Linguistic and temporal resources of pre-stored utterances in everyday conversations

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Abstract

Aided communicators often have an opportunity to express themselves with speech-generating devices (SGDs) that produce symbol by symbol (SBS) and/or pre-stored (PS) utterances. Studies on the usage of PS utterances report that these utterances affect conversations positively, but it appears that aided communicators and professionals may have divergent views on their benefits. The aim of this study is to analyse how school-aged aided communicators, their mothers, peers, and speech and language therapists (SLTs) co-construct the social actions of PS utterances during their everyday interactions. The theoretical framework of this study is conversation analysis. This approach to analysing the data enhances our understanding of the linguistic and temporal resources of PS utterances and how they are used to reinforce various rich social actions that promote the progress of aided conversations to resemble natural spoken conversations. The results of this study will help SLTs and teachers in their planning content for SGDs as well as in teaching, and guiding aided communicators and their partners to utilize PS utterances in combination with SBS utterances during their conversations.

I Introduction

Speech-generating devices (SGDs) are tools which non-speaking people can use to compensate for their inability to produce oral speech. Communication software programs offer the option of producing utterances[1] either by constructing them symbol by symbol (SBS) or by utilizing pre-stored (PS) utterances. Depending on the type of utterance, an aided communicator can activate either one cell (PS utterance) or multiple cells (SBS utterance) on a display, and a speech synthesizer recites

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the textual content of the cell(s). The more symbols an aided communicator selects for an utterance, the more time it takes to produce. To tailor the linguistic content and the corresponding graphic symbol[2] for each display cell, aided communicators and their speaking partners often work with professionals, such as speech and language therapists (SLTs) and teachers.

In clinical practice, children with complex communication needs are often introduced to devices which consist of only a few cells. These may include separate symbols, for example, for choosing a snack or PS utterances such as those pertaining to the game 'More bubbles' or related to selecting an activity, such as 'I like playing with animals.' The number and the content of cells visible on the display are actively and deliberately adjusted to reflect the expectations of a child's potential. Eventually, PS utterances are primarily used to recount the life events of the aided communicators, to discuss particular situations or topics, and to control the progress of conversations (Todman et al., 2008). For example, during their school lessons, pupils may request a turn ('I have something to say'), ask about their homework ('What do we have for homework?'), or comment on a story ('That's spooky').

1 Whole utterance approach

High technology communication systems based on PS utterances have been developed since the 1980s referred to as the 'whole utterance approach' (Todman et al., 2008). Communication software that is based on the whole utterance approach is generally designed for non-speaking adults who communicate through spelling. This also allows them to use text entry with word prediction (Todman et al., 2008). This approach not only focuses on PS utterances, but also on being able to access them at the appropriate time and with minimum effort. Several researchers have utilized natural language processing as well as speech recognition to organize PS utterances on the display, and to develop more effective communication systems (see, for example, Dye et al., 1998; Todman and Rzepecka, 2003; Wisenburn and Higginbotham, 2009). However, most of the reported software continue to be prototypes, and few have entered the commercial market.

Theoretically, this approach is based on studies of conversations, such as conversation analysis (CA) as well on the psycholinguistic model of formulaic language (Todman et al., 2008). CA has demonstrated that some recurrent actions are repeated in conversations, such as openings and closings (Schegloff, 2007). The psycholinguistic model asserts that language is learned and used in word strings that are stored and retrieved from memory as a single large unit, that is, as formulaic language (Wray and Perkins, 2000). These strings are used to manipulate others through use of commands, requests and politeness markers as well as to assert a separate identity, such as by storytelling and turn-holding. The strings are also used to assert group identity through the use of social phrases.

Research on the usage of PS utterances are often linked to the development of communication software based on the whole utterance approach. Most are implemented with adults, with the exception of Waller's studies (2003, 2006) on young aided communicators' storytelling through PS utterances and writing. While many researchers have analysed the use of PS utterances, their studies have rarely focused on participant practices within everyday interaction (for exceptions, see Koole and Mak, 2014; Waller, 2006). Instead, past research has emphasized the number of initiations by participants (Alm et al., 1993), their opinions and experiences (Todman, 2000; Wisenburn and Higginbotham, 2009), the speaker's communication rate or timing (Todman and Rzepecka, 2003) as well as the success of the communicative tasks (Dye et al., 1998). Most of these previous studies were implemented in specific situations or conversations with restricted topics.

Many studies on PS utterances have nonetheless reported that these utterances affect conversations positively. Communication partners, independent observers, and aided communicators

themselves usually describe conversations that contain PS utterances as natural, spontaneous, and enjoyable (Lunn et al., 2003; Wisenburn and Higginbotham, 2009). PS utterances are also recommended as a tool for social and personalized conversations that facilitate a speaker's belonging to a group (Koole and Mak, 2014). Participation is often asymmetric in aided conversations and this is manifested in aspects of aided communicators' interactions such as their minor initiations (Clarke, 2016). PS utterances may offer aided communicators quicker opportunities to participate in conversations and more control by increasing their initiations and means to display recipiency (Alm et al., 1993; Koole and Mak, 2014; Waller and O'Mara, 2003). These positive effects are reportedly reinforceable through practice (Koole and Mak, 2014; Todman, 2000; Waller, 2006). Even so, in comparative studies that estimate the preference of independent observers for PS utterances over writing, the observers' priorities depended on the context and the adequacy of the content of PS utterances in situ (see Bedrosian et al., 2003; Lunn et al., 2003).

2 Divergent views on the benefits of pre-stored utterances

Researchers and professionals share an understanding of two benefits that PS utterances offer conversations. First, the utterances include more words per turns than the typical SBS utterances, which are often short and ungrammatical (Binger and Light, 2008; Lunn et al., 2003). Second, PS utterances are faster to produce and demand fewer activations than SBS utterances (Clarke, 2016; Todman, 2000). Children and adults who use communication devices orient to furthering conversations in the same manner as their speaking partners (Higginbotham et al., 2016; Savolainen et al., 2020). PS utterances offer aided communicators a tool to minimize the delay between words that would otherwise not only affect their communicative fluency in many ways, but would also affect the length of their conversations (Koole and Mak, 2014; Wisenburn and Higginbotham, 2009).

