances for both clinical practice and for the understanding of the nature of interactions involving aided communication require further exploration.

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Communication Aids and Participation

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Communication aids have been found to enable children with speech impairments to communicate, learn, and interact with others. However, research also suggests that the use of communication aids present multiple challenges when interacting with others and participating in real-life situations (e.g., Light & McNaughton, 2015). For example, use of communication aids with speech output for peer interactions is associated with reduced efficiency and effectiveness. Some of the factors contributing to reduced efficiency and effectiveness include time and timing in interaction with others (e.g. see Higginbotham et al., 2016), limited vocabulary to express precise ideas (Deliberato et al., 2018), and limitations on the use of technology in certain environments (e.g., noisy, outdoors). Reduced expectations of people in the environment to the independence of young aided communicators may also influence communication development.

These challenges become even more complex for aided communicators who have motor impairments necessitating the use of alternative methods to access vocabulary, such as switches or eye-gaze operation, which differ from pointing without some interface. The motor impairments pose additional challenges to participation in two ways: first, the children have limited ability to manipulate the objects needed to take part in play activities with other children; and second, their access methods add complications to communicative participation, including cognitive demands (Batorowicz et al., 2016; Stadskleiv et al., 2014). The need for extended time to compose messages may interfere with the temporal and sequential organization and flow of conversational interaction (Clarke & Wilkinson, 2010). Participating in social interaction is associated with long-term development of cognitive and linguistic competency and skills, as well as social and emotional benefits (Petrenchik, King, & Batorowicz, 2011). Potential barriers to participation can thus have profound impact on a child's development and quality of life.

WHO (2001) defines participation as 'involvement in a life situation'. This definition has been expanded by Imms (2020) to include two key components of participation: *attendance* and *involvement (engagement)*. The attendance element of the participation construct ('being there') has been studied in relation to children with disabilities using a variety of measures, such as time-use devices, self-report or proxy report, as well as diary and survey studies (Adair, Majnemner, & Imms, 2020). Attendance has been a marker signifying inclusion in everyday activities; yet, attendance alone does not assure participation, much less communicative participation.

Involvement can entail what the child does (i.e., observable performance), but it also covers less easily observed dimensions (Imms, 2020), including what the child thinks, attends to, knows (cognitive involvement), and feels (emotional involvement). Involvement plays a

critical role in child development (e.g., Sameroff, 2010) and can be observed through attention to a child's engagement, motivation, persistence, social connection, and affect (Imms, 2020).

Participatory involvement is more complicated to study than attendance, because of the cognitive and emotional dimensions, which are personally experienced phenomena that occur at the level of the individual. Involvement is also reflected in how the individual interacts within a specific context, defined as activity, objects, place, people (Batorowicz et al., 2016). Exploring participation by focusing on aspects of involvement raises questions about what constitutes success, what differentiates "participation" from "communicative participation", and who judges what is and what is not successful from moment to moment. Communicative participation can be thought of as a kind of social engagement, in which the child is motivated to participate in meaningful interactions, such as sharing personal stories (Soto & Starowicz, 2016) or having a conversation about a topic of shared interest (Clarke, 2016). Reciprocity is a key component (Batorowicz & Smith, 2020). Children who use communication aids may not experience the same sense of autonomy in interaction as children with typical development of spoken language, they often are not in control and are 'talked over' (Soto & Starowicz, 2016). From this background, the BAC tasks were designed to put the children in control of the conversation by providing them with knowledge of what needed to be accomplished in the interaction, which was not known to the communication partners.

The BAC project has used a multifaceted approach to explore the participation attitudes and strategies of 5-15 years old children using aided communication. The children were asked about their views on communication aids and their own experiences using aided communication, and they were observed while participating in a range of tasks with peers, teachers, or parents, including topical conversations and goal-oriented tasks, when they were given control over the situation. Thus, the BAC tasks moved away from the didactic interactions of school and therapy sessions, and instead frame participation within contexts that level the playing field. The co-participants in the interactions (adults or children) were obligated to solve communication puzzles, alongside the children who used aided communication: all were involved.

Children's Perspectives on Using Communication Aids

The BAC project applied a semi-structured interview guide to allow the children who use aided communication and a reference group of children who use natural speech to share their opinions about aided communication and the aided communicators' own use in interactions with others, and to express their opinions about their interactions and their communication partners.

When asked how they felt about their communication aids, nearly all the aided communicators expressed satisfaction with their own current system. About half of them (out of 32) mentioned that it was *great, good, nice, or easy to use, helps to talk and they like it*; while around 16 percent of the children thought that it was *difficult, tiring, and annoying*, and six percent did not express an opinion. When the children from the reference group were asked to think about what it might be like to use a communication aid, all the children voiced

their concern, 70 percent of them (out of 20) said that it would be very difficult. The rest of the reference group said that it would be *very bad*, *irritating*, or that they *cannot imagine.* About 40 percent of the aided communicators said they could always communicate what they wanted, while an equal part of the group said they could not always communicate what they wanted. In the reference group, half of the children thought they could always say what they wanted, while 20 percent said that they could not.

The aided communicators mentioned issues with their communication aids, how it is time-consuming to use them and challenging to search for the right vocabulary. One aided communicator said: *Takes a long time, hard to find words* and another mentioned: *OK, but takes a long time*. The children in the reference group also talked about the issue of time. One child said: *Must be hard, takes a long time*, and another captured how the time it takes to communicate with aids is related to difficulty in constructing the meaning: *Takes a long time to say something, often we have a hard time finding out what it is all about.* The aided communicators also mentioned a lack of reliability of communication aids technology and difficulties in using them in daily interactions. For example, one child said: *Works fine, but often problems with software.* They indicated how difficult it is to use communication aids in general and specifically in settings with peers, as illustrated by these excerpts: *Harder to get my thoughts out* and *OK, but difficult in class.*

Other issues they raised spontaneously about technology included the desirability of access to voice output to express their ideas and a desire for rate enhancement to speed up communication and help them keep pace with peers. These suggestions are consistent with their expressed frustration with how slow communication is and how many did not indicate group discussion as a favourite context. One can also infer that difficulties reported with group conversations (see below) could be related to modality: use of communication books and low tech displays requires a partner to be close enough to follow the aided communicator's selections, something that is not easily accomplished in a group without an intermediary voicing the aided messages to the group. Higginbotham and Wilkins (1999) point out that "Although the issue of time and timing in interaction is a joint problem, it is still fruitful to examine possible points in the interactional system that could be improved to ameliorate any difficulties. One aspect that must be tackled concerns the augmentative communication technologies used by augmented speakers. The input and message display characteristics of these technologies place limits on the speed of message output, the manner and ease of message processing by one's interlocutor [...] Slowness in message production leads to frustration, misunderstanding, and reluctance on the part of the addressee to communicate" (77–78).

The aided communicators wished for changes related to function and communication rather than appearance, as they asked for more vocabulary or speech output: *Aid should contain many more pictures, more pictures, gestures, smiles and expressions*. One child in the reference group mentioned that *Device needs to work quickly to get from your thoughts to voice to keep up with fast communication.* The children also mentioned the importance of familiarity. When asked about ideas for communication aid, one child said: *Something with sound and also fast, and a system that everybody knows*. This might indicate that aided communicators, contrary to what has been maintained by Light and Drager (2002), are not really concerned with the appearance of their communication aids (von Tetzchner et al.,

2010). The international sample could also reveal cultural differences in the values. The aided communicators had few suggestions for changes or improvements to communication aids, suggesting, for example, internet connection. This suggestion might reflect that they had little experience with communication aids other than their own, and thus were unable to imagine how a device could be different.

Partners and Topics

The majority of aided communicators (65.6 %) and all the children in the reference group indicated one of their parents to be their favourite communication partner. In addition, about 35 percent of the aided communicators mentioned a brother or sister as their preferred communication partner at home. In both groups, most of the children named a specific child and a specific teacher as their favourite communication peer and adult partner at school. In the aided language group, about 30 percent mentioned their personal assistant, whereas 25 percent of the children in the reference group had no adult at school who as a favourite communication partner. Almost half of the aided communicators named a specific adult or peer that they did not like to communicate with, while most of the children in the reference group did not identify anyone (45%) or gave a name of a peer (40%).

In both groups, the children most often identified their parents or siblings as the easiest communication partners (about 35 percent). In the aided language group, about 35 percent preferred to communicate one-on-one and 30 percent of the children in the reference group had the same preference. By contrast, half of the children in the reference group preferred group interactions, while 25 percent of the aided communicators had the same preference (see also Drosopoulou et al., 2022).

There was a large variability in terms of the favourite communication topics mentioned by aided language group and the reference group. The topics mentioned most frequently by the aided communicators were ‘nothing and everything’ (15.6%), boyfriends, kissing and love (9.4%), as well as forbidden topics (9.4%). In the reference group, 30 percent of the children said they preferred to communicate about sport-related topics, such as football, tennis, or riding.

Half of the aided language group said that they did not communicate with strangers, or they did not know what it would be like to communicate with people they did not know because they had not experienced this. About 44 percent of the children who had previous interactions with strangers indicated that this communicating was good or exciting, while the remaining children said that it was difficult, not a good experience, ‘nasty’, or something you have to get used to.

Almost half of the aided communicators readily named a specific adult or peer that they did not like to communicate with, while most of the children in the reference group did not identify anyone (45%) or gave the name of a peer (40%). Clark (1996) notes that “When speakers need extra time to plan utterance, that isn’t their problem alone. The time they need belongs to them and their addressees together, so they have to coordinate with their addressees on the use of that time... most problems in using language are joint problems and dealing with them requires joint management” (p. 266).

Children's Communicative Participation: Opportunities, Time and Access

The children in the aided language group, relative to the children in the reference group, had very limited opportunities for activities and spending time together with peers (Batorowicz et al., 2014). Interviews with parents and professionals also revealed that the young aided communicators had limited participation and a lack of availability of the communication aid in many everyday situations (von Tetzchner et al., 2018). The BAC interviews highlight how communication partners were always in hurry and aided communicators could be left by others in the middle of composing a message (Batorowicz et al., 2014). They aided communicators were also often removed for self-care activities while their peers enjoying play or eating together (Batorowicz & Smith, 2020).

Furthermore, when the children were asked to converse with their parents and peers about favourite activities and who they want to become when they grow up, the children using aided communication took significantly longer to communicate their ideas than their peers and were generally much more succinct (see Hass et al., 2020). The average duration of the conversations of the aided communicators was approximately 15 minutes, whereas the average length of the conversations in the reference group was about 5 minutes. The substantial effort required to generate messages using a communication aid made the communication partners speak disproportionately more than the aided communicator, such as in this conversation between a child (C) and the partner (P).

C: *"When I grow up I want to be a teacher."*
P: (Gasps) *Oooooo that's a good thing to want to be! Why would you want to be a teacher? What do teachers do?*
C: *"Bus Driver."*
P: *Or a bus driver. Ya I know you've talked about wanting to be a bus driver a lot too.*
C: *"When I grow up I want to be a."*
P: *What?*
C: *"Chef"*
P: *Mmm you like eating. You want to be a lot of things! You like eating and you certainly know how to cook brownies.*

On some occasions, adult communication partners seemed to focus on the device rather than on topic of conversation, and included adults talking about the device when asking a question. Also, they used the SGD as a resource, reading the answers on the device's screen and not waiting for the children to speak or outload their messages. For example, one mother said: *You tell us on your device, is there anything on there that you would do? What would be some things?* In the following example, a child (C) and parent (P) have been told to talk about their favourite activities.

P: *The school has a pool so they swim at the school.*
C: *Yeah.*
P: *But that's not what you want to do, you don't want to go swimming?*
C: "No" (shakes head).
Pt: *What is this? What are you trying to tell me?*
P: *Computer?*
C: *Yeah.*
P: *Computer, that's this. Use your fingers. Use your digits.*

The detailed analysis of the communicative participation of the aided communicators using indirect access methods (i.e., scanning with one or two switches or step scanning) revealed that they spent 82 percent of the entire interaction to compose a message, while only 12 percent of the time was spent on social closeness and communicating (e.g., eye-contact, speaking out the message). The partners' behaviour during the aided utterance production varied, but parents often left the room, for example to put on the kettle, or were checking their phone, texting, while peers seemed bored (some expressed this), spinning around in a chair or running, or tried to offer their answers and take control over the interaction (Batorowicz et al., 2017).

Time and access in participation using aided communication thus concerns a trade-off between co-construction and independent access. Overall time did not differ in terms of access method: direct, scanning with switches, and partner-assisted scanning. The aided communicators tried to figure out what to say and how to say it, often looking for vocabulary or using what was most efficient, given context and communication partner. Collaboration and problem-solving while communicating together with partners seemed critical to involvement.

Participation as Friend or Foe

Together, the BAC findings highlight the inherent 'friend or foe' complexities associated with using aided communication in participation. On the one hand, communication aids enable participation and independent expression, while on the other hand, communication aids are cumbersome to use, slow communication, and prevent timely interactions with more time being spent on composing a precise message, rather than on being engaged in wider social interaction. When performance and precision are required all the time, there is little room left for fun and social connection, which are critical factors to both successful interaction and children's development.

Participation Settings

The BAC findings point to profoundly limited activity contexts and time spent with friends outside of classroom settings, where children who use aided communication are mostly requested to 'perform' and show their abilities, or are simply attending. Participation with the same peers over time is needed to form bonds, make connections and develop sustainable long-term relationships.

