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AAC USERS' DISCOURSE IN THE WORKPLACE

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Introduction

Discourse in the workplace is different from everyday talk. The nature of the workplace requires workers to adapt their speech to the situations they face; for example, there may be differences in roles between interlocutors which must be considered with regard to politeness markers and so on. These issues are amplified for workers who use augmentative and alternative communication (AAC) devices to communicate with others because of a speech impairment. In addition to demands of the individual workplace, they must also adapt to the properties of their AAC device and to their ability to vocalize different words. During their work day, they may meet clients, teach classes or distribute schedules for others to follow. These activities may require very specific language that is different to what they would use in everyday interactions. They may also require assistance for some tasks where they need to explain what they require of others or simply work in synergy with colleagues. Collection and analysis of corpora can help us understand how AAC users use their devices and vocalize in the workplace. Ultimately, this better understanding can be used to improve the devices themselves and help AAC users develop best practices when using them in the workplace. At the moment, research using corpora to explore AAC users' discourse in the workplace is at its inception but is very promising. This chapter overviews the work that has already been done using corpora to research AAC users' discourse in the workplace and other relevant work that helps us understand

the reality of the experiences of AAC users in their work environment. This is followed by a corpus-based analysis using the AAC and non-AAC workplace corpus (ANAWC; Pickering et al., 2019; Pickering & Bruce, 2009) where we discuss word counts, frequency lists, and keyness in relation to the speech of AAC users in the workplace. Finally, we suggest further readings on the topic.

Historical perspectives and core issues

Workers who are affected by some kind of language impairment often rely on AAC strategies and/or technology to communicate with co-workers and/or clients. Understanding the evolution and functioning of AAC systems is therefore essential to identify ways to improve the systems and ultimately the lives of people whose work and interpersonal relations depend on these systems. Over the past four decades assistive technology solutions have grown significantly as researchers and manufacturers have worked on the specific requirements of the increasing number of AAC users (Light & McNaughton, 2012). Communication tools range from unaided to aided utilizing no low, or high technology (Beukelman & Mirenda, 2013; Cook & Polgar, 2015; Elsahar, Hu, Bouazza-Marouf, Kerr, & Mansor, 2019; Jette, 2017). Research on AAC systems has explored very diverse solutions with the goal of facilitating communication and interaction for AAC users on the basis of their individual needs: "maximizing an individual's potential using AAC assistive technology requires selecting a solution that matches the individual's skills, needs, and expectations with specific language, input and output features of the system" (Hill, 2006, p. 2). Because of the complexity of individual needs and the customization of the systems, much of the literature on the outcomes and effectiveness of aided communication is based on case studies of specific individuals using tailored technology and strategies (Ganz et al., 2012).

According to The American Speech-Language-Hearing Association (ASHA), an AAC system is "an integrated group of components, including the symbols, aids, strategies, and techniques used by individuals to enhance communication. The system serves to supplement any gestural, spoken, and/or written communication abilities" (ASHA, 1991, p. 10). Because, by definition, these are *supplementing* systems, on the basis of the speakers' abilities, AAC devices take advantage of many different kinds of transmission systems: Jette (2017) classifies body language (gaze, gestures, vocalizations, etc.) under the umbrella of unaided communication, while any other system, whether or not it is technologically driven, is classified as aided communication. Every system which is powered by batteries or electricity is labeled as technological and this category includes two types of system: *visual output* (text on display, sets of pictures, symbols on boards), and *AAC technologies* which are also known as Voice Output Communication Aids (VOCA) comprising both speech-generating devices (SGDs) and mobile AAC technology, namely computer- tablet- smartphone-implemented applications or dedicated tools and/or smart devices that provide digitized and/or synthesized speech output.

There is shared consensus that the ultimate goal for AAC systems is effective communication, which translates into the implementation of two factors: *time* and *appropriateness*. It is necessary for the AAC users to communicate at a fast enough rate and to convey the specific meanings they wish to deliver. Although both time and appropriateness are fundamental, the former seems to have been best highlighted by technology that relies on pre-stored information, "in which priority is given to the pre-construction and storage of whole extended utterances for use in later interactions" (Todman et al., 2008,

p. 235) and the latter on the enhancement of spontaneous novel utterance generation (SNUG), which, on the contrary, prioritizes on-line phrase construction. Pre-stored information, on the one hand, and SNUG, on the other, identify different methods of utterance generation; it is, therefore, useful to understand the philosophy that underlies each of them.