Despite these benefits and the positive effects on conversations reported by studies on the whole utterance approach, some scholars and aided communicators have divergent views on the usability of PS utterances in aided conversations. Those who prioritize (recommending) to use of SBS utterances emphasize the fact that aided communicators need to have an opportunity to express themselves precisely in constantly changing situations, which at the same time develops their linguistic competence (e.g. Jagoe and Smith, 2016; Light, 1997; Rackensperger et al., 2005). Professionals may recognize the utility of faster communication and add some PS utterances to communication systems, but they may nonetheless prefer the SBS procedure, as SLT Hill does in her writing on decision-making in augmentative and alternative communication (AAC).[3] Hill states that using PS utterances forces aided communicators to select expressions that are not necessarily close to their original idea, which may effect to their willingness to communicate. In addition, the users of PS utterances '[m]ay have to tolerate features in a string that they would never have generated themselves' (Wray, 2002, p. 127). Aided communicators may feel that they need to continuously revise the linguistic forms of their PS utterances to accommodate the changing situations and their life events. It is difficult to anticipate emerging topics in advance because communication adapts to the time, place, season, news, and audience (Balandin and Iacono, 1998; Rackensperger et al., 2005).

According to Newell (2011) these differing attitudes were at their strongest when developing the whole utterance approach started. The approach was allegedly unethical, and the developers were accused of '[p]utting words into the mouths of AAC [augmentative and alternative communication] users' (p. 56). Even though Newell (2011) argues that these negative attitudes have changed, PS utterances continue to be typically considered more relevant in specific situations (Jagoe and Smith, 2016). Light (1997) has pondered whether the use of PS utterances '[l]ock the children into set scripts or patterns of interaction' (p. 165), and recommended offering access to PS utterances as well as to separate symbols.

3 Social actions of utterance are co-constructed

CA studies have revealed how conversationalists co-construct the social meanings of turns (social actions) moment by moment during the flow of conversations (Levinson, 2013). As conversations are unique, the same utterance may have several different social actions depending on the conversation (Schegloff, 2007). When participants interpret and produce social actions, they utilize several interactional resources, such as linguistic meanings, sequential positions,[4] the larger course of action and the background they share with other speakers (for example, see Goodwin, 2000). If they only utilize the linguistic form of an utterance, their interpretation of this utterance in situ might be misleading. Besides a shared understanding, participants orient to advancing conversations (Levinson, 2013). The temporal progress is evident when different units, such as sounds, words, turns and sequences are consecutive, and when social actions develop piece by piece in relation to the preceding conversation (Schegloff, 2007). Each next turn is therefore a tool to analyse the prior turn, revealing the participants' understanding or misunderstanding of other participants' social actions (Schegloff, 2007).

Studies of augmentative and alternative communication (AAC) that have adopted CA to examine human interaction have demonstrated that aided conversations are fundamentally interactive (Clarke et al., 2013; Higginbotham et al., 2016). They emphasize the co-construction process and how it is manifested when using communication devices in conversations concerning explicit negotiations on interpretations (for instance, see Auer and Hörmeyer, 2017). Many studies on conversations that utilize SBS utterances report that misunderstandings are common because short and ungrammatical utterances as well as the delays between symbols all pose challenges in understanding the turn position in a sequence (Binger and Light, 2008; Clarke and Wilkinson, 2008). Some previous studies that examine communication systems and adopt the whole utterance approach have reported an improvement in shared understanding (see Wisenburn and Higginbotham, 2009), but there is a lack of research on how participants co-construct their shared understanding of social actions that are formed by PS utterances in conversations. Some evidence suggests that during description tasks, communication partners tend to interpret PS utterances explicitly in terms of their linguistic form, even though aided communicators were using their creative and non-literal meanings (Jagoe and Smith, 2016).

This study analyses how participants orient to PS utterances in everyday conversations when aided communicators decide whether to produce an utterance by using either an SBS or a PS. By identifying how participants co-construct the social actions of PS utterances and further their conversations, the main of objective of our analysis is to acquire a more profound understanding of the linguistic and temporal resources[5] of PS utterances.

II Method

This study used inductive video-based observations to reveal how participants co-construct the social actions of PS utterances. The process of analysis applied CA conventions and was supplemented by details from transcriptions and repeated video observations (Hoey and Kendrick, 2017). This study was approved by the appropriate ethics boards at the authors' institution.

1 Participants

Participants were recruited from a special school for children and youth with physical disabilities. After permission was granted by the school principal, the school SLTs sent a recruitment letter to four families that had a nonspeaking child who was currently using an SGD and a communication

Table 1. A summary of participant characteristics using aided communication.

Name	Age	GDV[a]	CFCS[b]	Diagnosis	Speech	Time using TAIKE (in years)	Access method
Jaakko	18	12	III	Aicardi Goutières syndrome	Some words produced with vowels	8	Mouse
Paavo	11	5[c]	IV	Dyskinetic cerebral palsy (mild)	Unintelligible words	2	Finger pointing
Kalle	10	0	II–III	Arterial ischemic stroke of brainstem, Tetra- and bulbar paresis	Vocalizing	4	Finger pointing
Veeti	7	1.5[d]	II	Dyskinetic cerebral palsy (severe)	Vocalizing	2	Gaze

Notes. Age is given in years at the time of video recordings. GDV = the gap between the developmental and verbal age in years (Except for Kalle, participants' verbal age was lower than their developmental age); CFCS = Communication Function Classification System with levels I-IV (Hidecker et al., 2011). [a]Assessed by a psychologist, not measured for this research. [b]Assessed by the speech and language therapist who was responsible for the participants' therapy, not measured for this research. [c]The developmental age was 9 years old at the time of the assessment. [d]The developmental age was 6 years and 7 months at the time of the assessment.

book for everyday interactions. All participants granted their informed consent. For participants under 18 years old, both parents signed the informed consent form. Ethical approval was obtained from the University of Helsinki Ethical Review Board in the Humanities and Social and Behavioral Sciences.