About half of the reference group and one about one-fourth of the aided communicators preferred group interactions over one-on-one interactions. The children did not elaborate on why they did not rate group interaction as preferred and future research should probe this topic. There are many ostensible reasons (e.g., time constraints, the need for focused attention to construct messages, or being bombarded with more questions or turn opportunities than can be handled). However, without the children's own explanations, professionals could be missing crucial information. Given the increasing prominence of group projects in many educational settings, particularly for older children, research attention should be paid to intervention and support to facilitate ease of communication in group situations.

Success: Involvement as Collaboration and Co-construction?

More is needed to understand the roles of aided communication within the broader multimodal profile of human communication. Communicative participation can occur through multimodal means, and within family contexts these dominate, backgrounding the role of communication aids. The BAC studies so far have shown how affordances of communication aids can be used well or poorly, depending on the partners' flexibility in shifting from a literal to a metaphoric interpretation of graphic symbols.

Both groups of children were similar in their responses to questions about what they did or did not like to talk about, but only the aided communicators expressed that they sometimes could not discuss what they wanted to discuss because of lack of access to the necessary vocabulary. This problem is well known in AAC research and intervention. The BAC findings consolidate knowledge that vocabulary must support the topics that are prevalent in the child's community, and ideally should include access to "taboo" topics at some level. Because collaboration or co-construction with the communication partner is essential in meaning making (Smith & Murray, 2016) and involvement, achieving strategic competence may be more important than operational competence, as have been noted before (Mirenda & Bopp, 2003).

Achievements of Aided Communicators: Performance and Fun?

Most research has focused on what children who use AAC cannot do and their challenges, and researchers often used the term 'passive' in reference to children who use communication aids. However, it is equally important to focus on these children's multiple achievements because they have the ability to express independent ideas and participate when given time and opportunity. Although these children might have provided less information because using aided communication takes time, they could talk about their own unique perspectives. The findings of the BAC studies highlight the following:

- Regardless of communicative abilities, the aided communicators presented unique ideas and their conversations most likely reflected their own personal life experiences. The children's perspectives are important to consider. They may influence how often children participate, and how engaged they are.

- Insights into how aided communication can function as both a facilitator and a barrier to a conversation between a child and a communication partner. For example, an electronic communication device may provide children with little or no natural speech with their own voice. However, much focus is on the device rather than on content of conversation, meaning, and social interaction. The children in the BAC project used unaided modes of communication to support the aided language constructs, and it is important to pay attention to and accept expressions in all modalities.
- The need to support meaningful engagement and communicative participation of children and adolescents in a variety of environments and social contexts in a way that underscores importance of both: serious conversation about non-trivial topics, genuine reciprocity with peers, and true communicative participation. There is an inherent tension between the goals and techniques of supporting communicative participation in play or in "hanging out" with peers and the development of a formal language system, including relevant grammar and precise word choices. Researchers and practitioners still have much to learn about the balancing act to support fast-paced, informal discourse in some moments, and increasing levels of precision (word selection, grammatical structure) in others (see Jagoe & Smith, 2016).

Implications and future directions

Children's perspectives are important and add to the knowledge base about what it is like using aided communication. Knowledge about child views could be useful for planning adaptations to ensure that the best opportunities and supports are offered. Furthermore, BAC findings point to the importance of discovering a right balance to allow the child to engage in language building activities that may require meaningful and precise communicative participatory contributions (i.e., performance or training), but also moments with peers, with involvement and engagement that is not dependent on complex expressions but still adds to a sense of belonging.

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After BAC – Participants' Reflections on Involvement in Research

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The preparation, delivery, evaluation and dissemination of research may include many contributors. Across the BAC project's development and delivery, we heard many contributors with different backgrounds and from many contexts. They included the research team with backgrounds in education and special education, speech and language therapy, psychology, occupational therapy and linguistics. These researchers denoted several languages and cultures across the 16 countries represented. This team did the lion's share of project development through to dissemination of BAC findings. However, to just focus on their reflections, as per their presentations and publications, would not do justice to the many other contributors and the impact of the BAC research on those contributors. They gave their time, often during a work week or more, or spread over a longer time period. We take time now to reflect on the participant groups and how they enriched the study, but also, we take a moment to consider the impact the research may have had on them. For example, the project may have influenced the perception of professionals and family members about the communication potential of the aided communicators and how much they could improve their communication abilities.

These participants include the children and young people who used communication aids, their age-matched peers who acted as a reference group, the conversational partners within some of the research tasks (friends, teachers, parents), and finally parents and professionals who offered their time in interview to reflect on their young persons' achievements with aided communication. There were many perspectives gathered across the BAC project with many stories reflecting different cultures. So, today we seek to bring you some of these stories as they reflect opportunities that arose some time after involvement in the BAC research. These post-BAC stories resonate with the work of Shen and associates (2017), who considered the impact of the research design or approach on feelings of inclusion and quality of life for participants and others involved.

The final presentation of the morning could have focused on the reflections of the adults we included in our interviews, with their opinions expressed about the impact of aided communication on their young people. This drew to our attention the fact that we only completed a short interview with the aided communicators and their peers at the end of the data collection period. Here we asked the young people for a comment about their involvement in the BAC project and we had not intended any follow up with the young people after the BAC research data collection. These reflections reminded us that more often than not, researchers parachute in, collect something that they are interested in, and then leave never to know anything more about the young person or their support team. As luck would have it several of us continued to be involved with some of the young people and were able to follow up with

them. This session hears the voices of the young people (Smith & Murray, 2016). It is delivered through the lens of the aided communicators' aspirations, motivations and their sense of fulfilment and is not so much reflected through the lens of BAC. We appreciate an opportunity to share some personal achievements and offer their thoughts as the main content for this presentation session (see all video material). We have many reflections to offer but today we offer reflections from Brazil and Norway.

Luciana

We introduce you to one young person from Brazil, Luciana Orane who was specifically supported by Catia Walter and Leila Nunes (State University of Rio de Janeiro), Débora Deliberato (Paulista University, Marilia) and Maria Amelia Almeida (Federal University of São Carlos). At the time of the BAC research data collection, Luciana was 14½ years old and had used a printed communication board with Picture Communication Symbols (PCS) since she was 12 years old. Medically, she could be described as having cerebral palsy, presenting with characteristics of athetosis with dystonia. Luciana has severe motor difficulty (Gross Motor Function Classification System Level V). Her educational history shows that she attended a special school for three years, followed by regular school for two years. After this she was home-schooled. Over time she received a range of interventions, including speech and language therapy, occupational therapy, physiotherapy and specialist education. She received a communication aid with speech output when she was 26 years old (2020), and she started to operate her computer and her iPad using eye gaze. Moreover, after the increase in engagement in communicative acts, Luciana began to emit sounds and words more accurately.

After Luciana's involvement in the BAC project, a few things appeared to co-occur. For example, professionals started to see more ability than inability and this made them facilitate increased opportunities for communication. This change in perception and attitude had a positive impact on Luciana's expressive communication (*see Video 1*).
This included Luciana writing a book about her life and delivering a Blog post (http://historiasdaluciana.blogspot.com).

Along with the change from using a communication board to using a speech generating device, a change in motivation was also observed. This appeared to support her completion of elementary school through online teaching. It seemed that before Luciana's involvement in the BAC project, she had no intention of further study; after participating in the BAC project, she went on to graduate from high school through online study. Her current aim now is to gain the necessary qualifications to apply for university (*see Video 2*). She reports that she is helping her university professors in the initial training of pedagogy students, where she acts as an aided communicator and guides the students to become effective communication partners. This demonstrates the importance of including participants as co-researchers, pointing to practices and new paths for future research (Murray et al., 2021). We look forward to hearing of the next instalment for Luciana.

Hanne and Erik

And next our story related to BAC participants comes from Norway. This should be contextualized in the services available in Norway. Norway is a welfare state, meaning that certain services and resources are available to all. All children with cerebral palsy are offered regular and systematic follow-up through the specialized health care system. The children and young people involved in the BAC project would receive regular cognitive appraisal (typically at 5-6, 12-13 and 15-17 years of age). As an aspect of the cognitive assessment, it is natural that the follow-up includes assessment of communication and language. In this context, this would include an evaluation of aided communication and language skills. In Norway, follow-up assessment and recommendations offering access to communication aids are freely available. All children in need of any AAC have a legal right to attend kindergarten and since 2012, the Norwegian Law of Education gives AAC users the right to education in a language mode they can understand and use.

The BAC project includes ten aided communicators from Norway. Of these, five were assessed at least once after participation in the BAC project. These assessments all confirmed age-appropriate cognition. From the group of ten, several have gone on to be advocates in the media about the use of aided communication and the importance of having access to a language.

A very recent example is the story of how two young aided communicators, Hanne and Erik, met at a museum and started talking. Their ability to 'strike-up' a conversation or start chatting was only possible as both had access to aided communication. This initial conversation has led to many things including Hanne and Erik being a couple for more than three years now. They were interviewed on the seven o'clock news on May 31st 2022 on national television – which is the largest news broadcast in Norway. In the interview, they shared their experiences of not having access to expressive language and how being given that access through aided communication changed everything. See *video 3* for more explanation of their personal experiences.

We are grateful for these insights into the life-lived experiences of BAC participants. These windows into the world of some of the BAC participants is a salutary reminder that after research, life continues. It forces us (and other researchers) to ask what impact our research might have on the participants, their families or the professionals who support them, or those who seek to extend research exploration by setting new questions and attempting to answer them. Such issues are generally poorly considered within a research context and rarely addressed.

The reflections of the BAC team point to wider perspectives in research, including the impact of the commentary from different participant groups. This has led us to consider a body of research on defining roles in research. Specifically, we might review how we include potential participants in different research project roles, such as advisors, consultants, co-researchers as well as the traditional participant roles.

In the contexts offered in this presentation, the BAC exploration started out with a keen focus on the developmental processes underlying aided communication and with a rather traditional view of participants. We sought to demonstrate participant actions and reactions to tasks we had developed to enable them to demonstrate their language abilities, problem solving and interaction strategies (see other presentations in this volume).

Perspectives on Participation in Research

Seeking BAC participant insights through a more recently attained commentary about how being involved in the BAC research affected them (and possibly those around them) is a rarely-reported aspect of research. The BAC investigation is not in a position to scientifically report these reflections but presents thoughts and perspectives that may inform future research methodologies through its on-going connectedness to its participants. This led us to reflect that different research roles for those with a 'life-lived' experience can be so much more expansive than merely being the traditionally understood role of participant. Moving forward, considerations of how to enable the active involvement of all parties with a vested interest in the research topic at all stages of the research process is promoted for ethical, democratic and epistemological reasons (Jayes et al., 2021; Moulam et al., 2021; Murray et al., 2021). Research findings involving the participation of people who use AAC may be of practical relevance to those who aim to develop services, quality indicators or investigate aspects of the development of public and participatory services (Nind & Vinha, 2012). These perspectives cannot be claimed as an initial BAC endeavour but over the years and the changes in what research can or should consider, we are humbled to be able to share the reflections of those who have contributed to the BAC data set and can now reflect on their own achievements. They encourage us to continue to do better, explore better and seek useful answers to how to achieve better outcomes for all involved. It is fitting to end with our participants' achievements front and centre of the BAC endeavours.

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Reflections on the discussions

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The study day presentations were followed by discussion sessions in the afternoon. To allow for more attendees to engage in the discussion, the attendees were divided into six groups. Following the expressed preferences of the attendees, two groups focused on theoretical and methodological issues and four groups on clinical issues. However, all the groups engaged in both research and practice debates, and the issues are not clearly separated in this review. The discussion groups were multicultural (contributors from Africa, America, Asia and Europe) and multidisciplinary, and also included parents of aided communicators. There was no common agenda in the groups. The morning presentations constituted a common focus but the afternoon groups approached the discussion in different ways, although with a specific reference to cognitively well-functioning aided communicators, like those who participated in the BAC project. Some issues were introduced by the moderators, but the attendees were encouraged to lead the discussion, reflecting on the ideas and results from the BAC study as well as presenting their own ideas. Some topics were discussed in all or most of the groups, while some issues were raised in one or two groups only. This reflective review is based on the notes and recordings from the discussions and includes the major issues that were discussed, as well as relevant references to the existing literature. The bibliography includes publications referred to in the text and other publications suggested by attendees as relevant to the discussion.

The Nature of Aided Language

A main issue relevant for research and practice alike is what kind of phenomenon augmentative and alternative communication (AAC) is, and specifically what kind of phenomenon aided language is. In the discussion, some attendees suggested that AAC is anything that supports the development of language and communication use. Others found this broad definition problematic as it would imply that AAC includes all pre-verbal or non-verbal communication observed in typical development.

The discussion also raised the question what exactly is meant by aided language, what is included and what is excluded in communicative interactions involving communication aid use. Children use aided language because their speech is lacking or unintelligible to most people. The intention behind aided language intervention is that the communication aid should wholly or partly fulfil the functions speech has in typical development. Aided language may thus be defined as the use of communication aids in face-to-face conversations, including

boards and books and electronic devices with speech output. They may contain graphic symbols, letters and words (von Tetzchner, 2018). The multimodal nature of aided language is often emphasized, as graphic constructions may be supplemented with deictic and symbolic gestures and pictures. Aided communicators are described by aided language constructions representing their main expressive mode (von Tetzchner & Basil, 2011). Also, to be noted, typical spoken language is multimodal, as speakers produce gestures and show pictures that coordinate with their spoken utterances, but this is not considered augmentative and alternative communication (Cook, 2022). In both aided language and spoken language, symbolic pointing, gestures and pictures may be used to relay the meaning of missing words or graphic symbols. As many aided communicators have a relatively small set of graphic symbols in their communication aid vocabulary, they may use these additional modes somewhat more frequently than typical speakers. How multimodal aspects of message transmission are conveyed, recognised or acknowledged within an interaction or conversation remains worthy of further exploration and understanding. However, similar to the many studies where the children's receptive and expressive language was studied independent of gestures (e.g., Brown, 1973; Nóro & Mota, 2019; Tomasello, 2003), in the BAC project, the aided language constructions of the young people were the main object of study.