With regard to AAC technology relying upon pre-stored messages (Hoag, Bedrosian, McCoy, & Johnson, 2004), the idea derives from the understanding that people use a great deal of formulaic language; specifically, when speaking, many similar structures, utterances, and recurring words are used. Based on these recurring patterns and routines, words, phrases, or longer stretches of sentences can be pre-stored for later retrieval. Todman et al. (2008) explain how these devices have developed by including tags for utterance retrieval connected to different contexts, speech acts, interlocutors, and even humor. The authors organize such developments according to conversation categories and contexts. For example, some systems allow the user to select the stage of the interaction, for example, openings and closings (see also Alm, Arnott, & Newell, 1992), topic, backchannels, storytelling, narrative, and topic progression. However, one of the most relevant challenges is connected to the fact that expressive possibilities in natural language are virtually infinite, so while it is not practicable to store all the possible options of natural occurring language, experts have worked on identifying underlying structures of interactions, which even with speech acts has sometimes proven puzzling:

> The set of speech acts concerned with greeting and departing rituals tend to be fairly predictable with the same individual. On the other hand, the speech acts appropriate to topic discussion are potentially a very large class, and do not always appear in the same predictable sequences.
>
> *Alm et al., 1992, p. 49*

Communication tailored to context and interlocutors is then best achieved by using SNUG technology; the goal of which is to allow individuals to produce novel, spontaneous messages at the time of interaction. This type of technology has pushed research into vocabulary selection, for example, which is informed by the socio-demographic characteristics of each AAC user as well as situational contingencies. This type of technology relies on a number of tools based on vocabulary analysis such as compilation of composite lists of core topics and vocabulary selection questionnaires (Fallon, Light, & Paige, 2001; Light, Fallon, & Paige, 1999). Moreover, some researchers have worked on the creation of word lists based on past performances of AAC users (Yorkston, Smith, & Beukelman, 1990). Hill and Romich (2000, 2002) also report on the possibility of working on quantitative data obtained through language monitoring activity (LAM). Technology is improving communication options for AAC users; however, AAC systems are still not able to fully satisfy the complex interactional needs of their users.

Core issues for the workplace

One important focus of research on AAC has included users' real-time interactions and communication in workplace contexts. We have seen how AAC systems fail to simultaneously satisfy users' communicative needs in terms of communication rate[1] and message appropriateness:

> Historically, access to AAC devices has focused on ensuring the independence of the individual using AAC. While independence, understood as giving the individual control over the exact message he or she produces, is non-negotiable, it has come at the price of very slow communication that likely is fatiguing for the individual using AAC, makes it difficult to maintain engagement with communication partners, and limits opportunities to engage and participate.
>
> *Fager et al., 2019*

These issues are particularly relevant in workplace contexts, and the connection between workplace and AAC users has been explored both in terms of actual access to employment for people with language impairment (McNaughton, Light, & Arnold, 2002) and in terms of meaning negotiation and interactional dynamics (see, e.g., Bloch & Wilkinson, 2004; Bouchard, 2016; Friginal, Pickering, & Bruce, 2016; Wisenburn & Higginbotham, 2009). A recent line of corpus-based work on interactions including AAC users is being carried out by scholars working on the AAC and Non-AAC Workplace Corpus (ANAWC) (Pickering & Bruce, 2009; Pickering et al., 2019). Friginal et al. (2013) examined the corpus by analyzing linguistic co-occurrence patterns in the discourse of AAC device users and non-AAC users. Following Biber's multidimensional analysis of co-occurrence patterns along functional linguistic dimensions (1988, 1995), the authors found differences in the macro-discourse characteristics of AAC users' real-time exchanges. Results indicate that AAC texts make use of more informational, non-narrative, and explicit textual features of discourse than their non-AAC counterparts. These results were confirmed by an additional study on the same corpus by Friginal, Pickering, and Bruce (2016) who were able to show significant distance between the interactional features of non-AAC users compared to the discourse of the AAC users which showed fewer conversational features and was closer to pre-planned, written texts.

It is clear then that time constraints, lack of precision in the message output, and overall lack of narrative and implicit features differentiate AAC users' interactional and discoursive performance from that of the non-AAC users. Thus, meaning often needs to be negotiated and most studies investigate the ways in which AAC devices are used in interaction together with other strategies. Among these, the most effective seem to be the use of unaided communication (gestures and vocalizations) and the interlocutors' ability to predict meaning or complete its delivery.