The aided communicators in this study were all male and their ages ranged from 7 to 18 years. Their pseudonyms for this study were Jaakko, Paavo, Kalle, and Veeti (Table 1). In addition to the use of communication aids, Paavo communicated with more than 100 manual signs, while Kalle used only a few manual signs and gestures. All the aided communicators were able to produce multi-word SBS utterances, although their utterances were not always fully formed syntactically. All of them, except Paavo, used a wheelchair. Their communication partners were their mothers, peers, and SLTs. The SLTs had trained each mother to support their son's interaction with SGDs. The aided communicators selected their peers from school and they all had experience in interacting with different AAC means. The length of the aided communicators' relationship with their peers and SLTs varied from 1 to 16 years.

2 The TAIKE communication application

During the conversations reported in these data, all of the aided participants used an SGD with Boardmaker® communication software with Speaking Dynamically Pro v.6.1[6] and the Finnish communication application, TAIKE© v.2.2.[7] TAIKE is a large dynamic communication system that includes hundreds of displays and thousands of symbols (Savolainen, 2010). The aided communicator can either use PS or SBS utterances. The number of symbols and their arrangement varies across display pages (with a maximum of 65 symbols). These display pages are linked to a main menu, which is designed to support conversations and also includes routes to vocabulary, letters, and the aided communicator's own material (Figure 1).

The PS utterances in TAIKE are created to manage a conversation with openings questions, comments, answers, compensation and repair strategies, and closings as well as to discuss the lives
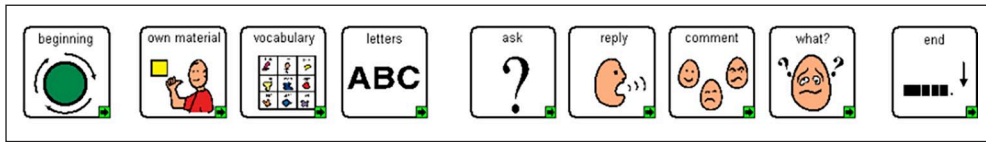
Figure 1. The main menu of the TAIKE communication application display.

or another specific topics of aided communicators, such as friendship, riding, movies, childhood, or a birthdays. PS utterances are also used to conduct discussions during an activity, such as role playing, joking, or visiting either a doctor or a library. TAIKE users consult with their communication partners and professionals when they decide on the topics and activities that are appropriate for their communication needs and then link those displays to the system. Some of the PS utterances in TAIKE are functional for every user, such as 'Hello' and 'What's your name?', whereas others require modifications that are tailored to their individual needs, such as 'My name is Jaakko' or 'Last summer, we travelled to Australia.' The PS utterances are predominately Finnish colloquial forms that have partly different phonetic forms, vocabulary and sentence structures than formal language (Saukkonen, 1970).

3 Setting and procedures

The data for this study are drawn from 20 video-recorded conversations. The duration of these conversations was not specified beforehand, and they ranged from 5 to 63 minutes across dyads (see Supplemental Table 1). The participants were informed that the study focused on conversation, and they were instructed to engage in a typical interactive situation without a specific goal, such as eating dinner, lying on the couch, playing and discuss on topics, of their choice. The aided communicators conversed with their mothers at their respective homes and with their peers and SLTs at school.

A single video camera[8] was used to record each conversation. This camera was positioned to ensure that the upper part of both participants' bodies as well as the communication device were visible. At school, the camera was set up by the first researcher or staff members, and at home, by family members. The researchers were not present during the recording sessions. Families were provided with a video camera, instructions for framing the video shot, and strategies for solving common video-recording problems. The participants were free to organize the seating arrangements themselves before recording began.

4 Data collection

First, we transcribed the 20 conversations with InqScribe4,[9] a digital media transcription tool to preserve the basic sequential organization of the conversations. To select the data for analysis, we searched 20 conversations for sequences that contained aided communicator turns consisting of one or more PS utterance(s) (see Supplemental Table 1). The number of turns in the PS utterances that occurred in each of the 20 conversations varied from 0 to 51. We excluded four conversations that contained no PS utterances to ensure a balanced collection of data between the aided communicators. We also excluded two randomly selected conversations by one participant, Paavo, who used PS utterances extensively in each conversation. The data for the analysis, therefore, consisted of 14 conversations and 260 turns of PS utterance(s).

5 Data analysis

CA approaches human interaction from the perspective of practices that speakers use to co-construct conversations moment by moment (Ten Have, 2007). Although each conversation is understood as being unique, some practices that conversationalists adopt during interaction are conventional (Hoey and Kendrick, 2017). Our analysis therefore began by identifying a candidate phenomenon from data sessions conducted by researchers who were familiar with the CA method and who made repeated observations about the videos (Hoey and Kendrick, 2017). Our first observation was that the sequences with the PS utterances predominantly resembled natural spoken conversations. The co-authors and CA researchers made repeated viewings and analyses of the video-taped data. We discovered that in addition to length and speed that are generally mentioned in prior studies, PS utterances provided speakers with multiform linguistic and temporal resources. Furthermore, imprecise PS utterances did not generally result in complex repair sequences. These analyses were based on the details that were observed in the conversationalists' behavior, and more specifically in the actions that they themselves consider relevant in the organization of talk (Ten Have, 2007). Our central methodological resource is the next-turn proof procedure (Sacks et al., 1974). Each (next) turn in a conversation reveals the speaker's interpretation of the prior turn in a part of a sequence and in the larger course of action for the conversation (Schegloff, 2007). To understand the vast amount of data gathered for this study, we grouped the turns (PS utterances and participants' actions) according to the variables that emerged during analysis. In CA, quantitative data is regarded as background information for the microanalysis of participant practices in situ (Ten Have, 2007).

Excerpts have been selected to demonstrate the participants' multifaceted practices in utilizing the linguistic and temporal resources of PS utterances in everyday interaction, and to ascertain how the exchanges resemble natural spoken conversations. We present cases of participants who (1) share an understanding and co-construct several social actions for one turn by exploiting different linguistic and temporal resources, (2) utilize the diversity of resources when co-constructing the social action of linguistic imprecise utterance, and (3) further conversations by utilizing linguistic and temporal resources of PS utterances. These excerpts were transcribed using both the traditional CA conventions developed by Jefferson (2004) as well as the AAC conventions proposed by von Tetzchner and Basil (2011) (Appendix 1).