Of note and debate, from a theoretical point of view is to what extent aided language has its own evolved characteristics and to what extent aided utterances correspond to and mirror the spoken language of the society (von Tetzchner et al., 1996). The child's language comprehension and possible use of natural speech, even if only understood by those closest to them, are part of the foundation of becoming a competent aided communicator. Results from the BAC project clearly show the complex relationship between aided language construction and spoken language production (Murray et al., 2018; Neuvonen et al., 2022; Smith et al., 2018).

How people in the environment view aided language has implications for how aided language users are met, accepted and supported. Practitioners' conceptualization of aided language will inform what they identify as useful to train and what strategies they will apply. As developmental change-agents in communication, practitioners need insights into the psycholinguistic processes related to construction of aided language utterances. They need the tools that theories and concepts represent as a foundation of their work.

Aided language modes may relate to the use of graphic symbol or orthographic writing. In principle, spelling makes it possible for the aided communicator to produce any written word. However, the challenges many aided communicators experience with spelling (Smith, 2005) and the consequences of less varied language experiences with vocabulary availability or use (Lund & Light, 2006), may impact their aided language competence, and hence their communication possibilities. The issue of acquiring literacy skills was also raised in the context of aided communicators benefiting from other or additional teaching and learning strategies than those used to teach written language to children with typical development. Related to this, study day attendees pointed to the patterns in the BAC data that suggest that participants who used either a text-based or the more linguistic graphic system Blissymbolics (Bliss, 1965) or semantic encoding systems such as Minspeak (Baker, 1982) were more successful on many of the tasks than those who used PCS (Dada, Huguet, & Bornman, 2013) or other mainly pictographic systems. The study day discussion concerned the interpretation of these BAC

findings. It was emphasized that the nature of the relationship of graphic language learning and literacy-related language learning remains unclear, particularly as data from the BAC study are cross-sectional and therefore cannot say anything about developmental trends cross-linguistically, but that it is possible that more specific instruction and guidance are necessary in order to support both literacy skills and competence in using ideographic-linguistic systems such as Blissymbolics for effective communication. The instruction processes themselves might be key factors to be considered and revisited by all.

Some study day attendees described the more typical utterances produced with voice output acknowledging that the spoken words of aided communicators are different and more challenging to produce and comprehend than the spoken words produced by natural speakers. This difference was also highlighted by the examples available from the BAC reference group. Unlike in typical speech production, aided communicators have to navigate the aid to build the structure of a sentence to convey their intended meaning or conversational ideas. It was also noted that the presence of voice output may further hide the need for explicit negotiation of understanding as the 'spoken word' may have even more weight as a unit of meaning than a selection of a (non-spoken) symbol or letter. There was quite a wide-ranging discussion on the magnitude of the shift from communication boards and books (low-tech) to tablets and other electronic communication devices (high-tech) in the AAC field. Since the technical revolution, the availability of speech output has been considered an important aspect of aided language output (Smith & Costello, 2021). One attendee illustrated the importance of the availability of a device with speech output via a case study about a man who was 40 years old when he received his first electronic communication device. He said that through his communication aid he builds his inner voice; he is thinking and even dreaming in his own inner voice, acquired through use of the speech output device.

However, it was also debated that early use of electronic devices may change how graphic symbols are perceived and introduced; perhaps without being well thought through or researched. Especially illustrated by the increasing implementation of technology at an early age (with their associated vocabulary packages) without a period of communication book or board use, the latter demanding that everyone considers what language is needed and where it is positioned on the low-tech system for the young person. Lack of such discussion among professionals and the family may have long-term consequences for aided communicators. Another impact of the technological revolution was described as a less active role of the communication partner in co-construction of messages, which may impact the communication exchanges negatively, even into adulthood (Smith et al., 2010). However, study day discussion also recognized that there is no going back from technology. Even so, the study day discussion illustrated the importance of studying communication with a variety of communication aids and from different developmental perspectives and different conversational partner contributions.

Methodological Issues

The participants included in the BAC study, who belong to the expressive language group (von Tetzchner & Martinsen, 2000), were experienced aided communicators and used their own

graphic systems in the tasks. Attendees inquired whether the researchers also provided relevant vocabulary to complete the tasks. No additional vocabulary was provided as the study investigated what the aided communicators did with what they had access to. Many studies provide a topic board with the vocabulary the researchers believe is needed, but it is uncertain what the performance shows as it does not reflect the actual communication situation of the aided communicator. The available vocabulary of the participants was registered, so it would be possible to compare the vocabulary used to the vocabulary items available. However, some users of the Minspeak system had 10,000 words available – and it was not possible for the project to assess the actual comprehension and use of all vocabulary items.

One attendee asked how the participants in the study reacted to the assessments and tasks. The participants were asked about this in an interview after the data collection and most had found the tasks interesting. Many of the teachers mentioned that similar tasks would be useful in intervention. The variation in performance also indicated that the tasks were well designed to show skills and challenges.

Conversations

Participation in various conversations may be regarded as the main function of language use involving two or more individuals (Clark, 2018; Donnelly& Kidd, 2021. Consideration of the children's management of different types of conversation is a core issue of the BAC project investigations, especially conversations where there is exchange of information unknown to the communication partner(s).

Most of the topics debated in the discussion groups were concerned with conversational issues. The BAC results presented showed that aided communicators used a variety of strategies in becoming understood within conversations. These strategies related to partner and context, and sometimes showed original or idiosyncratic forms that were different from what might have been expected. One question that was raised was whether professionals are trying too hard to match aided utterances with spoken sentences as part of a conversation, and not paying enough attention to the special characteristics of aided systems and their impact on conversation. For instance, aided communicators may construct utterances that differ, in both structure and content, from those that naturally speaking adults think they should produce. That said, sentence construction is crucial for effective communication in conversations and has always been an important intervention goal in aided language intervention (see Kraat, 1985). However, how this is best done with different symbol systems is still a matter that needs to be researched. Research on aided conversation strategies often report on clinical intervention sessions or sessions taking place in educational settings (e.g., Pilesjö & Norén, 2017; Soto & Clarke, 2017, 2018; Waller et al., 2013) but there are exceptions (e.g., Clarke & Wilkinson, 2007, 2008; Savaldi-Harrusi & Soto, 2018; Savolainen et al., 2020). Although most of the data collection in the BAC project took place in schools, the tasks were not part of an intervention and the BAC aim was to investigate everyday conversational skills and strategies. How conversations mediated by aided communication progress has received more research attention in these last years but still remains under researched and practitioners may be uncertain how to address this

in their intervention supports. The study day discussions of conversations and how they are conducted suggest that this is a topic for much greater consideration both in research and in practice.

Vocabulary

Vocabulary selection remains a major concern in aided language intervention and the study day discussions addressed a range of issues, from the age-old nugget of the need for quick interaction options (single hit: 'I like ice-cream') to the place of novel (word by word) sentence generation. An important distinction needs to be drawn between the vocabularies in the communication aids and the users' mental lexicon, and subsequently, the users' strategies for expressive vocabulary construction (Deliberato et al., 2018). Results from the BAC project highlight that – like spoken words – graphic symbols may be polysemous (Carston, 2021) and used with different senses or meanings in different situations.

One attendee suggested an intervention approach including setting up pages for clue-giving or strategic use – enabling the aided communicator to guide the inferencing process of the communication partner. Some of the strategy features of for example, the Minspeak and Blissymbolics systems, could be very valuable in supporting both aided communicators and their partners to think explicitly about concepts and their meaning negotiation. Specific examples presented included the use of 'similar to', 'sounds like' and 'opposite to' – each of which require explicit instruction from the aided communicator and which engage the partner in collaborative and explicit negotiation of meaning.

Stored messages can be a useful conversation strategy (Todman et al., 2008), but mainly when interacting with new people and in situations where a more rapid response is required or expected. Discussion recognised that repeated use of the same stored messages may become repetitive and make the conversation boring or meaningless.

A vocabulary tension was acknowledged in relation to considering the cognitive level of the aided communicator, and then either introducing (i) the 'one-shot' options to get into a conversation at speed, or (ii) demonstrating and developing linguistic skills through word-by-word sentence construction. As there was a sentiment that devices can be viewed as "magic wands" that will release the communication that is locked inside the individual, one group concluded that there is a need for an understanding of why and when phrase-level utterances and word-by-word constructions should be considered and included (see Iacono, 1992).

Another discussion point was the tension that exists between providing individualized, personalized graphic symbol systems for individual children and having a shared symbol system embedded within the school environment. Such tensions recognised the need to provide a system that best suits a child's communication abilities and potential even if this is at odds with the environments' knowledge and skill of specific aided communication systems, e.g., 'we are a PCS school'. Some attendees suggested that for aided communicators, the presence of any graphic symbols in the environment potentially validates their own personal system, even if the graphic symbols look somewhat different. A question was raised about the practice of embedding graphic symbols into the environment, for example on drawers and cupboard doors.

Evidence seems to be lacking with regard to a possible impact on the aided language development of aided communicators but it may function to remind staff and peers that there are aided communicators in the class or group.

The discussions led to a debate aiming to distinguish between an individualized *system* and an individual aid *vocabulary*. Of note, there is significant variation in vocabulary among children with typical development who speak the same language (Hart & Risley, 1995; Milton & Treffers-Daller, 2013). Some attendees pointed to the fact that the selection of graphic symbol systems is often based on what is available, either within an environment or within a specific device. From the point of view of staff, many of whom spend only short periods of time with given cohorts of children, the learning implications of multiple different systems may make it less likely that they actively support aided systems. Questions raised in the debate, was how many systems that are actually in use in UK (or in other countries), and, how many systems that are needed for any country to have access to the full range of vocabulary features aided communicators might need.

The vocabulary discussion also included the relative benefits of the concepts of core and fringe vocabularies, concluding that both are important to vocabulary understanding and use. One attendee queried whether the focus should be on literacy enhancement so that symbols can gradually be faded, as one mechanism for reducing ambiguity in meaning negotiation. In reply, it was suggested that the key challenge of a restricted external (AAC system) lexicon was a more powerful influence on strategies for negotiating meaning than the inherent features of any symbol. For example, some aided communicators are spelling but may still need support in developing *communication strategies* that enable them to use what they have learnt in symbol or text format in totally new ways. The concluding question from this debate was how one teaches such strategies. The BAC methodology provides some hints as to a possible direction.

Participation

Participation in social and societal settings is an overall aim in aided language support (Batorowicz et al., 2014). This aim was followed up by several attendees, emphasizing the importance of social and societal participation, while recognising the strong emphasis in the child's context on technology provision. It was suggested that professionals can get caught up in new apps and technology, rather than focussing on using the technology to develop good conversations and so gaining access to participation.

Studies show that in the early years, participation in symbolic play supports language development in children with typical development (e.g., Greaghe, Quinn & Kidd, 2021; Hà, 2022). Participation in construction play supports development of spatial concepts and awareness (Ferrara et al., 2022; Levine et al, 2011). Participation in play is equally important for cognitive and language development in young children with disabilities (Besio, Bulgarelli, & Stancheva-Popkostadinova, 2017). Aided communicators with severe fine motor impairment may miss out on construction play, functional play and symbolic play and the language experiences these afford. Several attendees pointed to a need to move from requesting activities to communication about people, materials and actions involved in different forms of play. In

relation to this, one attendee shared how she had very recently attended a course on seating, and how in this course the idea of participation was emphasized and that she, as a speech and language therapist, could see that this had relevance also for communication. This example has synergies with the facilitation of participation in aided language.

Everyday routines have been highlighted as a participatory frame for language development (Bruner, 1983). Familiar routine events facilitate a shared focus but language development also requires variation in language input, expected output and context (Goldenberg, Repetti, & Sandhofer, 2022). For example, routine talk related to dressing or care might occupy a lot of aided-language training time without enhancing the child's access to a range of conversational experiences. The child might not have a real conversation because everyone is focused on taking trained turns.

As evidenced in the BAC study, some practical challenges persist in that young aided communicators do not have their communication aid available in many everyday situations (von Tetzchner et al., 2018). Some attendees pointed out that failure to provide aid access means taking away the child's voice, and that this may reflect the communication partners' perceptions of when they expect the child to communicate. The points raised in discussions highlighted the complexity of aided language support and the processes of facilitating learning in a truly participatory manner.

Assessment

For practitioners and researchers alike, a recurring issue in aided language intervention is what to assess and how to assess it. Several attendees emphasized that they find it challenging to assess children and adults with severe speech and motor impairments and were interested in new methods for assessment of this group. One important approach to re-emphasize is to alter the response modality of standardised assessment so that it is suitable for individuals with limited fine motor skills (Kurmanaviciute & Stadskleiv, 2017).

Although not in itself an assessment package, the BAC material represents a model for expanding assessment in both research and clinical work. The tasks used in the BAC project were designed to reflect different aspects of aided language comprehension and use. In several of the tasks, the children had to relay information that was unknown to the communication partner. The attendees highlighted that this is an essential feature of language that has been given too little attention in aided language assessment and intervention.