As "vocalizations provide an effective means for quick, general intent to be communicated" (Millikin, 1997, p. 107), many users alternate the use of the AAC technology to some speech or vocalizations (Di Ferrante, 2013; Di Ferrante & Bouchard, 2020; Dominowska, 2002; Müller & Soto, 2002; Bouchard, 2016; Pullin, Treviranus, Patel, & Higginbotham, 2017). A fair number of studies (Bloch & Wilkinson, 2004; Ferm, Ahlsén, & Björck-Åkesson, 2005; Weitz, Dexter, & Moore, 1997) have focused on how AAC users manage this alternation: they show a clear preference for AAC users to avoid delay by using voice, facial expressions, gestures, etc. (see McNaughton & Bryen, 2007; Higginbotham, Fulcher, & Seale, 2016). Vocalizations comprise non-speech or non-word sounds (see Di Ferrante & Bouchard, 2020); nonetheless, they are often used to communicate very specific meanings (Lancioni & Lems, 2001; Lancioni, O'Reilly, Oliva, & Coppa, 2001; Sigafoos, Didden, & O'Reilly, 2003) and can be used together with other strategies like gestures, gaze, facial expressions, etc. (Millikin, 1997).

It is clear in this situation how essential the role of the interlocutor is in negotiating and interpreting the meaning expressed through vocalizations of AAC users. In this

regard, several studies have focused on the role of interlocutors in negotiating meaning and in solving issues of comprehension and intelligibility, and corpora have been used very effectively to understand interactions among AAC and non-AAC speakers in workplace contexts. Recently, Bouchard (2016) demonstrated how the type of relationship between speakers and the degree of their familiarity greatly informs message delivery and the implementations of strategies that improve mutual understanding. For example, the author identified spelling sounds or words as an effective strategy used in exchanges between co-workers, including AAC and non-AAC users, to achieve mutual understanding. Fager et al. (2018) also report the use of dedicated technology for familiar partners to help AAC users by predicting and suggesting word or sentence completion: "technology-assisted word supplementation takes advantage of the communication partner's knowledge of language, context, and personally relevant vocabulary" (Fager et al., 2018, p. 21).

It is apparent that, in order to communicate as efficiently as possible, AAC users rely upon multiple strategies, combining the use of devices with any non-verbal communication they are able to employ. The combination of these strategies and the way interlocutors engage with them are intertwined elements that detemine the interaction.

Focal analysis

Research questions

In this analysis, we focus on the use of vocalization in comparison to device use by AAC users in the ANAWC corpus. The questions we investigate are the following:

1. How is AAC users' discourse different when they use their device and when they vocalize in the workplace?
2. What factors influence these differences?

Methodology

In order to compare the speech produced by AAC users while using their devices and vocalizing, we have extracted three sub-corpora from the ANAWC. The ANAWC is a specialized corpus focusing on AAC users' and non-AAC users' talk in the workplace. Four focal AAC users were matched with four focal non-AAC users who occupied comparable positions and were recorded during one work week. More precisely for the four AAC users, Lenny is an administrative assistant, Ron, a parks and recreation manager, Sarah, a grant administrator, and Saul, an IT specialist. In total the corpus includes more than 200 hours of spoken interactions that include the 8 focal participants and more than 100 interlocutors (see Pickering et al., 2019 for more details). The three sub-corpora extracted for this project are: (1) the AAC users' sub-corpus that includes the talk and vocalizations of the AAC users in addition to the talk of their interlocutors; (2) the talk of the four focal AAC users produced only with their devices, and (3) the talk of the AAC users produced only with vocalizations. These three sub-corpora are the basis of this analysis. The analysis was conducted in several steps: first, a quantitative analysis was performed to give us more information about the main characteristics of the sub-corpora. This analysis was conducted using the AntConc software (Anthony, 2019). It is a freeware corpus analysis toolkit that can be used to pull out frequency lists,

concordance lines, n-grams, and keyword lists among other things. Our analysis includes word counts, frequency lists, and the keyness analysis.