III Results

This section begins with a description of PS utterances, followed by our analysis of the excerpts to demonstrate how the participants used them in everyday interaction. The analysis of excerpts presents the linguistic composition of the PS turn first and then states its temporal position within a sequence as well as within the larger course of actions (see Hoey and Kendrick, 2017).

1 Description of the PS utterances in the study

The selected turns of PS utterances most often occurred in the first pair part position of the sequence (211/260) as in the question 'Who is your best friend?' The turns consisted of one or more PS utterance(s) that were either syntactically complete or incomplete, such as 'Do you remember . . .?' They also either represented the topic themselves or were a part of several sequences concerning the same topic or activity. Repetitions of the same PS utterances in different sequences were rare. Due to the internal organization of TAIKE, the PS utterances were most often used when

Table 2. Percentages of using pre-stored utterances for different purposes.

Aided communicators	Using pre-stored utterances*			n
	Managing conversation	Discussing a specific topic	Discussing in activity	
Jaakko	24	66	10	21
Paavo	18	30	52	127
Kalle	15	42	43	78
Veeti	64	36	0	34
Total	23%	39%	38%	260

Note. * The purpose is classified according to the organization of TAIKE.

the participants discussed different topics and performed various activities, but the aided communicators displayed substantial differences (Table 2). For example, Veeti predominately used PS utterances to manage conversations. The topics included in the conversations were past events, mutual acquaintances, traveling, childhood, and relationships between boys and girls. The activities that occurred in the conversations were playing doctor, shopping, listening to music, and guessing games. The trajectories of PS utterances during a specific activity or topic were tailored to the context, and did not follow any order defined beforehand.

2 Linguistic and temporal resources that facilitate shared understanding and various social actions

The participants in this study typically shared an understanding of the social actions of PS utterances, and co-constructed several situational social actions for one PS utterance. In this study, a majority of the speaking partners (81%) produced their interpretations implicitly during the next turn (see Heritage, 1984), and the need to repair was not prevalent (10% of partners' next turns).[10] When this need occurred, the speaking partner generally specified the reference or offered a candidate understanding.

Excerpt 1 illustrates how the participants utilize the different linguistic and temporal resources of PS utterances to facilitate shared understanding and various social actions during a discussion. In this excerpt, Jaakko shares his personal fondness for his relatives by using a PS utterance, and the SLT interprets it as his justification for discussing his relatives often.

Excerpt 1. Jaakko justifies his habit of discussing his relatives with a PS utterance.

Line	Time	Person	Transcription
01	0.0		⌈ ((SLT↔J)) ((Jaakko laughs))
02	0.0	SLT	⎮ £ se on kestoteema. joo. £
			⌊ *it is a common theme. yes.*
03	3.0	Jaakko	⌈ ((J → SGD))
04	3.0	SLT	⎮ £ mä * tiedän. (2.8) * mä tiedän sen homman. £
			⌊ *I know. I know that thing.*
05 ➡	7.9	Jaakko	£ * "mun kaikki sukulaiset on mulle tosi rakkaita" £
			all my relatives are very dear to me.
06	11.2	SLT	£ no kyllä juuri näin. £ ja siksipä niistä sitten puhut
			well absolutely so. and that's why you speak of them

(Continued)

Excerpt 1. (Continued)

Line	Time	Person	Transcription
07	16.1	Jaakko	((J → SLT, laughs))
08	16.1	SLT	*eiks nii.* **isn't it**
09	17.1	Jaakko	((nods))
10	17.2	SLT	((nods)) *mm. joo.* *mm. yes.*

This excerpt contains the linguistic form of the PS utterance 'all my relatives are very dear to me'[11] which is colloquial (line 5) and it contains words that both specify the linguistic meaning of the utterance ('all', 'to me') and intensify this meaning ('very') (VISK §570, §615). The SLT utilizes the syntactic completeness of the utterance and begins her turn, even although Jaakko does not shift his gaze to the SLT to mark the end of his turn. At the end of a turn, speakers usually shift their gaze to the recipient both in spoken and aided conversations, but in these data, the aided communicators only did so at the end of 64% of the PS utterances.

The social action of the PS utterance 'all my relatives are very dear to me' develops when considering the larger course of actions. Prior to that excerpt, Jaakko and his SLT state that they often discuss Jaakko's relatives. The SLT proposes that occasionally they could also discuss other topics, but Jaakko rejects that suggestion. While the participants disagree, they both express a mutual position during the excerpt through their smiling and laughing.

At the beginning of the excerpt, the SLT expands the previous sequence by confirming she knows Jaakko's opinion on his favorite topic: 'it is a common theme. Yes. I know' (line 2). As a part of the larger course of action, Jaakko simultaneously begins to prepare for his turn by activating navigation symbols to stay in time. There is a delay of 2.8 seconds. The SLT fills the space by adding an increment, 'I know that thing', which does not insert new information, but indicates that she is ready to give the floor to Jaakko (Schegloff, 2007). Jaakko takes his turn immediately and begins a new sequence by using the PS utterance of 'all my relatives are very dear to me', which emphasizes the importance of his relatives to him (line 5). The SLT produces the implicit interpretation in her next turn and first indicates pronounced agreement with Jaakko in stating 'well absolutely so'. Implicit interpretations allow the conversation to progress more quickly than explicit interpretation sequences, such as 'Do you mean . . .?'

The utterances following the agreement demonstrate that Jaakko and the SLT interpret the PS utterance as an act of communicating a meaning other than a statement on the importance of relatives. The SLT's utterance 'that's why you speak of them' reveals that she interprets Jaakko's PS utterance as a justification for his habit of mentioning his relatives often (line 6). Jaakko gazes at the SLT and begins to laugh. At the same time, the SLT invites a like-minded response by stating: 'isn't it', which Jaakko confirms by nodding (line 9). The SLT closes the sequence by nodding and saying 'mm. yes' (line 10), which confirms their shared understanding of the PS utterance as a justificatory account, not only a description of something pleasant.