Stadskleiv's presentation elicited a long discussion of possible 'underpinning skills' and what aspects of cognitive assessment should be included beyond standard cognitive assessment. Psycholinguistics is about the cognitive processes underlying language comprehension and use (Cutler, 2005; Fernández & Cairns, 2018). Many of the processes involved in spoken language are relevant for aided language but there is also a need for psycholinguistic investigation of processes specific to aided language, such as vocabulary aid navigation and vocabulary construction (Murray and Goldbart, 2009). Searching for specific items while keeping the intended and partly constructed message in mind may be taxing for executive functions. Physical closeness and shared navigational routes may influence short-term recall of sequences

of lexical items (Dukhovny & Gahl, 2014). There is much research on the possible reciprocal influences of language and executive functioning (Shokrkon & Nicoladis, 2022) but in spite of the obvious relevance of executive skills to communication aid navigation, there are few studies on executive functioning among aided communicators (see Stadskleiv et al., 2014; Thistle & Wilkinson, 2013). Many of these skills support the four types of communicative competence suggested by Light (1989) and Light & McNaughton (2014) and should be given consideration at assessment and intervention stages. Attendees agreed that Stadskleiv's presentation highlighted the need to be aware of the additional cognitive demands for learners that navigating a vocabulary involves when communicating and should be highlighted in any report.

One group suggested that it may be possible to use standardized assessments descriptively, rather than normatively. The range of formal and informal assessments identified and used within the group included:

- Renfrew Action Picture Test (RAPT),
- Marion Blank Language Levels
- The Roadmap of Communicative Competence (ROCC). Includes ten different areas and offers a really functional AAC assessment https://www.roccassessment.com.au
- British Picture Vocabulary Scales (BPVS)
- Test of Reception of Grammar (TROG)
- Resources following Derbyshire Language Scheme for children with language delays.
- Tools to aid informal assessment: Play dough, Mr Potato Head and Lego
- Use of video and photographic evidence for reporting and evaluating change was also highlighted. One UK based example: ISLA Visual Care
- Neuvonen' s presentation highlighted that transcript examples may demonstrate the complexity of aided communication and could be effectively incorporated into assessment reports (as well as used in training activities).

The group recognized that the use of conventional assessments came with some trade-offs: capturing useful data vs the child becoming exhausted vs service delivery constraints, e.g., short term involvement from an assessment centre or a local AAC service delivery perspective. The question was also raised whether phonetics in communication devices could potentially replace graphic symbols. It would be interesting to develop this through evidence-based research, and then testing this with aided communicators (see Ottem, 2001).

Aided Language Development and Intervention

A recurring theme across debates was the identification of appropriate aims for aided language interventions, and what skills and activities these interventions should include. Core questions concerning how to choose between methods of communication and with whom to use differing methods, or where and for what purpose to use different methods of communication all influenced the conceptualisation of intervention aims.

Attendees were concerned that research on aided language focuses mainly on short-term intervention practice and high-lighted the need for longitudinal studies, to gain insight into the developmental processes related to aided language comprehension and use. One attendee

highlighted the quote about conversation being recreation (from Smith's presentation in the morning).

Reflections from all five morning presentations suggested some challenging debate to be had concerning what constitutes training (Lynch et al., 2019). A number of questions were debated.:

- Who is the training for?
- What are the planned outcomes from the training?
- Who will those outcomes impact upon?
- What does "help" look like? (referring to co-construction in utterance generation)
- What should training include? For example, many people receive '12-hours of training on using AAC', but no specifics on what exactly constitutes help or facilitation of interaction, conversation or access to the curriculum and classroom activity, or communication activity outside of the classroom or school.
- Do professionals train peers? How do they do it; and if not done, how could they do it?

The BAC tasks, especially when the information the aided communicator produces is novel and unknown to the conversational partner, highlight the need for different communication strategies for both the aided communicator and the conversational partner. This led to a discussion of how professionals support everyone to approach co-constructed conversations, and whether these are typically part of an intervention package. This led to a further debate about conversational roles and how ever-changing conversational roles reconciles with different approaches to aided language "training" (Clarke, Bloch & Wilkinson, 2013).

Debates suggested that aided language intervention tends to have two foci: (i) generic introductions to aided language use for the team around the young person, or (ii) training content dictated by the communication system chosen for the individual child. This elicited a discussion about perceived values of having a voice (as in speech generating devices) compared to some of the advantages of low-tech options. It was triggered by the BAC excerpts showing conversations with paper-based and electronic communication aids. The debate reflected on the need to explore more overtly where the intervention objectives and motivation are coming from and to better understand decisions to focus on one type of communication system over another, e.g., mentors, staff expectations or experiences. It was suggested that one should try to avoid the possibility that a high-technology (electronic) option is viewed as a magic wand, implying that the job is done by providing a device for the child. Intervention needs to focus much more on the purpose of the device and not the device's 'bells and whistles' (Lynch et al., 2019). With an over reliance on 'off the shelf' electronic technologies and associated language packages, professionals might be prescriptive in their language teaching instead of helping aided communicators build their own language together with independence and creativity. A recurring point in the debate was whether electronic devices should be introduced later in the aided language process. The heterogeneity of aided communicators makes this an interesting point for further debate. Further illuminated by consideration of many aided communicators who are used to having devices for playing games, so when communication apps or programs are introduced on the same device, it makes it very demanding for the aided communicator to now use the device for speech production rather than for playing or gaming. This re-emphasizes

the debate that the child should learn basic communication functions and to operate a paper-based communication book before introducing a communication program on an electronic device already used for playing. One might even consider using separate electronic devices, at least in the phase when moving from book to device.

Currently in the UK, there is a renewed drive to include the 'student voice' in relation to annual educational review and transition reports. The question was raised how to ensure that this happens in a meaningful way for aided communicators. The group(s) all felt they could do more in terms of starting early in this process and introducing debate about aspirations and plans for the next five and ten years as a way to support development, giving the young people a different type of target for aided language proficiency and also to inform staff and help them think beyond the 'year' the young person may be in their classroom. These annual reviews of educational and other interventions are aiming to appraise achievement, one group posed the question whether aims are long-term enough and aspirational enough – with a healthy dose of reality in the mix too. The studies of Wickenden (2010, 2015) are relevant; she interviewed teenagers and young adults who used communication aids about their aspirations.

The possibility of engaging peers in interventions caused attendees to revisit the value of group work. Building from the BAC tasks, participants agreed that games involving the relay of information unknown to the other may change communication partner power and increase enjoyment. One practical example offered, was using a software package 'Art Director' where the students give instructions to build a picture together (with verbal prompts to extend their utterances). One attendee suggested: 'my favourite [outcome] was a pink cat dancing with an angry elephant and a sad man sitting at a table'. However, it also raised concern that peers may be given the role of "teaching assistants," which may interfere with the emergence of ordinary peer relationships and friendships (see Østvik, Ytterhus, & Balandin, 2018a,b; Wickenden, 2011). This debate raised many points for further research consideration.

Several attendees highlighted the relevance and importance of the BAC tasks involving instructing others to do something and how this compared to the everyday lives of children with severe motor impairments, and equipping them to deliver instructions as they will spend much of their life instructing people who support them in daily living tasks and other activities (e.g., family, support staff, peers). It was also suggested that greater focus on how to give instructions might have a positive impact on their cognitive development. This discussion emerged from a reference to the phrase "language for action", used in previous BAC publications. The idea is that some young, aided communicators have such severe motor impairments that independent locomotion and exploration are precluded. Instead, they may use aided language to direct others to do the physical actions that they would have performed themselves if their motor skills had allowed it. One attendee suggested that the BAC physical instruction tasks may be most suitable for younger children and described a group of pupils in secondary school using aided communication whom she was meeting regularly. Instead of describing a physical object or drawing, the pupils shared social information that was unknown to the teacher. The pupils decided themselves what they wanted to tell her. The aided communicators enjoyed knowing something that the adults did not know and this motivated them further to discuss their news. This underlines the importance of tasks that are interesting and suitable, and with some creativity it is possible to design tasks with static visual scenes or video events that are appropriate for adolescents and adults.

One group reflected on reasons for using different types of AAC in different locations and how to support all of these in all contexts of interaction with the young person, e.g., children may use aided communication in school and a different AAC mode at home. Any form of AAC should be valued for its usefulness in specific contexts, rather than judged "less [linguistically] advanced".

Attendees discussed the potential tensions that may arise from different curricula and treatment goals and targets, and how these may differ from those of the child or family. Being mindful of how to sensitively negotiate and navigate these together remains key to long-term achievement for the young person involved. Professionals have such a short time in the lives of young, aided communicators that it is important to consider their 'fleeting but influential role' in supporting the young people and their families for the long term.

Creating an Aided Language Environment

The need for communication partner training was a recurring topic. Professionals need better strategies for guiding parents, carers, support staff and other professionals on how they use their young person's communication board or device, how frequently they use it and the importance of multiple clues as conversational strategies with their aided communicators.

Partner instruction is important, but, cognitively able aided communicators who fulfil *the vision* of social and societal participation will also meet people who have no prior experience with communicating – or even observing – an aided communicator. Cognitively able aided communicators – like the aided communicators in the BAC project – also need to learn how to communicate with people who have little experience with aided communication and who are less proficient in making inferences from aided language constructions. This means that the aided communicator user may have to monitor partner comprehension and the accuracy of partner interpretation of the messages they deliver. It may be an efficient strategy, for instance, to use single-word or single-symbol in everyday life with familiar people who need fewer cues to understand what the aided communicator means. However, when communicating with unfamiliar people, aided utterances may have to be longer and more complex, and conversations may include more turns. Aided communicators and individuals using natural speech both need a varied repertoire for communicating efficiently in different settings and with diverse partners (Light, 1989).

Attendees also emphasized the need to adapt the language environment to create a natural learning environment for aided communicators, ensuring that parents and other communication partners spend time conversing every day so that they learn how to operate the communication book or device and understand their benefits and challenges. In the experience of the attendees, some partners intuitively engage in collaborative discussion about what someone is attempting to communicate while others are more focused on achieving an outcome or "teaching". Drawing explicit attention to conversational strategies and to using the available conversational space in a meaningful way was recognized as an important feature that deserves greater attention.

Many attendees did not find it obvious what they should teach partners to do without turning them into teachers of aided language. They pointed to a need for more research exploring what features of learning contexts facilitate learning in aided communicators, both structured intervention settings and everyday interactions with parents, peers or any conversational partner. Attendees agreed that not every moment should be a teaching moment, and outside of formal aided language training sessions, the days should be filled with non-educational conversations. This debate on teaching conversational skills revisited a point from Smith's presentation emphasising a difference between learning to access a word from a communication aid versus learning how to use the word. Parents and professionals should be careful about "teaching" and correcting their young person all of the time, possibly being in danger of turning all interactions into a lesson in aided communication (see Smith, 2003). There is a balance to be had between regular checking of one's inferred meaning of the constructions produced by the aided communicator and interrupting his or her message construction (see Oscar Wilde's quote from Smith's morning talk). However, this also requires that aided communicators are taught efficient ways of correcting and repairing the partner's incorrect inferences.

Time

The time usage of aided communicators is a long-standing issue, especially time usage among aided communicators with severe fine motor impairments. It was discussed how using aided communication takes time and several attendees related to the experiences shared by Batorowicz in the presentation on participation in the morning. An attendee pointed out that when looking for the best system for the aided communicator, speed of communication was considered the most important factor.

The time usage is important and much work has been directed toward increasing the speed of communication. Electronic devices with word or symbol prediction, and eye gaze technology have contributed to speeding up utterance construction. Partner strategies may also support faster communication. However, a constant attention to speed may be stressful for aided communicators. There may be different contexts for communicating fast and slowly. There may be situations where the slow speed reflects "how the world works" and other situations where one should try to overcome limitations in speed.

When waiting for an aided communicator to construct a message, some communication partners may check the device screen and switch their "interaction" position. Attendees pointed out that it is not really known what aided communicators want the communication partner to do during this time; indeed, giving the aided communicator a means to negotiate their personal view on how to negotiate this was mentioned by attendees. Preferences could be different for a switch user compared to a user who uses direct access. Time must also be framed in terms of what the aided communicator and the partner do during co-construction. One mother mentioned that her child sometimes accepted that she engaged in other tasks, such as "making a cup of tea" while her child formulated an aided message. On other occasions the child might demand the mother's full attention – and this should be respected. Aided communicators need a variety

of strategies for holding the floor, thus speaking to the need for training on how to understand and appreciate this need.

The complexity of time is illustrated in a case study where a young man had used a communication board but wanted to be an independent communicator using a computer. However, he was faster on a board because he and his partner engaged in all phases of the conversation (Smith et al., 2010) this contrasted with the co-construction efforts that were absent from his use of the electronic system. The impact of wait time during utterance construction differs according to partners. Studies indicate that conversations between two aided communicators are less affected than conversations between one aided communicator and one person using natural speech (Clarke, Bloch & Wilkinson, 2013).

The issue of time was also discussed in relation to cultural differences. One attendee explained that in some native American cultures, time is not such a big issue, as whoever is talking "holds the floor" and is at liberty to take the time necessary. In other cultures, and here Northern Ireland was mentioned as an example, conversations tend to be fast in general. Withoutt prejudice, people may jump in or take over if the answer is not fast enough. This illustrates that even though aided communication is a time-consuming method of expressing oneself, the practical consequences and the possibility of participating in a conversation will be different in different cultures and contexts.