For the word count analysis, we compared the number of words produced with vocalizations with the devices, and the instances of unclear vocalizations. In some instances, the transcribers could not transcribe the words that were vocalized with certainty. On these occasions, the transcribers identified the talk as *unclear vocalizations*. Because they were unclear, it was difficult to differentiate the number of words. There were also repetitions in the vocalizations because it was difficult for the speaker to produce the sounds and for the recipient to understand them (Bloch & Wilkinson, 2011; Bouchard, 2016). Because of these characteristics, we decided to count vocalizations in terms of instances rather than number of words. A second part of the word count analysis is an analysis of the word type–token ratios. In these ratios, a word type refers to a lexical item, and the count is the total number of different lexical items. Tokens refers to the total number of words. Thus, this measure comprises word types count divided by the word tokens count, and this number gives us an overview of the variety of the words used by a speaker. In this case we compared the word type–token ratios of the AAC users when vocalizing and when using their device.

The frequency lists analysis compares the words that are most commonly used while using the device, vocalizing, and in the AAC users' sub-corpus. This analysis allows us to pinpoint the differences between the different modes (i.e., vocalization and use of the device) with the words most frequently used in the AAC users' sub-corpus.

Keyness is different from frequency. Frequency is calculated by looking at the number of times a word is present in a corpus, while keyness relates to the frequency of a word in a corpus compared to its frequency in another reference corpus (Scott, 1997). Keywords have a frequency that is statistically different in the corpus of interest than in the reference corpus. For example, the frequency of the words in the ANAWC could be compared to their frequency in another, similar workplace corpus. The reference corpus is generally a larger, more general corpus than the one under investigation. The keyword analysis compares the word lists of the reference corpus and of the corpus of interest and highlights words that are either significantly more frequent or less frequent than in the reference corpus (Evison, 2010). These words are therefore key to the corpus of comparison, as they do not follow the distribution of a more general corpus. For this chapter, we used the complete AAC sub-corpus for reference, as it includes the talk of AAC users and of their co-workers. This corpus is more general but has similar linguistic and contextual characteristics as the sub-corpora of interest, making it a good reference corpus (Friginal & Hardy, 2014). This last analysis was the starting point for the qualitative analysis. We investigated the ten positive keywords in each mode and looked for common characteristics within the modes and disparities between them. We used these findings to inform our analysis of sample instances of these keywords.

Analysis

Word count

The four focal participants in the ANAWC vary broadly in the amounts in which they each use their devices or vocalize to interact with other speakers. A simple word count shows great disparity between the participants in the total number of words uttered through the device and through vocalizations (see Table 3.1).

Table 3.1 Word count in the different modes for each focal participant

Speaker	*Intelligible vocalizations (a)*	*Device talk (b)*	*Instances of unclear vocalization*	*Total number of words (a+b)*
Lenny	4,452	1,512	1,860	5,964
Ron	15	312	333	327
Sarah	778	709	1,023	1,487
Saul	61	9,546	3,559	9,607

For example, Saul produced 9,546 words with his device while Ron produced only 312. This disparity is explained in part by the different types of interactions the participants took part in during their workday. Saul trained students in the use of computer software, and some of this talk was pre-programmed, which allowed for more words to be uttered in a shorter period of time. Ron on the other hand, did not use pre-programmed talk in his daily work. In other words, some participants relied more on their device than others. Saul, for example, uttered 99.4% of his words using his device while Lenny used vocalization for 74.6% of his words. To be effective, vocalizations need to be understood by the recipient of the talk, and this was not always the case. When the vocalizations were deemed unclear, they were counted in instances. These vocalizations that are not intelligible are frequent; the count (shown in Table 3.1) indicates that they are more frequent than the number of words uttered using the device for three of the participants and that all the focus participants produce this type of utterance. This is in line with previous findings that AAC users aim to inhabit the same "time-stream" as their interlocutors (Higginbotham & Caves, 2002, p. 55). Even when not understood clearly by the recipients, vocalizations enable the speaker to keep a turn at talk and to participate without delay.

From this first glance at the number of words uttered with the device or through vocalization and instances of unclear vocalizations, it is clear that different individuals make different choices. One variable that can help explain this difference is the particular disability of the AAC participants in the corpus, as some can vocalize more clearly than others. A second important difference when comparing the AAC users' texts is that the variety of words uttered is different in the two modes. In previous work analyzing the texts of the entire ANAWC corpus, Friginal et al. (2013) found that AAC texts have a lower average count for type–token ratio than their non-AAC counterparts. Thus, we report our results for the AAC users in Table 3.2. We found that when the talk of all the participants is combined, AAC users produce around 20% of their words using vocalization. In other words, they show a preference for using their device. In terms of lexical variety, the word type–token ratios show that their choice of words is more varied when using the device. The difference in the choice of lexical items made in the two different modes is discussed in the word frequency analysis and the keyword analysis below.