In brief, Jaakko and his SLT co-constructed the social action by utilizing the linguistic form (such as syntactic completeness and linguistic intensifiers) of a PS utterance, its clear position as a first pair part in the sequence, and the fluent transition in the larger course of action. Their familiarity with each other and their displays of emotions (smile and laughter) together with their disagreement contributed to the humor as one of the social actions present in the conversation (Schnurr, 2010). The progression of the PS utterance turn was fluent and the SLT interpreted its meaning implicitly in her next turn.

3 Different resources support the co-construction of social action in imprecise linguistic utterances

In these data, the participants did not appear to be challenged by co-constructing the shared understanding of their social actions. Excerpt 2 demonstrates that participants utilize diverse resources during the co-construction process when one resource is inadequate. During the following excerpt, Veeti returned to the previous topic by posing an imprecise PS question for this context, and the participants resolved the challenge easily.

Excerpt 2. Veeti asks about the SLT's Easter vacation using an imprecise PS utterance.

Line	Time	Person	Transcription
01	0.0		((V → SGD)) ((SLT → V))
02	2.7	Veeti	*"mitä sä aiot tehdä"* (0.9) *"lomalla"* ((V → down)) **"what are you going to do" "on vacation"**
03	7.0	SLT	((SLT → SGD)) ((SLT → V)) *lomalla. millä lomalla* **on vacation. which vacation**
04	8.8		(1.8)
05	10.6	Veeti	((V → SGD)) ((vocalizes)) (10.0) ((V ↔ SLT)) *"pääsiäisloma"* **"Easter vacation"**
06	25.4	SLT	*ai niin niin et. mitä mä tein pääsiäislomalla.* **yeah so so that. what I did on Easter vacation.**
07	27.4	SLT	*nytte viime viikonloppuna.* **now on the last weekend.**
08	28.9	Veeti	((nods, smiles, vocalizes))

The PS utterance in this excerpt (line 2) is produced in two parts that consist of an incomplete utterance and one word. The linguistic form of the first part, 'what are you going to do', consists of the dialectal word [sä] (the literal form of 'you' in Finnish is [sinä]), which indicates that Veeti is inquiring about the SLT's future plans. The second part, 'on vacation', specifies the time.[12] After that utterance, Veeti lowers his head. The utterance is a syntactically complete question, but the SLT has difficulty understanding its message because the linguistic reference to the vacation is imprecise, as the video was recorded 3 months before the next holiday season.

The challenges in comprehension during this excerpt focused on the linguistic composition of the PS utterance, and the participants solved it together through producing a short elaboration and by the larger course of actions. Earlier in the conversation, Veeti and his SLT had discussed Veeti's Easter vacation, but the two immediately preceding sequences covered other topics. After Veeti's PS question, which occurs in the first pair part of the sequence, the SLT glances at the SGD and subsequently initiates a repair sequence by requesting a clarification, 'on which vacation'. After a short delay (1.8s), Veeti raises his head, vocalizes, and begins to prepare his reply 'Easter vacation' (line 5). The SLT understands that Veeti used the PS utterance with a literally imprecise meaning and the wrong verb tense and offers a candidate understanding of the reference of time. First, she uses the Finnish particle 'ai' to indicate that Veeti's reply includes new information (VISK §798). Then, she re-formulates the utterance 'what I did on Easter vacation' and specifies the time 'now on the last weekend' (lines 6-7). After Veeti's confirmation, the SLT begins a longer telling turn, and interprets Veeti's question as a request to tell a story. The clarification of the imprecise verb tense took approximately 22 seconds from line 3 to 8.

In short, the imprecise linguistic form of the PS utterance did not result in a long repair sequence. Veeti and his SLT utilized the larger course of actions, the syntactically complete form of the

question and its clear position as a first pair part, when they produced and interpreted the meaning of the PS utterance.

4 Temporal and linguistic resources that further conversations

Excerpt 3 demonstrates that the participants use both temporal and linguistic resources offered by PS utterances to facilitate a transition from one conversation to another. In the excerpt, the video recording between Kalle and his friend Eino has just begun, but the researcher remains in the room to prepare the recording. The excerpt is divided into three sequences, and the duration is 52 seconds. Turn-transitions that occurred before the turns of PS utterances were created by overlapping or latching with the prior turn in 48% of the turn-transitions in this data. During the first two sequences, Kalle is the only person who is visible in the video. The first sequence illustrates how Kalle initiates the transition by using PS utterances that close conversations, and the researcher agrees that it is time for her to leave.

Excerpt 3a. Kalle attempts to close a situation with a PS utterance.

Line	Time	Person	Transcription
01	0.0	Kalle	⌈ ((K → SGD)) *
02	0.0	R	| onkse hyvä idea
			⌊*is that a good idea*
03 ➡	0.9	Kalle	* *"moi"*((raises hand, K → R)) *"moi"*((raises hand, K → R → SGD))
			"hi" *"hi"*
04	6.9	R	sanoksä ↑mulle että moikka
			do you say bye-bye to ↑me
05 ➡	8.0	Kalle	* (2.9) * *"hei-hei"* ((K → R))
			"bye-bye"
06	11.9	R	no niin. heippa heippa.
			alright. bye-bye.

Excerpt 3a contains the PS utterances [moi-moi] and [hei-hei], which are not multi-word utterances but institutionalized social phrases to close conversations, and their meaning remains exactly the same. The TAIKE communication system has sections on opening and closing conversations. For the first goodbye in line 3, Kalle uses the section on opening conversations. He states 'hi', raises his hand, glances at the researcher, and repeats them once. The Finnish [moi] can both open and close a conversation, but when it is repeated as [moi-moi], it usually expresses a closing situation. For the second goodbye in line 5, Kalle uses a cell from the section on closing conversations, which is produced three seconds faster than the first goodbye was produced.

During the goodbyes, participants negotiate whose turn it is as well as to whom the PS utterance is intended. Kalle begins to produce his first goodbye simultaneously with the researcher who asks, 'is that a good idea' (line 2), which refers to her previous proposal that while they are having the discussion, Eino can simultaneously make himself sandwiches and eat them. The boys ignore that previous proposal, and the researcher does not demand a reply. Kalle continues his turn and produces the first goodbye. The general convention is that recipients reply immediately after terminal utterances (Schegloff, 1973), but the researcher inquires 'do you say bye-bye to me' (line 4), and stresses the word 'me' as she seeks confirmation that Kalle is closing the conversation with her, instead of opening it with Eino. Kalle reaffirms the social action of closing the conversation with the second goodbye. The researcher replies with goodbye, which communicates that she intends to leave the room.