It was noted that time pressure may influence vocabulary selection and how the aided communicator copes when lacking specific vocabulary items. For example, it might pay off for the aided communicator to choose a graphic symbol that "works" in the moment, is quick and saves time, for example, using an associated graphic symbol on the current page, rather than navigating to a more precise vocabulary item. However, this expedient vocabulary choice might not make sense to a partner who does not always understand how the child makes strategic use of the vocabulary that happens to be on a page but does not necessarily reflect the exact meaning the child wants. How these differences are considered and valued in different cultures and contexts could benefit from further research.

After BAC Participation

Most studies of aided language that concern interventions have a limited scope and short-term or no follow up. There is a blank slate for further after-project research. The participants of these studies are rarely asked how they experienced their participation and whether the experimental intervention had any impact on their further development of aided communication, therefore such information is rarely reported (for an exception, see Lund & Light, 2006). The BAC participants were asked about their views on participation after the tasks were finished, but the BAC study was not an intervention study and hence no "outcome" measures or follow up were planned. As highlighted by Walter in the morning session, because some of the researchers were in contact with some of the participants as part of their work, follow-up information was gathered about their life and perspectives, including hearing about an appearance on the national news. Moreover, this session led to a discussion that many parents have never met adult aided communicators whose developmental trajectories might be

comparable to what they may come to see in their own child. After seeing the video of an interview with two young adult aided communicators in love, one mother said: “As a new parent, I wish I had seen or known about this level of aspiration or achievement – doctors were very negative in their summary of what would be possible.” This illustrates the importance of showing that aided communicators also have interesting lives and engage in friendship and romantic relationships. For any research group, it makes a significant difference to learn that participation in their project may have actually made a positive impact on the future lives of the young people.

Concluding Remarks

This short reflective review summarises the major issues that were discussed during the afternoon session of the study day. The results of the BAC project offer a glimpse into the potential of aided communicators, both the average development and individual variation in this selected group of cognitively able aided communicators. The BAC study highlights the need for on-going research that includes many participants from diverse cultural and linguistic backgrounds. Such research is time consuming, as it includes in-depth investigations with the development of new data collection materials. This can be challenging but is necessary to take the field of AAC research and practice forward. For example, the length of time to deliver the research itself and its on-going dissemination. A major aim of the project was that it should inspire both researchers and practitioners. Several attendees asked how the research findings of the BAC study could be made more readily available for clinicians, who tend to have little time for reading research papers and also may not have ready access to them. This booklet is one example of how the BAC team are attempting to do this. Alternative methods of distributing BAC research findings, such as YouTube, were suggested, as well as ideas for dissemination that perhaps Communication Matters could continue to support in terms of further dissemination opportunities.

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The BAC Project: Main Researchers

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Marie Amelia Almeida, PhD, is special educator and Associate Professor at the Federal University of São Carlos. Her research is in the area of special education, with special interest in intellectual disabilities, autism spectrum disorder, inclusion, augmentative and alternative communication, teaching strategies and collaborative consultation. She is member of the Editorial Board of the *Journal of International Special Education* and the *Brazilian Journal of Special Education*.

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Sue Balandin, PhD, is speech pathologist and Professor at Deakon University in Victoria, Australia. Her research interests centre on adults with lifelong disability with a particular focus on participation of those with little or no functional speech who require AAC and those who are ageing. She has conducted research into health interactions for adults who need AAC, including several studies on interactions between this group of adults and staff in hospitals. She has studied the impact of dysphagia on those who are ageing with cerebral palsy and has also explored a range of issues around friendships and loneliness for both adults and children who use AAC. She is currently one of the chief investigators of a project exploring safety incidents in hospital where the patients have little or no functional speech. Balandin was President of the International Society for Augmentative and Alternative Communication (ISAAC) 2000–2002.

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Carmen Basil, PhD, is psychologist and retired Professor from the University of Barcelona. Her research is about the development of children with disabilities, especially children with communication and language disorders who AAC. Basil is a pioneer in the field and has contributed significantly to the development of AAC in Spain.

Beata Batorowicz, Queen's University, Canada (beata.batorowicz@queensu.ca)
Beata Batorowicz, PhD, is occupational therapist and Assistant Professor at the School of Rehabilitation Science, Queen's University, Canada. Her primary research focus is enhancing participation and autonomy of children and youths with disabilities. Her research involves developing and evaluating strategies to enhance social interaction and meaningful activity engagement of children who use AAC. Batorowicz is Chair of the Research Committee of the International Society for Augmentative and Alternative Communication (ISAAC) and Associate Editor of the AAC journal. She has authored over 50 peer-reviewed publications, and has given more than 70 addresses, presentations and invited keynotes in professional and scholarly venues.

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Sally Clendon, PhD, is a speech and language therapist and Senior Lecturer at Massey University. Her research interests are focused around access to the curriculum and to literacy learning for children who use AAC. She is working with the *Better Start Literacy Approach* team to assist with the adaptation of this assessment and instructional approach for children

who use AAC. Clendon was Scientific Co-Chair of the ISAAC Conference (2018) and ISAAC Connect, and is presently Vice President of the Executive Board of the International Society for Augmentative and Alternative Communication (ISAAC). She is as an Associate Editor of the AAC journal.

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Annika Dahlgren Sandberg, PhD, is psychologist and retired Professor of the Department of Psychology at Gothenburg University. Her research interests span a wide area within in the fields of child development and disability, and she has contributed significantly to the development of AAC in Sweden, with special attention to autism spectrum disorders, as well as the development of literacy among children who use AAC. In 2009, Dahlgren Sandberg was awarded the Philips Nordic Prize in Neurodevelopmental Disorders for her research on how factors in the social, psychological and physical environment may affect children and adolescents with developmental disorders and how problems can be avoided, including the provision of AAC.

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Débora Deliberato, PhD, is speech and language pathologist and Associate Professor at the Department of Special Education of São Paulo State University (UNESP), Brazil in Marilia and of the Graduate Program in Education. She has long experience with practicing speech and language therapy, mainly in special education. Her main research interests are AAC, interventions in special education, training of professionals in health and education in relation to inclusion of students with disabilities. She has published many articles and several books and book chapters on special education and AAC. She is a CNPq fellow researcher.

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Margareta Jennische, PhD, is speech and language therapist and Associate Professor at the Department of Public Health and Caring Sciences, Uppsala University. She has worked extensively with AAC for many years and has contributed significantly to the development of AAC in Sweden. She was president of the Blissymbolics Communication International from 2016 to 2022.

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Kaisa Launonen, PhD, is a speech and language therapist and in August 2020 she retired from the University of Helsinki, where she was professor and director of the BA and MA programmes in logopedics. Her main research interests are early intervention, quality of life and intervention of people with the most severe communication disabilities, and augmentative and alternative communication, manual signing and other unaided communication forms, in particular. In her clinical work, Launonen has worked with people with intellectual disabilities and their families. Launonen has recently edited, together with Nicola Grove, “Manual Sign Acquisition in Children with Developmental Disabilities” (2019). She is the Finnish principal investigator in the “Becoming an Aided Communicator” (BAC) project.

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Munique Massaro, PhD, is a special educator and Assistant Professor at Paraíba Federal University. She completed her PhD at State University of Sao Paulo, Marilia Campus, within the BAC project under supervision of Associate Professor Débora Deliberato.

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Elisabete Mendes, PhD, is psychologist, with master degree in educational psychology and PhD in developmental psychology. For 15 years, she worked as a psychologist in different institutions, mainly with children and young people with intellectual and developmental disabilities. Since 2000, she has been Associated Professor at the Polytechnic of Portalegre, where she teaches early childhood intervention, inclusive education, developmental disabilities, ethics and deontology. She is the coordinator of the Master degree in Special Education and of the Programme to Support Students with Special Needs. Her main research interests early childhood intervention, AAC, and intellectual and developmental disabilities. She has coordinated and participated in several European and international projects related to inclusive education, AAC, social inclusion and self-advocacy.

Janice Murray, Manchester Metropolitan University, UK (j.murray@mmu.ac.uk)
Janice Murray, PhD, is a speech and language therapist and Professor of Communication Disability at Manchester Metropolitan University. As a therapist, she has developed, delivered and evaluated clinical services in the provision of AAC for over three decades. Additionally, Murray has led delivery of undergraduate and post graduate speech and language therapy education for a similar amount of time. Her innovative PGCert in AAC was welcomed nationally and internationally. She has a funded research portfolio that has focused on clinical decision making in AAC, AAC and literacy development throughout the lifespan, and language development through aided communication. She is a former Chair of Communication Matters (ISAAC UK), a former Chair of Council (ISAAC), current Chair of the AAC committee for the International Association of Communication Sciences and Disorders. She is a Fellow of the Royal College of Speech and Language Therapists, awarded for her research and its impact.

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Kirsi Neuvonen, MA, is speech and language therapist and currently working towards her PhD in logopedics at the University of Helsinki, under supervision from Kaisa Launonen. Her research interests are the co-construction and meaning-negotiation strategies of young aided communicators and their communication partners using natural speech. She is particularly interested in enhancing communicative skills of young children who are unable to develop speech.

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Leila Nunes, PhD, is psychologist and Professor of special education at the Department of Inclusive and Continuing Education, State University of Rio de Janeiro, where she teaches in the Graduate Program. She teaches developmental psychology and experimental research

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Judith Oxley, PhD, is speech and language therapist and Associate Professor at Department of Communicative Disorders, University of Louisiana at Lafayette. She has broad experience with teaching undergraduate and graduate courses, including all aspects of assessment and intervention related to communication and language disorders. She has been a central member in the field of AAC for many years.

Gregor Renner, Catholic University of Applied Sciences, Freiburg, Germany
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Gregor Renner is a special educator and holds the first professorship in augmentative and alternative communication (AAC) in Germany. He is the chair of the bachelor program in special education and inclusive education. Renner has studied electronics and special education in Berlin and has worked in the AAC field since the early 1990s. In 2004, he completed his doctorate about the theoretical basis of AAC. He worked as postdoc in different research projects in Berlin and Halle. In 2008, he received the professorship of AAC. He was co-chair of the ISAAC research committee from 2004 to 2015. He was ISAAC President Elect in 2014 and 2015, ISAAC President 2016 to 2018. He is actively involved in research, professional education and training, and service delivery in the area of augmentative and alternative communication (AAC). His primary interest is self-determined participation and inclusion of persons who use AAC, especially in area of work and employment.

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Martine Smith, PhD, is a Speech and Language Therapist and Professor in Clinical Speech & Language Studies in Trinity College Dublin. Her research interest focus on language and literacy development in children who use aided communication, as well as the impact of aided communication on interactions for children and adults who rely on these modes. She is a Past President of the International Society for Augmentative and Alternative Communication (2004-2006) and former Editor-in-Chief of the AAC journal (2015-2018).

Gloria Soto, San Francisco State University, USA (gsoto@sfsu.edu)
Gloria Soto, PhD, is Professor at San Francisco State University with a joint appointment in the Department of Speech, Language and Hearing Sciences and the Department of Special Education. She specializes in AAC and her research focuses on language development and intervention for children and youths who use AAC, inclusive educational practices, and the provision of AAC services to children from culturally and linguistically diverse backgrounds. Current research projects involve the development of best practices for the equitable provision of AAC services to 'minoritized' students, the investigation of discourse-based interventions on the linguistic skills of children and youths who use AAC, the validation of a protocol for the analysis of aided language samples in Spanish, and vocabulary selection for bilingual Spanish-English users of AAC. Soto is the co-director of *Project AAC for ALL*, a personnel preparation project to train speech and language therapists and special education teachers on the provision

of AAC to dual language learners with disabilities. Among Soto's publications are numerous articles and two books about the provision of AAC services in school settings, "*Practically speaking: Language, literacy, and academic development for students with AAC beeds*" and "*AAC in the schools: Best practices for interventions*."

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Kristine Stadskleiv, PhD, is neuropsychologist and Professor at the Department for Special Needs Education, University of Oslo. Her research areas are AAC and cognitive development of children with various neurodevelopmental disorders. Her clinical work involves assessment of cognition and communication at the Department of Neurosciences for Children, Oslo University Hospital. She is in charge of offering systematic follow-up of cognition through the Norwegian Cerebral Palsy Quality and Surveillance Registry (NorCP).

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Stephen von Tetzchner, PhD, is psychologist and professor emeritus of developmental psychology at the Department of Psychology, University of Oslo. His research includes a wide range of issues related to typical and atypical development in general, and communication and language development in particular. He addresses AAC from a developmental perspective, with a focus on the transactional processes that govern development. He has published a large number of articles and book chapters, and textbooks in several languages on typical and atypical developmental psychology, language development, AAC, habilitation, challenging behaviour, school psychology, juvenile neuronal ceroid lipofuscinosis and autism spectrum disorder.

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BAC and BAC-Related Articles and Book Chapters

Walter, C. C. F., Nunes, L. R. & Delgado, S. M. M. (2010). Avaliação da linguagem receptiva de adolescentes usuárias de sistemas de comunicação alternative (Evaluating comprehension in adolescent who use alternative communication. In E. G. Mendes & M. A. Almeida (Eds.), *Das margens ao centro: Perspectivas para as políticas e práticas educacionais no contexto da educação especial inclusiva, Volume 1,* (From margins to the center. Perspectives from political and education practices in the context of special inclusive education, Volume 1) (pp. 179–189). Araraquara, Brazil: Junqueira and Marin.

Nunes, L. R., Delgado, S. M. M. & Walter, C. C. F. (2011). O que dizem as familias e os profissionais sobre a comunicação alternative (What families and professionals say about augmentative and alternative communication). In L. R. Nunes, M. Pelosi & C. C. F. Walter (Eds.), *Compartilhando ex*periências: Ampliando a comunicação alternativa, Volume 1 (Sharing experiences: Enlarging augmentative and alternative communication, Volume 1) (pp. 41–55). Marilia, Brazil: Editora da Associação Brasileira de Pesquisadores em Educação Especial.