Word frequency lists

Word count gives a general picture of the use of the different modes by the AAC users. Other tools can be used to find and understand some patterns that encompass the talk of all the participants. Word lists can be utilized to compare the vocabulary used in each sub-corpus and to understand how the participants use their devices and vocalizations in

Table 3.2 Word types and tokens for all AAC users in each mode

	Vocalization	*Device talk*
Word types	494	1,863
Word tokens	5,329	12,537
Word types/word tokens	0.0927	0.1486

Table 3.3 Most frequent words and their relative frequency in each sub-corpora

Order of frequency	*Intelligible vocalizations*		*Device talk*		*All*	
1	Yeah	36.74	You	4.15	I	2.78
2	You	4.88	The	3.63	You	2.63
3	I	4.86	I	2.69	The	2.51
4	Thank	2.06	It	2.58	To	2.43
5	A/ got	1.24	To	2.58	It	2.17
6	-	-	A	2.02	That	1.99
7	Uh	1.22	Will	1.76	And	1.68
8	No	1.11	Is	1.59	Yeah	1.30
9	It	0.99	Do	1.37	A	1.28
10	Alright	0.98	We	1.35	We	1.26

this respect. Table 3.3 shows the most frequent words in the three sub-corpora and their relative frequency (number of instances per 100 words) in each mode. To relativize the production of the most common words, we also compared them to the words most commonly used by all the speakers in the AAC sub-corpus.

Table 3.3 shows that the five most frequent words uttered using the device and in the AAC users' sub-corpus (All) are the same, although the exact order differs. This shows a certain commonality between the two sub-corpora. However, when looking at the most frequent words uttered using vocalization, only two pronouns are shared with the other lists; the other words are different. Looking further down on the lists, the indefinite article "a" is also frequent, arriving sixth in the device sub-corpus and ninth in the AAC users' sub-corpus. The two other words are present only once in the device sub-corpus in total but are also present in the AAC users' sub-corpus with "yeah" being eighth in frequency and "thank" 143rd. There is then a strong disparity in the use of "yeah" and "thank". We will return to these two words in the section about keyness below.

The distribution of certain words can be accounted for by the nature of spoken interaction. Words such as "yeah", "okay", and "uh" only appear in the 20 most frequent words in the vocalization sub-corpus and in the AAC corpus. These words are present in interaction either as a response to what someone has said, as a hesitation marker, or as a way to keep a turn during talk. A significant amount of talk at work is what we might consider small talk or "watercooler talk": this is the type of talk happening in extract 1, an example of the use of *yeah* taken from the vocalization sub-corpus. In this extract, Lenny and his co-workers are talking about a movie and the listeners are not clear what Lenny is saying on line 2. Lenny's *yeah* on line 4 is a response to S10's attempt to guess

what Lenny said on line 2. The *yeah* acts as a response and a confirmation of Speaker10's guess. Lenny also produces *uh-huh* on line 2 before his unclear vocalization, and this does the same work as the *yeah* discussed on line 4.

Extract 1

1 S10 he said remember the movie
2 Len (yeah) about (.) Mary
3 S10 about Mary. something about Mary?
4 Len yeah
5 S02 I saw that movie

Other, similar words are present only in the vocalization sub-corpus, as these words are more frequent because of the nature of vocalization talk. This talk essentially only appears in real time as the conversation progresses. As the AAC device does not allow participants to talk at the rate of conversational speech (Dominowska, 2002; Tonsig & Alant, 2004; Venkatagiri, 1995), this accounts for the absence of such interactive words in the 20 first words of the frequency list of the device sub-corpus.

When we compare the 20 most frequent words of the three sub-corpora (shown in Table 3.4), we can see that six words are present in all of them, 70% of the words in the device sub-corpus and the AAC users' sub-corpus overlap, and 50% of the words in the vocalization sub-corpus are not repeated in the others. This shows a clear difference between the vocalization sub-corpus and the others, suggesting that AAC users do not use vocalization and their devices similarly (Figure 3.1).