To summarize, Kalle furthered the transition to the conversation with his friend by initiating the transition. He utilized the PS social phrases to close the conversation in two different ways and indicated explicitly to the researcher that it was time for her to leave.

During Excerpt 3b, the researcher continues the arrangements for the recording, although she replied to the goodbyes in the previous sequence. Kalle uses a PS utterance to encourage her to leave the room, and the researcher assures him that she is leaving.

Excerpt 3b. Kalle urges the researcher to leave room with a PS utterance.

Line	Time	Person	Transcription
07	11.9	Kalle	((K → R))
08	11.9	R	*no niin. heippa heippa. mä pistän- mä oon täällä näin. sitte*
			alright. bye-bye. I put- I'm right here. then
09	15.0	R	⌈*(xxxx)*⌉
10	15.0	Kalle	((K → SGD))
11	15.0	Eino	⌊*onks* ⌋ *toi kamera päällä vielä.*
			⌊ **is** ⌋ **that camera still on.**
12	16.9	Kalle	((K → R))
13	16.9	R	*on se päällä. mut ei teiän tartte siitä perustaa. mä oon täällä ja*
			yes it's. but you don't have to care about it. I'm here and
14	20.7	Kalle	((K → SGD))
15	20.7	R	*tota.* (1.8) *sitte sijota ittes ⌈tonne noin (xxx)* ⌉
			well. then position yourself ⌊there (xxx)⌋
16	24.0	Kalle ➡	* ⌊*"eipä siitä sitten sen ⌊enempää"*
			⌊**"nothing more about⌋ it"** ((K → R))
17	25.7	R	*((laughs))* ⌈*tohon. joo. menen. menen. joo.*
			⌊**there. yes. I'm going. I'm going. yes.**
18	25.7	Kalle	⌊((begins to sign HURRY))
	28.0		During the next phase, which is not transcribed, the researcher once again guides Eino as to how he needs to position himself. Eino requests that the researcher leave the room, after which they continue to negotiate about whether the door should be closed during the recording.

The linguistic composition of the PS utterance 'nothing more about it then'[13] (line 16) is non-grammatical without a verb. Its Finnish form includes a clitic particle [ei-PÄ] that reinforces the contrastive meaning of the utterance (VISK §833). The PS utterance is an idiomatic social phrase and its linguistic meaning is impossible to describe without context, as it is more than the sum of its parts. During this conversation, the participants interpret it as a request for the researcher to leave the room, but in another context, it could be considered as an act of closing a conversation on an unpleasant topic.

This social action is shaped through the sequence and the larger course of actions. At the beginning of Excerpt 3b, the researcher is aware that Kalle is waiting for her to leave, but she continues to adjust the recording and stumbles over her words (lines 8, 13, 15). Both boys interrupt her. First, Eino overlaps by asking 'is that camera still on' (line 11), and Kalle later overlaps with the PS utterance 'nothing more about it then'. Prior to producing this PS utterance, Kalle follows the researcher's preparation for the recording for 24 seconds. The PS utterance makes the researcher laugh, and she assures Kalle that she is indeed leaving with the following repetitions: 'yes. I'm going. I'm going. Yes' (line 17). Simultaneously, Kalle signs 'hurry', which intensifies his request for her to leave the room (line 18).

To summarize, Kalle rushed the transition to the conversation with his friend by overlapping his turn with the researcher's turn and by using the PS social phrase as well as signing. The researcher then assured him that she was leaving. In the last sequence (Excerpt 3c), the researcher has finally left the room. Kalle uses a PS comment to connect the previous situation to the present, but Eino does not share his stance.

During Excerpt 3c, Kalle uses the same PS utterance twice (lines 20 and 22). He first produces the incomplete utterance 'wasn't it' and then the word 'terrible'. For the second utterance, Kalle activates the TAIKE message window, which produces the comment in its complete form 'wasn't it terrible'. The linguistic composition of the utterance has clitic particles [-KS] and [-KIN] that invite a like-minded response although it is in a negative form and displays that the conversationalists share their knowledge on the previous issue (VISK §836, §1694). Kalle's smile during the first PS utterance reveals his own orientation to the utterance, although he turns his gaze to Eino only after Eino's reply.

Excerpt 3c. Kalle comments on the researcher with a PS utterance.

Line	Time	Person	Transcription
19	35.8	Kalle	((K → SGD)) ((door bangs)) ((smiles))
20	37.8	Kalle ➡	* *"eiks ollutkin"* ((glance at the door)) * *"kauhea."* **"wasn't it"** **"terrible"**
21	45.8	Eino	*ei ollu kauhea.* **(no it) wasn't terrible**
22	47.7	Kalle ➡	* *"eiks ollutkin kauhea."* **"wasn't it terrible"**
23	50.0	Eino	*((walks toward Kalle)) ei ollu* **no it wasn't**
24	51.7		((K → E))

The social actions of turns are always co-constructed, and this excerpt reflects how the participants' different stances affect the co-construction process. The excerpt begins when the researcher leaves the room. The door bangs shut and Kalle smiles and immediately states, 'wasn't it'. He subsequently confirms that the door is closed by glancing at the door, and he then continues with the word 'terrible' (lines 19-20). By synchronizing the position of the negative word, he implicitly displays that he is telling a secret. Eino does not, however, share his stance and disagrees by stating, '(no it) wasn't terrible' (line 21). Kalle continues to seek affiliation, but Eino maintains his opinion by stating, 'no it wasn't' (lines 22-23). During the sequence, the spoken and the aided turns latch without delays, and the sequence proceeds fluently.

To summarize, Kalle used the PS comment on the researcher to create a bridge between the previous and present situations. By synchronizing the position of the negative word, he increased the tension in the conversation. He also invited Eino to share his humor by utilizing the linguistic nuances of the PS utterance and smiling, but Eino did not share his stance.