Reports on a Brazilian subgroup of the BAC project. Presents and discusses the views and perspective of parents of young aided communicators and professionals on aided communication and what they think about the child's aided language development.

von Tetzchner, S. & Basil, C. (2011). Terminology and notation in written representations of conversations with augmentative and alternative communication. *Augmentative and Alternative Communication, 27,* 141–149.

Discusses the need for terms to should use within the field of augmentative and alternative communication. When talking and thinking about people in their role as users of alternative communication forms, the terms should reflect their communicative ways and means, their achievements and what they are doing, rather than focus on what they cannot do. The article points to the lack of articles analysing utterance construction and dialogue processes involving children and adults using manual and graphic communication systems. The aim of the paper was to contribute to reviving the discussion of terminology and to the publication of more analyses of signing and aided communication and an increase in the use of conversation excerpts in publications about AAC.

Nunes, L. R., Walter, C. C. F. & Delgado, S. M. M. (2012). Comunicação alternativa na perspectiva das famílias, dos profissionais e dos próprios usuários (Alternative communication from the perspective of families, professionals and users themselves). In E. G. Mendes & M. A. Almeida (Eds.), *Dimensões pedagógicas nas práticas de inclusão escolar, Volume 2* (Pedagogical dimensions of school inclusion practices, Volume 2) (pp. 399–419). Marilia, Brazil: Editora da Associação Brasileira de Pesquisadores em Educação Especial.

Reports on a subgroup of the BAC study, using semi-structured interviews, checklists and assessment scales, involving parents, other caregivers, teachers, special teachers, professional and the aided communicators. The aim of the study was to investigate the views of parents and professionals on the development of language and communication in young aided communicators, the intervention process, and the aided communicators' own view on these systems.

Deliberato, D. (2012).Terminologies and theoretical aspects of expressive skills in the context of alternative communication. In E. G. Mendes & M. A. Almeida (Eds.), *Pedagogical dimensions for educational inclusion practices* (pp. 385–397). Marília: ABPEE Associação Brasileira de Pesquisadores em Educação Especial.

Yang, C. K., Liao, Y. K,. & Chung, L. C. (2012). *The final report of the establishment of aided communication system for the 3–18 years old users' language proficiency rating scale project, Revised edition*. Taipei City, Taiwan: Ministry of Education.

Describes the characteristics and performance of the Taiwan participants in the BAC study (Chinese).

Deliberato, D. (2013). Comunicação alternativa na escola: Possibilidades para o ensino do aluno com deficiência (Alternative communication in school: Possibilities for teaching aided communicator students). In A. P. Zaboroski & J. P. de Oliveira (Eds.), *Atuação da Fonoaudiologia na escola*: *Reflexões e práticas* (pp. 71-90). Rio de Janeiro: WAK Editora.

Massaro, M. & Deliberato, D. (2013). Uso de sistemas de comunicação suplementar e alternativa na Educação Infantil: Percepção do professor (Use of augmentative and alternative communication systems in early childhood education: Teachers' perceptions). *Revista de Educação Especial, 26,* 331–350.

Augmentative and alternative communication (AAC) resources have proven to be helpful in involving students with disabilities and complex communication needs into a variety of pedagogical activities and expand the skills and competencies of the teacher in the teaching-learning. The objective of this research was to identify the perception of teachers regarding the use of augmentative and alternative communication during an intervention program in preschool. Participants were a special class of preschool students with disabilities and severe communication disorders, along with their teacher and the researcher. For the development of this research, an AAC program was applied. The teacher was provided with systematic guidance related to language and communication. In a collaborative process, three children's songs were selected according to the teacher's pedagogical planning and adapted resources through AAC systems. During the intervention program, evaluations were performed immediately after the music activities. The data were collected with audio recordings. Content analysis resulted in the outlining of themes and subthemes. The teachers found that AAC systems can facilitate expressive abilities of students with disabilities, that AAC systems can be used by children in preschool, and that resources adapted through AAC systems should be in accordance with the abilities of students

Batorowicz, B., Campbell, F. M., von Tetzchner, S., King, G., & Missiuna, C. (2014). Social participation of school-aged children who use communication aids: The views of children and parents. *Augmentative and Alternative Communication. 30,* 237–251.

Social participation is crucial for children's development and well-being; however, little is known about the social participation of children who use communication aids. This article presents findings from interviews with eight 5- to 14-year-old children who used communication aids and their parents about social participation, communicative interactions, and peer relationships. Video and audio-recordings were transcribed and analysed using thematic content analysis, and five themes were identified. Two themes reflect parents ' views: Communication partners and strategies and Access to aided communication. Three themes reflect perceptions expressed both by children and parents: Participation in society, Interaction opportunities, and Social relationships. The findings provide insights into both the achievements and the challenges experienced by young people who use aided communication.

Stadskleiv, K., von Tetzchner, S., Batorowicz, B., van Balkom, H., Dahlgren Sandberg, A., & Renner, G. (2014). Investigating executive functions in children with severe speech and movement disorders using structured tasks. *Frontiers in Psychology*, *5,* 1 –14.

Executive functions are the basis for goal-directed activity and include planning, monitoring, and inhibition, and language seems to play a role in the development of these functions. There is a tradition of studying executive function in both typical and atypical populations, and the present study investigates executive functions in children with severe speech and motor impairments who are communicating using communication aids with graphic symbols, letters, and/or words. There are few neuropsychological studies of children in this group and little is known about their cognitive functioning, including executive functions. It was hypothesized that aided communication would tax executive functions more than speech. Twenty-nine children using communication aids and 27 naturally speaking children participated. Structured tasks resembling everyday activities, where the action goals had to be reached through communication with a partner, were used to get information about executive functions. The children (a) directed the partner to perform actions like building a Lego tower from a model the partner could not see and (b) gave information about an object without naming it to a person who had to guess what object it was. The executive functions of planning, monitoring, and impulse control were coded from the children's on-task behaviour. Both groups solved most of the tasks correctly, indicating that aided communicators are able to use language to direct another person to do a complex set of actions. Planning and lack of impulsivity was positively related to task success in both groups. The aided group completed significantly fewer tasks, spent longer time and showed more variation in performance than the comparison group. The aided communicators scored lower on planning and showed more impulsivity than the comparison group, while both groups showed an equal degree of monitoring of the work progress. The results are consistent with the hypothesis that aided language tax executive functions more than speech. The results may also indicate that aided communicators have less experience with these kinds of play activities. The findings broaden the perspective on executive functions and have implications for interventions for motor-impaired children developing aided communication.

Basil, C. & Cusine, E. (2015). Communicative functions in aided language studies. In S. von Tetzchner & Judith D. Oxley (Eds.), *Processes of aided language development in cognitively high-functioning children and adolescents. Proceedings of the Twelfth Biennial Research Symposium of the International Society for Augmentative and Alternative Communication, Lisbon, Portugal, August 25–26, 2014* (pp. 47–69). Toronto: ISAAC.

The ultimate goal of any intervention in communication and language is to promote its use, during the life span, in multiple real life situations and with a diversity of partners. However, there seems to be little information in the augmentative and alternative communication (AAC) literature about the diversity of communicative functions, particularly in higher functioning aided communicators. A systematic review of the research literature was carried out with the intent of understanding the most common topics of research and sample characteristics. Each identified study was examined to see if it fulfilled the following inclusion criterion: a) empirical research or reviews of empirical research, b) conducted between 2003 and 2014, c) children who use AAC and/or their communication partners or professionals. From the selected collection, a total of 37 research papers and 11 book chapters, 48 articles in total, were finally included and analysed.. Most functions other than simple requests are investigated in high or relatively high functioning children. Only two studies investigate the functions of conversing, narrating, describing events and story retelling in low functioning children, and in five studies the cognitive level is not mentioned. Beside the fact that 26 of the 48 studies report that cognitive functioning is unknown or it is not mentioned, even when individual variability is well analysed, the results are not being specifically discussed according to such variability. There is a need to ensure that individual variability in cognitive functioning is accounted for in studies of aided communicators in order to avoid overgeneralization of the results to diverse populations.

Deliberato, D. & von Tetzchner, S. (2015). Habilidades comunicativas de alunos usuários de sistemas gráficos do ponto de vista de suas mães (Communicative abilities of students using graphic systems from their mothers' point of view). In R. Y. S. Chun, L. Reily & E. Moreira (Eds.), *Comunicação Alternativa: Ocupando territórios* (s. 271–290). São Carlos: ABPEE.

The objective was to identify the communicative skills of Brazilian aided communicators who use graphic communication systems from their mothers' point of view through analysis of checklists and evaluation scales completed by Brazilian families. Different family members and professionals completed interviews, checklists and evaluation scales for selected participants.

Stadskleiv, K. (2015). Assessment of cognitive processes in aided communicators. In S. von Tetzchner & Judith D. Oxley (Eds.), *Processes of aided language development in cognitively high-functioning children and adolescents. Proceedings of the Twelfth Biennial Research Symposium of the International Society for Augmentative and Alternative Communication, Lisbon, Portugal, August 25–26, 2014* (pp. 87–99). Toronto: ISAAC.

Discusses results from studies of cognitive functioning in children with severe speech and movement disabilities, and presents a model of adapted cognitive assessment of aided communicators, including a description of how assessment can be done for children who are difficult to assess.

von Tetzchner, S. (2015). The semiotics of aided language development. *Cognitive Development, 36*, 180–190.

Some children fail to develop speech due to motor impairments, and have to use graphic symbols on communication aids to express themselves. Young aided communicators typically hear and produce different language forms. The adults' child-directed language hence has a different form from the child's utterances and their expansions of the child's utterances tend to contain many linguistic elements that the children are unable to construct and produce. Reading and writing typically develop late in children who lack speech, and sometimes remain limited. The small graphic vocabulary of young aided communicators implies that they often have to rely on unusual and untaught ways of constructing meaning. The semiotics of their expressive communication appears to be a blend of the spoken language they hear, the graphic representations of the communication system they use, and the strategies they use to construct the expressions. Young aided communicators may show significant achievements, even when the language environment gives poor constructive support. This atypical form of language development may shed light on the children's language situation and on language and semiotics in general.

von Tetzchner, S. & Nunes, L. R. (2015). Pesquisa transcultural em comunicação alternativa: Justificativas, objetivo e metodologia (Cross-cultural research in alternative communication: Justifications, objective and methodology). In R. Y. S. Chun, L. Reily & E. C. Moreira (Eds.), *Comunicação alternativa: Ocupando territórios, Volume 1* (pp. 227–240). S. Carlos, Brazil: Marquezine & Manzini/ABPEE.

The starting point of the BAC study is that aided communication does not only reflects deficits in spoken language, but also achievements in communicative performance. The functional skills of aided communicators are reflected both in the failure to acquire spoken language and in the ability to learn alternative modes of communication. The study outlines patterns in utterances produced by young aided communicators, comprising a wide range of topics, produced in a variety of situations with different purposes, and investigates how children and adults interpret these utterances. Suggests communication tasks to assess the communicative competence of young aided communicators.

von Tetzchner, S. & Oxley, J. D. (2015). Aided language processes: Introduction. In S. von Tetzchner & Judith D. Oxley (Eds.), *Processes of aided language development in cognitively high-functioning children and adolescents. Proceedings of the Twelfth Biennial Research Symposium of the International Society for Augmentative and Alternative Communication, Lisbon, Portugal, August 25–26, 2014* (pp. 4–9). Toronto: ISAAC.

Introduction to the proceedings of the ISAAC Research Symposium, in 2014. The symposium discusses the significant individual variation among children who need augmentative and

alternative communication (AAC). The only characteristic they have in common is that they have little or no intelligible speech. Comprehension of spoken language, cognitive levels and profiles, and perceptual and motor abilities, as well as specific learning disorders and autistic traits may vary as much as in the general population. Also experiential features influence the children's development of alternative means of language to different degrees.

Walter, C. C. F., von Tetzchner, S., Nunes, L. (2015). Avaliação da linguagem expressiva de usuários de comunicação alternative. In R. Y. S. Chun, L. Reily & E. Moreira (Eds.), *Comunicação Alternativa: Ocupando territórios* (pp. 241–254). São Carlos: ABPEE.

Batorowicz, B., Stadskleiv, K., von Tetzchner, S., & Missiuna, C. (2016). Children who use communication aids instructing peer and adult partners during play-based activity. *Augmentative and Alternative Communication, 32*, 105–119.

Little is known about how children with severe motor impairments who use communication aids provide instructions when given control over interaction. In this study, 35 children – 18 who used communication aids and 17 who used natural speech – were videotaped in play-based activities. Both groups successfully instructed partners to build replications of models the partners could not see. The results demonstrate that children using communication aids can also have an active role in play-based activities using language, but that their experience with activities may be limited and their instructions may take longer to give. The children who used natural speech provided more detailed instructions and were more successful in guiding their partners. Creating opportunities for active participation in play may be important for the development of communicative autonomy.

Massaro, M., Stadsklein, K., von Tetzchner, S., & Deliberato, D. (2016). Estratégias de comunicadores auxiliados para instruir parceiros de comunicação na construção de modelos físicos (Aided communicators strategies to instruct communication partners in building physical models). *Revista Brasileira de Educação Especial*, 22, 337–350.