Keyness analysis

Using AntConc, we performed a keyword analysis on the vocalization sub-corpus and the device sub-corpus. The results of this analysis show that some words are used much more frequently (positive keywords) and substantially less frequently (negative keywords)

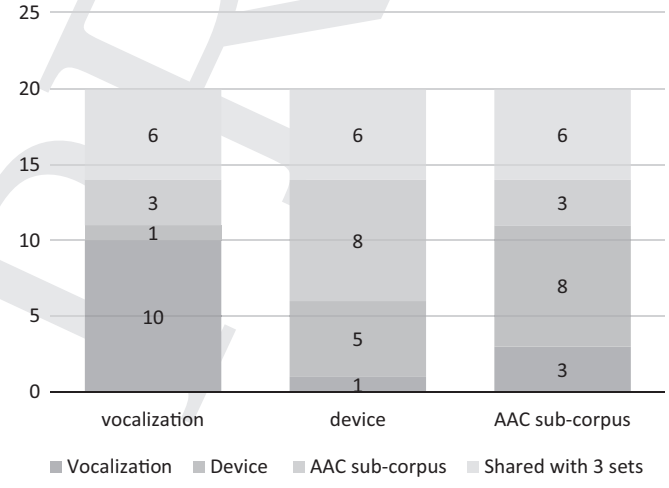

Figure 3.1 The 20 most frequent words shared between

Table 3.4 Top ten positive keywords in the vocalization and the device sub-corpora

Rank	*Vocalization*			*Device*		
	Keyword	*Frequency*	*Keyness*	*Keyword*	*Frequency*	*Keyness*
1	Yeah	1,985	9,728.18	Will	220	554.96
2	Thank	110	456.04	Would	97	119.07
3	Hey	49	182.83	Questions	37	104.3
4	Alright	52	169.33	You	513	92.39
5	Bye	25	88.3	Do	170	85.26
6	Unh	24	86.35	Civil	16	71.15
7	You	260	83.25	Is	196	64.94
8	I	259	69.07	Movement	15	64.2
9	Call	35	65.23	Bar	27	61.96
10	Got	66	58.34	Does	38	56.65

in the sub-corpora than in the complete corpus with a P = < 0.05. Table 3.5 shows the top ten positive keywords in both sub-corpora.

The keywords in both modes show that the speech of AAC users when they use their devices and when they vocalize is different from the speech of non-AAC users. This is in line with the findings of Friginal et al. (2013) that the discourse characteristics of AAC users and non-AAC users were different when they compared the AAC and the non-AAC sub-corpora. In our analysis of the ten strongest keywords, we found only one keyword present in both the vocalization and the device sub-corpora. The pronoun *you* is used in a pattern that differs from the AAC sub-corpus showing that AAC users use it differently than their non-AAC interlocutors. This result further aligns with Friginal et al. (2016), who found that AAC users' talk had features of more formal language, including a more frequent use of second-person pronouns.

When comparing keywords in both modes, we can also see differences. As discussed when looking at word frequency, the words chosen are related to the type of talk that is possible to do in the two different modes. Words like *hey* are easy to vocalize and efficient interactionally. Lenny, for example, uses *hey* as a greeting when he meets people he knows, as shown in Extract 2.

Extract 2

1 Len *hey* (Bob)
2 S14 *hey* Lenny
3 Len ((voc)) yeah
4 (1.5)
4 S14 (you have computer problems)
5 Len (yeah)
6 (5.0)
7 S15 *hey* Lenny
8 Len *hey*

Extract 2 shows Lenny and two other people greeting each other. Lenny uses only vocalization during this interaction. Lenny instigates the greeting saying *hey* and something

else that is not intelligible to the transcriber on line 1. His interlocutor responds with a greeting and Lenny's name on line 2. Here we have a first short greeting sequence where both turns are built in the same manner. The second sequence is instigated by S15 who greets Lenny with *hey* and his name and Lenny responds with a simple *hey* on line 7. Some of Lenny's talk was difficult for transcribers to understand, but this did not affect the understanding of what was going on. Saying *hey* when one meets someone else is usually understood as a greeting and this is how it was understood here by the participants. Greetings are very routinized and a greeting is generally responded to by a similar or identical one (Schegloff, 2007), which is the case here. Lenny also frequently uses *hey* in combination with "how are you" when greeting people. This routine expression can be understood easily by other interactants, as these words are often combined and they can guess what is said even if they don't hear each word clearly. It can be understandable even if it is not completely intelligible.