IV Discussion

The qualitative analysis revealed that the conversations that were included in these data resembled natural spoken conversations. In addition to other interactional resources, the participants utilized the linguistic and temporal resources that PS utterances offer to co-construct various and rich social actions and to further the progress of conversations. Some of the resources were only achievable

with PS utterances (not with SBS utterances). Linguistic nuances are an example of this. The other resources, such as implicit interpretations by speaking partners, supported the general flow of conversations. They could be recognized in any aided conversations, but the resources were emphasized in these data. It is noteworthy that PS utterances decreased the challenges that typically arise for aided conversations, such as slowness and linguistic poverty. The PS utterances also functioned well when the participants discussed different topics, engaged in various activities as well as when they managed their conversations (see Jagoe and Smith, 2016). It is important to note that the participants of this study could always choose when to use PS utterances and when to use SBS utterances according to their situational needs, which is possibly the one reason for the positive effects on their conversations. If professionals recognize the linguistic and the temporal resources of PS utterances, they are then able to offer recommendations, teach, and guide aided communicators in utilizing the PS utterances together with SBS utterances.

1 Linguistic resources of PS utterances

It is apparent that PS utterances are easier to understand when they consist of multiple words, and are grammatically correct and completely formed, in contrast to the typically short, ungrammatical SBS utterances (Binger and Light, 2008). The data serve as evidence of the prevalent shared understanding, the implicit interpretations in next turns and fluent repairing sequences (see Alm and Newell, 1996; Clarke and Wilkinson, 2008). Another observation was that when one linguistic feature was imprecise, as the verb tense was in Excerpt 2, the participants could utilize other linguistic features and interactional resources to resolve the challenge without difficulty.

The PS utterances in these data were generally colloquial forms, and their linguistic details varied. They included short intensifying words, dialectal words, and clitic particles. The role of these linguistic nuances was significant in co-constructing the diverse social actions. If aided communicators had inserted these linguistic details by SBS utterances, they would have required more time to produce the utterance. In reality, the communication systems rarely have those symbols and even if they would have them, the meaning of some PS utterances could not have been produced by SBS utterances. For example, the PS utterance 'wasn't it terrible' could be replaced with the SBS utterance 'she' 'was' 'terrible', but then it would give the impression that Kalle was insulting Eino rather than inviting him to share humor (Excerpt 3c). Besides these linguistic details, the idiomatic social phrases, such as 'nothing more about it' (*eipä siitä sitten sen enempää*) in Excerpt 3b, constitute one form of colloquial language that is challenging to express with SBS utterances, but that is also significant when creating a group identity (Wray and Perkins, 2000).

In spoken and aided conversations, speakers generally shift their gaze to a recipient at the end of their turn (see Clarke et al., 2013; Stivers and Rossano, 2010). The aided communicators in this study did not necessarily perform this to signal turn-transition, but their speaking partners began their turns after concluding that an aided communicator's turn was at its end. They based this on the syntactic completeness of a PS utterance (Excerpts 1, 2, 3c). The data analysed in this study did not allow us to more accurately determine whether the unconventional gaze practice is connected to the use of PS utterances in general.

Speakers in conversations alter their turns moment by moment to accommodate the recipient (Stivers and Rossano, 2010). PS utterances that are set on the cells of an SGD do not offer the possibility to create linguistic content in situ. The use of incomplete PS utterances with separate words allows, however, for some creativity in situ and an opportunity to express the aforementioned linguistic nuances (Excerpts 2, 3c). The fact that aided communicators are not always the ones who decide the linguistic forms of PS utterances, and that they sometimes need to tolerate linguistic features they would not generate themselves (Wray, 2002), does not decrease the benefits of the linguistic details and the social phrases for interaction in situ. The linguistic resources of the

colloquial PS utterances appeared to help the speakers to co-construct various social actions, to express emotional stances and replace insufficient prosody of speech synthesis, to use language that resembles what the aided communicators hear in their spoken environment as well as to reinforce their sense of social cohesion (Binger and Light, 2008; Koole and Mak, 2014). It is noteworthy that using PS utterances refers to aided communicators' social and strategic communicative competence, and to their understanding of language, but it does not tell about their linguistic competence to produce utterances word by word (see Binger and Light, 2008).

2 Temporal resources of pre-stored utterances

The results of this study suggest that PS utterances also offered other temporal resources in addition to the rapid expressions, such as a clear position in the sequence, properly timed transitions and phrases that perform the social action of furthering conversations. The fact that PS utterances did not have delays between words must have helped our participants to recognize turn boundaries and the position of the utterance in a sequence (see Binger and Light, 2008; Clarke and Wilkinson, 2008), which may also explain the minimal number of misunderstandings in the data. The lack of long repair sequences that commonly occurred in aided conversations facilitated the progress of conversations (see Clarke and Wilkinson, 2008). PS utterances were more often positioned as the first pair part of a sequence than the second pair part. This result contrasts with some previous studies that report on aided communicator turns that frequently serve as responses. These turns are described as a shared practice that participants use to enhance their understanding and further aided conversations (Clarke, 2016). It could be argued that PS utterances make it easier for the aided communicators to take initiative because these utterances are effortless to understand even when they occur in the first position in a sequence. It appears that PS utterances bring balance to the symmetry of participation and offer the aided communicators an opportunity to establish their separate identity (Koole and Mak, 2014; Wray and Perkins, 2000).

By analysing why the PS utterance turns occurred where they did in the sequences, we also recognized that the participants were oriented to furthering the flow of conversations, as other studies of aided and spoken conversations have reported as well (Sacks et al., 1974; Savolainen et al., 2020). During their turn-transitions, the speaking partners allotted time to search for the PS utterance and the aided communicators anticipated their turn by beginning their preparations during their speaking partner's turn, which helped the aided communicators to latch their turn onto a spoken turn (Excerpts 1). Their turns also overlapped with spoken turns (Excerpt 3b), or they synchronized their action according to the social context, as Kalle did when he timed his comment with the closing of the door (Excerpt 3c). Some evidence suggests that the turn-transitions of this study appeared to occur in overlapping or latching with the prior turn (48% of turn-transitions) more often than in another study, in which both PS and SBS utterances were used (32 % of the turn-transitions) (see Savolainen et al., 2020). Further research is needed to determine the reasons for this difference. In any case, the combination of rapid turn-transitions and PS utterances reinforced the conversational coherence in this study. Besides these temporal resources, the aided communicators exploited linguistic resources that encouraged conversational flow (Excerpts 3a, 3b). These types of social phrases created a bridge between two situations or controlled the progress of situations that both advanced the conversations and strengthened the aided communicators' belonging to a group (Wray and Perkins, 2000).