This study aimed to analyse the strategies used by aided communicators and of naturally speaking communicators to instruct a communication partner for the construction of physical models. Participants were 18 aided communicators and 18 naturally speaking communicators of a comparison group, aged 5–15 years, from Brazil and Norway. In addition, three different groups of naturally speaking communication partners participated in the research: parents, peers and one professional. At first, the aided communicator children were evaluated. Next, the construction tasks were administered. In this task, aided communicators and comparison group had to instruct the communication partner to build physical models. Participants were filmed during the building and the recordings were transcribed. Content analysis was performed, which resulted in the delineation of categories, and the results were qualitatively and quantitatively analysed. This study suggests that there are differences between the strategies used in the constructions. Aided communicators and their communication partners spent more time to complete the construction. However, both groups used the language to instruct the communication partners and finish the constructions.

von Tetzchner, S. (2016). Foreword. In M. M. Smith & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp. ix–xii). North Guildford, UK: J&R Press.

Introduces three overall themes and the diverse perspectives on aided language processing and use discussed in the edited volume.

Smith, M. M. & Murray, J. (2016). Introduction. In M. M. Smith, & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp. 1–16). Surrey, UK: J&R Press.

Aided communication refers to the use of communication tools that are external to the individual to "aid" co-construction of meaning in interactions with communication partners. In general, aided communication is introduced when, for whatever reason, a child or adult is unable to effectively use unaided modes of communication (e.g., speech, gesture, facial expression, vocalizations, etc.) to meet their communication needs. As noted by von Tetzchner and Stadskleiv, interventions incorporating aided communication have a history stretching almost 50 years. Although much has changed since the first communication boards were described in the 1960s, the fundamental challenge such interventions seek to address, (i.e., enabling individuals who experience significant difficulty in producing and/or interpreting intelligible spoken language to participate fully in communication interactions) remains unchanged. The purpose of the book is twofold: (a) to explore how, within communication interactions, aided communication resources are used and interpreted as individuals negotiate shared meanings; and (b), to consider how the use of aided communication potentially influences and is influenced by the developmental path of children, as they become enculturated into linguistic communities that are often unfamiliar with aided communication.

Murray, J., Bell, H., & Goldbart, J. (2016). Operational demands and representational forms. In M. M. Smith & J. Murray (Eds.), The silent partner? Language, interaction and aided communication (pp. 35–64). Guildford, UK, Surrey: J&R Press.

Here the complex cognitive, motor and perceptual demands of using aided communication are explored. One of the themes of this chapter is the relationship between the multiple symbol forms experienced by children who use aided communication and how children develop an understanding of pictures, of pictures as symbols and of graphic symbols as communicative tools.

Jagoe, C. & Smith, M. M. (2016). Relevance in the context of multimodality and aided communication. In M. M. Smith, & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp. 229–246). Guildford, UK: J&R Press.

Multimodality is a feature of all human communication, but individuals who use augmentative and alternative communication (AAC) may rely in a unique way on multimodal communication, incorporating unaided modes such as gaze and vocalisations, as well as aided modes, as they participate in the co-construction of meaning with communication partners in interaction. The impact of multimodal communication on the conversation process, in terms of how aided components are "treated" in the interaction, how a speaker makes choices of which message elements to encode in aided communication and how listeners receive and interpret

messages have been explored through various different paradigms, including structural linguistic and discourse analysis. A theoretical framework that has seen less application in the field of AAC is that of relevance theory, a cognitive-pragmatic approach to interpreting communication and interaction phenomena. Relevance theory offers the potential to increase the understanding of the cognitive-pragmatic processes at play in interactions involving the use of aided communication, offering a potential explanatory framework for interpreting communication behaviours. The chapter presents a brief introduction to the notion of *relevance* as it evolved from Gricean pragmatics, provides an overview of some key concepts in relevance theory, and applies specific features of the theory to data involving the use of aided communication in interactions between a child, a teacher and a researcher.

Soto, G. & Starowicz, R. (2016). Narrative development and aided communication. In M. M. Smith, & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp. 141–158). Surrey, UK: J&R Press.

Narrative is recognized as a core human communication activity, central to most of our interactions. There is growing evidence that children with language difficulties demonstrate particular difficulties in mastering this form of language use. Children using aided communication face a particular challenge, in that most often, their communication partner is involved in interpreting and co-constructing their communication output. Thus ownership of narratives in these situations is often ambiguous. In addition, these linguistic differences impact the development of identity through interaction. This chapter explores the unique context of narrative development in aided communication, outlining the linguistic, pragmatic and social importance of this particular form of discourse and the unique co-construction that typifies narratives in aided communication. The chapter discusses the use of narratives, their developmental trajectory and implications, and their relationship to autobiographical memory and identity. The chapter further discusses the narrative practices in aided communication and suggests how the emergence of narratives can be supported.

von Tetzchner, S. & Stadskleiv, K. (2016). Constructing a language in alternative forms. In M. M. Smith, & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp.17–34). Guildford, UK: J&R Press.

Through its nearly 50 years of history, intervention with individuals who use augmentative and alternative communication has changed. In the beginning, the provision of communication boards with graphic symbols seemed to be regarded as a sufficient basis for using aided language. Developmental processes were rarely discussed. There was a tendency to focus on 'physical' help, that is, on guiding a child to a communication form he or she could actually produce. It is now acknowledged that it may take a long time to establish a system whereby a child with a severe motor impairment can select and indicate a reasonable number of graphic symbols, but also for this group, intervention is not only a matter of providing a graphic system and a board or electronic aid. All aspects of the communication situation are affected by a slower rate of communication, a limited vocabulary and problems in initiating joint attention, conversations and new topics. For support to be functional, it must be adapted to these characteristics.

Smith, M. M. & Murray, J. (2016). Conclusion. In M. M. Smith, & J. Murray (Eds.), *The silent partner? Language, interaction and aided communication* (pp. 289–293). Surrey, UK: J&R Press.

There is a well-established tradition of communication partner training within the field of AAC. Much of this work has focused on identifying reliable and effective ways of enabling communication partners to adapt their conversational style to ensure that there are opportunities for a child or adult to use aided communication, or on ways of modelling and promoting more sophisticated expressive use of aided communication. Far less attention has focused on the strategies that might support communication partners in interpreting output generated in aided forms, strategies that focus on strategically interrogating how what has been communicated might be relevant, where it might fit within a multimodal exchange and how to balance the potentially competing demands of constraining possible meanings while still being open to creative and 'loose' use of symbol forms. The discussions in the book suggest that the caution recommended by Sutton in interpreting how symbol forms reflect language is appropriate – if symbols are not words, how are they to be treated and how is their development to be supported? Answering these questions implies re-aligning the roles of the communication partners acknowledging their joint responsibility for the construction of meaning through aided means. Although the device may clearly be in the literal ownership of one person, the communication that it is used for is in the shared ownership of both participants. Inevitably, this view implies that both partners require skills in using a device. The Silent Partner "belongs" to both.

Solomon-Rice, P. L., Soto, G., & Heidenreich, W. (2017). The impact of presupposition on the syntax and morphology of a child who uses AAC. *Perspectives of the ASHA Special Interest Groups*, *2*(12), 13–22.

Children with complex communication needs often rely on augmentative and alternative communication (AAC) to communicate. Use of AAC can result in messages with limited syntax and morphology that are difficult for communication partners to understand. This case study examines the linguistic productions of a child who uses high-tech AAC, with emerging literacy skills, under two pragmatic presupposition conditions. In Condition 1, the child believes the communication partner has a larger amount of background information about the topic being discussed. In Condition 2, the child presupposes the communication partner has less background information about the topic being discussed. Condition 2 resulted in the child's production of more complex morphology and syntax in comparison to Condition 1. The results suggest pragmatic presupposition might have impacted the level of morphologic and syntactic complexity produced. Possible clinical implications and suggestions for facilitating production of linguistically complex sentences are discussed.

Stadskleiv, K., Jahnsen, R., Andersen, G. L. & von Tetzchner, S. (2017). Executive functioning in children aged 6–18 years with cerebral palsy. *Journal of Developmental and Physical Disabilities*, 29, 663–681.

Executive functioning (EF) is necessary for purposeful and goal-directed activity. Deficits in EF have been related to prematurity, low birth weight and early acquired brain lesions. Cerebral palsy (CP) is a condition where all these factors might be present and therefore suited to explore the relative contribution of each. The aim is to investigate factors that may contribute to

variability in EF in children with CP. Participants were 68 children with CP, with various degrees of speech and motor impairment. Mean age 10;2 years (range 6;0 to 17;7 years), 38 were girls. EF was investigated with tests, Backward memory from Leiter-R and Wisconsin Card Sorting Test, which were adapted so that the children could respond regardless of their level of motor functioning. The mean standardized scores on tests of EF were within the normal range (89.5–105.9). The considerable individual variation (55–145) is explained by age and cognitive ability. Of the 68 participants, a measure of EF was available for 57 (83.8%). The 11 who did not complete the tests all had an intellectual disability. Variability in EF in children with CP was explained by age and cognitive ability, and not by prematurity, type of brain lesion or epilepsy. There was a developmental trend towards an increase in EF with age. However, the delay in EF may have consequences for overall cognitive and everyday functioning. The large variability in EF suggests that cognition should be assessed in all children with CP.

von Tetzchner, S. (2018). Introduction to the special issue on aided language processes, development, and use: An international perspective. *Augmentative and Alternative Communication*, *34*, 1–15.

This introduction to the Special Issue discusses current theoretical approaches to language development and their application to aided language development. It also discusses some conceptual issues and aspects of aided language development that are relevant for the articles, and gives a short overview of the articles.

Deliberato, D., Jennische, M., Oxley, J., Nunes, L. R. D. O. D. P., Walter, C. C. D. F., Massaro, M., Almeida, M. A., Stadskleiv, K., Basil, C., Coronas, M., Smith, M.M. & von Tetzchner, S. (2018). Vocabulary comprehension and strategies in name construction among children using aided communication *Augmentative and Alternative Communication*, *34*, 16–29.

Vocabulary learning reflects the language experiences of the child, both in typical and atypical development, although the vocabulary development of children who use aided communication may differ from children who use natural speech. This study compared the performance of children using aided communication with that of peers using natural speech on two measures of vocabulary knowledge: comprehension of graphic symbols and labelling of common objects. There were 92 participants not considered intellectually disabled in the aided group. The reference group consisted of 60 participants without known disorders. The comprehension task consisted of 63 items presented individually in each participant's graphic system, together with four coloured line drawings. Participants were required to indicate which drawing corresponded to the symbol. In the expressive labelling task, 20 common objects presented in drawings had to be named. Both groups indicated the correct drawing for most of the items in the comprehension tasks, with a small advantage for the reference group. The reference group named most objects quickly and accurately, demonstrating that the objects were common and easily named. The aided language group named the majority correctly and in addition used a variety of naming strategies; they required more time than the reference group. The results give insights into lexical processing in aided communication and may have implications for aided language intervention.

Murray, J., Sandberg, A. D., Smith, M. M., Deliberato, D., Stadskleiv, K. & von Tetzchner, S. (2018). Communicating the unknown: descriptions of pictured scenes and events presented on video by children and adolescents using aided communication and their peers using natural speech. *Augmentative and Alternative Communication*, *34*, 30–39.

The facility to describe scenes and events is important in everyday communication, but little is known about the description skills and strategies of young people using aided communication. This article explores how 81 children and adolescents using aided communication and 56 peers using natural speech, aged 5–15 years, described pictured scenes and events presented on video to a partner who had no prior knowledge of the content. The group who used aided communication took longer and included fewer elements in their descriptions than the reference group; however, the groups did not differ in their use of irrelevant or incorrect elements, suggesting that both groups stayed on topic. Measures related to aided message efficiency correlated significantly with measures of spoken language comprehension. There were no significant differences between groups for their descriptions of pictured scenes and video events. Analyses showed both unpredicted group similarities and predictable differences, suggesting key components for future research consideration.

Smith, M. M. Dahlgren Sandberg, A., Murray, J., Batorowicz, B. Neuvonen, K., von Tetzchner, S., & Stadskleiv, K. (2018). Constructing narratives to describe video events using aided communication. *Augmentative and Alternative Communication, 34,* 40–53.

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.

Batorowicz, B., Stadskleiv, K., Renner, G., Dahlgren Sandberg, A. & von Tetzchner, S. (2018). Language and communication assessment: Achievements of children who use aided communication. *Augmentative and Alternative Communication, 34,* 54–67.

There is limited knowledge about aided language comprehension and use in children who use aided communication and who are considered to have a relatively good comprehension of spoken language. This study's purpose was to assess their aided language skills. The participants were 96 children and adolescents who used communication aids (aided group) and 73 children and adolescents with natural speech (reference group), aged 5 to 15 years. All of the participants who used aided communication were regarded by their teachers or professionals as having age-appropriate language comprehension. All of the participants completed (a) standardized tests of visual perception, non-verbal reasoning, and comprehension of spoken language, and (b) tasks designed for this study that measured comprehension and production of graphic utterances through communicative problem solving. Using their own communication systems, the participants achieved an average of 72% correct on the graphic symbol comprehension task items, and 63% on the expressive tasks. The participants with natural speech achieved an average of 88% correct on comprehension items, and 93–96% accuracy on production items. The differences between groups were significant on all the tasks and standardized tests. There was considerable variation within the group of participants who used aided communication, and the results reveal a need to develop instruments with norms for aided language competence that can inform the implementation of interventions to support aided language development.

Stadskleiv, K., Batorowicz, B., Massaro, M., van Balkom, H. & von Tetzchner, S. (2018). Visual-spatial cognition in children using aided communication. *Augmentative and Alternative Communication*, *34*, 68–78.