3 Creative strategies or challenges in using PS utterances

The data in this study included some PS utterances that were used 'unusually'. In the excerpts, this becomes apparent when Veeti uses an imprecise verb tense to inquire about the SLT's last vacation

(Excerpt 2), and when Kalle closes the conversation by utilizing the display for opening conversations (Excerpt 3a). We cannot determine why the aided communicators used the PS utterances in this manner, or whether the aided communicator thought that this was unusual. On the one hand, it is possible that they used 'unusual' PS utterances as a creative strategy for furthering the conversation and trusted the familiar communication partner to interpret them correctly (see Bedrosian et al., 2003). On the other hand, it is possible that the 'unusual' utterances were misactivations that resulted from the aided communicators not remembering the exact contents of a cell, or they avoided possible challenges to produce the same content by a SBS utterance (see Jagoe and Smith, 2016; Light, 1997). Although the participants co-constructed the social actions of the 'unusual' PS utterances easily with their familiar communication partners, it is important to note that the fluency and co-constructed nature of conversations may nonetheless surpass the aided communicators' competence to use their complex communication devices when they interact with unfamiliar communication partners.

V Conclusion and clinical implications

The results of this study expand the overall perspective on the use of PS utterances. An analysis of participant practices that co-construct the social actions of PS utterances and further the progress of their conversations revealed that PS utterances offer resources including linguistic nuances and social phrases that are not possible by other aided means. It also revealed that the participants utilized the linguistic and temporal resources of PS utterances to:

- reinforce a shared understanding and various social actions;
- enable additional initiations that support aided communicators' participation in conversations;
- support maintaining the coherence of conversations;
- advance the flow of conversations;
- allow the creative use of PS utterances.

These observations serve as reasons for professionals working with children who use SGDs to consider the following suggestions:

1. SLTs and teachers must be informed of the aforementioned benefits of PS utterances, as aided communicators and their partners can use them to improve the naturalness of aided conversations. When the best characteristics of different practices (e.g. the use of SBS and PS utterances) are recognized and utilized, together they may create for their users much richer communicative opportunities than any of the practices alone.
2. The content for SGDs has to be planned so that aided communicators have an opportunity to:
   - express themselves by using both SBS utterances and PS utterances;
   - use incomplete PS utterances that allow them to express various social actions and simultaneously create new content in situ;
   - use PS utterances to discuss different topics, participate in different activities, and manage the progress of conversations.
3. Aided communicators require additional time and opportunities to familiarize themselves with the communication system in use and to discover the content independently. They also need to practice using the system with the help of SLTs and teachers as a part of interventions and schoolwork.

The limitations of the present study warrant some consideration for future studies. First, the data were restricted to the analysis of PS utterances. This excluded the comparison of sequences with PS and SBS utterances. A comparative study of these would enhance our understanding of the challenges and benefits in using them as well as increase our knowledge of aided communicators' practices in selecting the form of an utterance. Second, our analysis excluded cases of speaking partners who did not produce the second pair part after a PS utterance that was positioned as the first pair part. It appeared that these cases are related to the use of a device, and a complete understanding of this phenomenon would require additional research.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Utterance refers to a conversational unit that represents a social action (i.e. pragmatic function) (VISK §1004).
2. The symbols vary from the iconic (such as photographs) to the abstract (as in letters). The graphic symbol systems generally used in SGDs are somewhere between these two extremes.
3. www.asha.org/public/speech/disorders/communicationdecisions (accessed August 2020).
4. A sequence refers to a series of turns that is produced by different speakers and ordered as a first pair part (such as a question) that creates a position for the second pair part (such as an answer) (Schegloff, 2007). The sequence may occur in the second pair part, but it often expands to the third position, such as when the first speaker comments on an answer in the third position.
5. Temporal resource refers to the features that further the progress of conversations.
6. The Boardmaker® with the Speaking Dynamically Pro is a product of Tobii Dynavox of Danderyd; www.tobiidynavox.com/software (accessed August 2020).
7. TAIKE is a product of the Communication and Technology, Center Tikoteekki, of Helsinki; www.papunet.net/tikoteekki/materiaalit/taike (accessed August 2020).
8. Handycam HDR-CX24OE is a SONY product; www.sony.fi/electronics (accessed August 2020).
9. InqScribe is a product of the Inquirium, LCC; www.inqscribe.com (accessed August 2020).
10. The data also included 24 turns of PS utterances (9%) in the position of the first pair parts (such as a question or greeting), after which the partners did not produce the second pair part (such as a reply or a return to a greeting), which would be the next logical step. It appeared that they were often linked to the operational use of the SGD, such as misactivations, and owing to the large amount of data, these are not shown in the excerpt.

11. The utterance was located in the TAIKE in the display section titled 'Your own material', which consist of, for example, the favorite topics of each user. Jaakko moved to this display from the display of numbers.
12. The utterances were located in the 'Ask' section of TAIKE.
13. The utterance was located in the 'Closing' section of TAIKE.

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Appendix 1

Transcript notation

01	Bolded line number refers to a pre-stored (PS) utterance
Natural speech	Naturally spoken elements. Translations are in bold.
"Synthesized speech"	Utterances produced with a speech-generating device (SGD). Translations are in bold.
SIGN	Signed word. Translations are in bold.
*	Aided communicator activates the cell of an SGD.
.	Fall in intonation.
↑	Rise in intonation
[ ]	Overlap between multiple lines.
⎢⎢	
⎣ ⎦	
(1.0)	Time in seconds. Turn-transitions under 1 second are not transcribed.
(( ))	Non-verbal activities are described within parentheses.
£ £	Utterance between these symbols is expressed by smiling.
Gaze	Gaze is transcribed with capital letters referring to the participants and arrows in positions, in which the direction of the gaze changes; for example: ((SLT → J)) means 'SLT looks at Jaakko'; ((SLT ↔ J)) means 'SLT and Jaakko look at each other'