Children with severe motor impairments are restricted in their manipulation and exploration of objects, but little is known about how such limitations influence cognitive development. This study investigated visual-constructional abilities in 75 children and adolescents, aged 5;0–15;11 (years;months), with severe speech impairments and no intellectual disabilities (aided group) and in 56 children and adolescents with typical development (reference group). Verbal comprehension, non-verbal reasoning, and visual-spatial perception were assessed with standardized tests. The task of the participants was to verbally instruct communication partners to make physical constructions identical to models that the partner could not see. In the aided group, 55.7% of the constructions were identical to the models participants described, compared to 91.3% in the reference group. In the aided group, test results explained 51.4% of the variance in construction errors. The results indicate that the participants' language skills were decisive for construction success. Visual-perceptual challenges were common among the aided communicators, and their instructions included little information about size and spatial relations. This may reflect less experience with object manipulation and construction than children with typical development, and using aided communication to instruct others to make three-dimensional constructions. The results imply a need for interventions that compensate for the lack of relevant experience.

von Tetzchner, S., Launonen, K., Batorowicz, B. Nunes, L. R. d'O. de P., Walter, C. C. de F., Oxley, J., Massaro, M., Stadskleiv, K., Yang, C.-H. & Deliberato, D. (2018). Communication aid provision and use among children and adolescents developing aided

communication: An international survey. *Augmentative and Alternative Communication, 34,* 79–91.

A fundamental requirement of a supportive language development for young children who need aided communication is that an aided communication system is made available and its use is supported. There is limited information about the age at which children are typically provided with a communication aid or about how aided communication is used in everyday situations. Using questionnaire-based interview data, this study investigated (a) the pattern of provision of communication aids to 84 children and adolescents, (b) parents' and professionals' evaluation of the quality of communication across contexts, and (c) availability and use of aided communication in these contexts. The age at which the participants received their first aided system varied considerably across the group; however, most were considerably older than the age at which children with typical development usually begin to speak. Parents and professionals rated most everyday situations as good communication situations but reported that the participants did not have their main form of expressive language available in many of these situations, or did not use it much. Parents rated their child's education in relation to aided language positively, but many professionals indicated that they had limited knowledge about the participant's use of aided communication outside of the school environment, or about the parents' attitudes. The study gives insights into the language learning situation of children and adolescents who develop aided communication.

Azevedo, V. A. P. (2018). Narrativas de vídeos por alunos usuários de sistemas de comunicação alternativa com diferentes interlocutores (Video narratives by students using alternative communication systems with different interlocutors). Doctoral thesis, Marília Programa de Pós-Graduação em Educação.

The objective of this research was to analyse the narratives of students with cerebral palsy users of augmentative and alternative communication (AAC) systems with different interlocutors. This study used the task of video narration of a cross-cultural research survey with the participation of 16 countries, which collected data between the years of 2011 and 2014. Five participants were selected from one of the larger study groups, with ages ranging from 9 to 14 years, all diagnosed with cerebral palsy and their communication partners. In the video task, the students had to watch videos and manage to retell them for the partners, in total 3 tasks were selected with each interlocutor (mother, professional and colleague), the criteria for choosing the tasks were: a video with a common scene and present in the students' daily lives; video with an absurd scene; video with a longer duration and a sequence of two events. For the data analysis, categories and subcategories were established: expressive abilities, linguistic elements, and strategies of mediation and the retelling of the video by the interlocutor. The results showed that to count the videos the students used different expression abilities, with a higher frequency of the use of the graphic symbol followed by the gestures, there was also a variety with regard to the interlocutor, with the mothers greater use were the gestures, with the professionals was the graphic system and with colleagues there was a predilection for a specific skill. The linguistic elements used in greater quantity were the nouns and the verbs. The most used mediation strategy was the related questions followed by the repeated information and with this the interlocutors were able to retell all or part of the story on most tasks. They can

be important tools in classroom workwith narrative and alternative communicating students may benefit from mediation to engage in narrative activities.

Massaro, M., Stadskleiv, K., von Tetzchner, S. & Deliberato, D. (2018). Estratégias de comunicadores auxiliados para instruir parceiros de comunicação na construção de modelos físicos (Assisted communicators strategies to instruct communication partners in building physical models). *Revista Brasileira de Educação Especial, 22,* 337–350.

This study aimed to analyse the strategies used by aided communicators and of naturally speaking communicators to instruct a communication partner for the construction of physical models. Participants were 18 aided communicators and 18 naturally speaking communicators of a comparison group, aged 5–15 years, from Brazil and Norway. In addition, three different groups of naturally speaking communication partners participated in the research: parents, peers and one professional. At first, the aided communicator children were evaluated. Next, the construction tasks were administered. In this task, aided communicators and comparison group had to instruct the communication partner to build physical models. Participants were filmed during the building and the recordings were transcribed. Content analysis was performed, which resulted in the delineation of categories, and the results were qualitatively and quantitatively analysed. This study suggests that there are differences between the strategies used in the constructions. Aided communicators and their communication partners spent more time to complete the construction. However, both groups used the language to instruct the communication partners and finish the constructions.

Stadskleiv, K., Jahnsen, R., Andersen, G. L., & von Tetzchner, S. (2018). Neuropsychological profiles of children with cerebral palsy. *Developmental Neurorehabilitation, 21,* 108–120.

The purpose was to explore factors contributing to variability in cognitive functioning in children with cerebral palsy (CP). Method: A geographical cohort of 70 children with CP was assessed with tests of language comprehension, visual-spatial reasoning, attention, working memory, memory, and executive functioning. Mean age was 9;9 years (range 5;1–17;7), 54.3% were girls, and 50.0% had hemiplegic, 25.7% diplegic, 12.9% quadriplegic, and 11.4% dyskinetic CP. For the participants with severe motor impairments, assessments were adapted for gaze pointing. A cognitive quotient (CQ) was computed. Results: Mean CQ was 78.5 (range 19–123). Gross motor functioning, epilepsy, and type of brain injury explained 35.5% of the variance in CQ ($F = 10.643$, $p = .000$). Conclusion: Twenty-four percent had an intellectual disability, most of them were children with quadriplegic CP. Verbal comprehension and perceptual reasoning scores did only differ for the 21% with an uneven profile, of whom two-thirds had challenges with perceptual reasoning.

Massaro, M.; Deliberato, D; & von Tetzchner, S. (2019). Parceiros de comunicação em pesquisa internacional acerca da Comunicação Suplementar e Alternativa (Communication partners in international research about Augmentative and Alternative Communication). In R. Yu .S. Chun; L. Reily, E. C. Moreira; R. C. B. Varela, & D. Dainez. (Eds.). *Diálogos na diversidade e o alcance da Comunicação Alternativa*

(Dialogues in diversity and the reach of Alternative Communication) (pp. 213–223). Timburi, SP: Publisher Cia do e-Book.

This study analyses two interaction sessions with aided communicators and communication partners, emphasizing the different strategies used by the partners. Both were interacting to perform a task, in which the aided communicators needed to instruct the communication partners to build a physical construction from a model that only the aided communicator could see. The model was a string with a sequence of three geometric shapes, which was hidden in a box so that the partner could not see it. The partner had several geometric shapes, of different shapes and colors, on a table and a cord. The aided communicator instructed the partner to make an identical sequence using his own communication system with graphic symbols.

Deliberato, D. & von Tetzchner, S. (2019). Compreensão de vocabulário e estratégias de nomeação: ampliação e uso do vocabulário na diversidade (Vocabulary comprehension and naming strategies: expansion and use of vocabulary in diversity). In R.Yu.S. Chun; L. Reily; E.C. Moreira; R. C. B. Varela & D. Dainez. (Eds.). *Diálogos na diversidade e o alcance da Comunicação Alternativa* (Dialogues in diversity and the reach of Alternative Communication). (pp. 253–270). 1ed.Timburi, SP: Publisher Cia do e-Book

The present study analysed questions about the vocabulary of Brazilian aided communiators. The first part of the results is related to the comprehension of graphic symbols (with image and written word) of the participants' own systems, representing common concepts. Then, the study was concerned with analysing the use of graphic symbols (or written words) in naming a set of object drawings with their own communication resource. The results were compared with the performance of a group of peers who used natural speech to complete the same tasks, being called the reference group.

Neuvonen, K. A., Jagoe, C., Launonen, K., Smith, M. M. & von Tetzchner, S. (2019). Expectations and interpretations of conversations using aided communication: An application of relevance theory. *Journal of Interactional Research in Communication Disorders*, *10*, 125–152.

Reaching mutual understanding can sometimes be challenging in interactions involving communicators using aided communication. This explorative qualitative study offers insights into some of the features of utterance interpretation and meaning negotiation in interactions using graphic communication systems. Relevance theory was applied as a framework for analysis of conversations between a non-speaking child using a communication aid and her communication partners using natural speech. Through analysis of a series of videotaped conversations, several assumptions and contextual implications affecting the interpretation processes were identified. A tendency to organize interpretations according to contextual expectations and scripts emerged as a central explanatory factor in co-constructing meanings from available graphic utterances. This study highlights the importance of understanding factors that may affect the interpretation processes of all participants in interactions involving aided communication.

Renner, G., Hörmeyer, I., & Hoffer, L. (2019). Ko-Konstruktion erkennen und verstehen–eine Analyse verschiedener Ko-Konstruktionstechniken in der Unterstützten Kommunikation

(Recognize and understand co-construction – an analysis of various co-construction techniques in augmentative and alternative communication). *Sprache· Stimme· Gehör*, *43*, e1–e7.

The collaborative construction of one utterance by two partners (so called co-construction) is an essential communicative strategy for people with complex communication needs. A detailed analysis shows that there are several patterns of co-construction differing in form and function. Two frequently occurring patterns are repair strategies to ensure understanding and hint und guess-sequences. Initiating a repair the interaction partner shows that she needs another information to fully understand an utterance. This information is given by the person using AAC. Using a hint and guess-strategy, the interaction partner makes guesses that are based on the given information and knowledge of context. The guesses have to be confirmed or denied by the person using AAC.

Sotiropoulou Drosopoulou, C., Murray, J., Smith, M. M., Neuvonen, K., Lynch, Y. Stadskleiv, K. & von Tetzchner, S. (2021). . Conversation patterns between children with severe speech impairment and their conversation partners in dyadic and multi-person interactions. Applied Linguistics, *43,* 473–492.

Active engagement in interactions is crucial for the development of identity, social competence, and cognitive abilities. For children with severe speech impairment (SSI) who have little or no intelligible speech, active participation in conversations is challenging and can be critical for their social inclusion and participation. The present study investigated the conversational patterns emerging from interactions between children with SSI who use aided communication and typically speaking conversation partners (CPs) and explored whether active participation was different in interactions with different numbers of partners (dyadic versus multi-person interactions). An unusually large multilingual dataset was used (N = 85 conversations). This allowed us to systematically investigate discourse analysis measures indicating participation: the distribution of conversational control (initiations versus responses versus recodes) and summoning power (obliges versus comments). The findings suggest that (i) conversations were characterized by asymmetrical conversational patterns with CPs assuming most of the conversational control and (ii) multi-person interactions were noticeably more symmetric compared to dyadic, as children's active participation in multi-person interactions was significantly increased. Clinical implications and best practice recommendations are discussed.

Neuvonen, K., Launonen, K., Smith, M. M., Stadskleiv, K. & von Tetzchner, S. (2022) Strategies in conveying information about unshared events using aided communication. *Child Language Teaching and Therapy, 38,* 78–94..

Describing events may be challenging for any child, but children who use communication aids may face unique linguistic, pragmatic, and strategic challenges in conveying information with the communication means they have available. This study explores strategies used by young, aided communicators when describing the content of a video unknown to their communication partners. The participants of the study were 48 aided communicators (aged 5;3–15;2) from nine countries and seven language groups and their communication partners (parents, professionals, and peers) who used natural speech. Descriptive and statistical analyses were utilized to investigate the relationships between individual characteristics, linguistic and non-linguistic

factors, linguistic strategies, and performance in conveying the content of the video event. Analyses of the 48 videotaped interactions revealed the use of a variety of linguistic elements and multimodal strategies, demonstrating both creativity and challenges. Success in relaying messages was significantly related to age, mode of communication, and individual profiles, such as everyday communication functioning and comprehension of grammar. Measures of receptive vocabulary and non-verbal reasoning were not significantly related to communicative success. The use of shared context and negotiation of meaning of potentially ambiguous utterances demonstrate the shared responsibility of disambiguation and meaning construction in interactions involving aided and naturally speaking communicators.

Stadskleiv, K., Batorowicz, B., Sandberg, A. D., Launonen, K., Murray, J., Neuvonen, K., ... & von Tetzchner, S. (2022). Aided communication, mind understanding and co-construction of meaning. *Developmental Neurorehabilitation,* 1–13.

Mind understanding allows for the adaptation of expressive language to a listener and is a core element when communicating new information to a communication partner. There is limited knowledge about the relationship between aided language and mind understanding. This study investigates this relationship using a communication task. The participants were 71 aided communicators using graphic symbols or spelling for expression (38/33 girls/boys) and a reference group of 40 speaking children (21/19 girls/boys), aged 5;0–15;11 years. The task was to describe, but not name, drawings to a communication partner. The partner could not see the drawing and had to infer what was depicted from the child's explanation. Dyads with aided communicators solved fewer items than reference dyads (64% vs 93%). The aided spellers presented more precise details than the symbol users (46% vs 38%). In the aided group, number of correct items correlated with verbal comprehension and age.