Routinized expressions are easy to understand for interlocutors. It is also the case when the situation calls for a certain type of activity, for example, when Lenny calls the speech-to-speech phone call services and talks with a communication assistant using the keyword *call*, as shown in Extract 3.

Extract 3

1 CA okay now what are you trying to tell me?
2 Len I wanna *call* (0.8)((clicking sound)) "Augie"
3 (.) I wanna *call* (.) Augie
4 (1.0)
5 CA are you asking for a name here?
6 Len yeah

Here, Lenny is talking with a speech-to-speech phone call communication assistant and wanting to call a person named Augie. The communication assistant understands that Lenny wants to call someone but does not get the name of the person Lenny wants to talk to. The extract begins with the communication assistant asking Lenny to tell him what he wanted to say when he was interrupted several turns earlier. Lenny responds by telling him what he wants to do on lines 2 and 3. Lenny vocalizes that he wants to call someone, but uses the device to say the name of the person, showing that he expects the name of the person to be difficult to understand but the rest of his vocalizations to be understood. He then repeats the whole thing as vocalization. Lenny's expectations are confirmed on line 5 when the communication assistant asks him if he is saying a name, which Lenny confirms. Here Lenny expects the communication assistant to understand what he vocalizes, and the capacity of the communication assistant to understand that Lenny wants to call someone is enhanced by the fact that people contact speech-to-speech services because they want help with a phone call. The lexical item *call* is then likely to be well understood in this situation.

These keywords are effective interactionally and can be used without creating problems of intelligibility or understanding. The words used with the device do a different type of work; they are better understood combined with other words and may require more effort when pronouncing them. For example, a word like *will* needs to be combined with other words for a clear meaning to be understood. This is made clear in Extract 4 when

even if the talk produced by the device is intelligible there is a problem of understanding and the focal AAC participant, Saul, needs to repeat.

Extract 4

1	S06	so that's: (.) that's it and the good news
2		is that your- your rooms and transportation and
3		all that will be paid for then cause you're (.)
4		actually having to (1.5) do the class [(
5		)]for me
6	Saul	["*will* he
7		do hands out or do we?"]
8	S06	I'm sorry say that again
9	Saul	"*will* he do hands out or do we?"
10	S06	uh: I don't know if they're paying for handouts
11		or not
12	Saul	((throat noise))
13	S06	uhm: (1.0) I think we do

In this extract, Saul talks with a co-worker about a conference where he will be presenting. Saul wants to know if the people in charge of the conference will print the handouts or if his employer is responsible. The extract begins with S06 who talks about some of the logistics for Saul's presentation such as that his room and transportation will be paid for as he will be teaching a class. On lines 6 and 7, Saul uses his device to ask about the handouts for his presentation. S06 does not understand at first and asks Saul to repeat on line 8. Saul repeats his question on line 9 and S06 responds in the next turn with an answer and a reformulation of what Saul said in the previous turn. This reformulation shows Saul what S06 understood and makes it possible for Saul to reformulate if he was misunderstood. In this case, the word *will* is part of a longer sentence that is not well understood, even though it is said using the device. Problems of understanding are not typical in the data when using the device to utter the word *will* and it is most often used as part of longer sentences in the data; because of this, vocalization in these instances would make understanding more difficult.

There is one further particularity of some of the positive keywords produced with the device in that they are typical of specific topics or types of activities. More specifically, they are typical of one user in a specific situation. For example, all 15 instances of the word *movement* and the16 instances of the word *civil* are produced by Lenny in a speech about the civil rights movement and the disability rights movement. These words were part of a speech that was pre-stored in the device. In a second example, *questions* is a word frequently uttered by Saul when he is teaching and asking if there are any questions from the students. This is the case for 22 of the 36 instances of the word *questions* in the data. Extract 5 is an example of one of these occasions.

Extract 5

1	S03	Saul was it right about save and save as?
2	Saul	((voc))
3	S02	okay hold on

4		(7.5)
5	Saul	"any *questions*?"
6		(1.0)
7	S01	so save could be the same as save in (0.5) will
8		it work the same way Saul?
9		(28.0)
10	Saul	"save will not ask you for a name"
11		(11.8)
12	Saul	"any *questions*?"
13	S03	how many questions will be on the quiz: (.) is it
14		gonna be paper? (.)is it ( )open book ( )

In this extract, Saul is teaching a computer class. It has just been announced that there are five minutes left to the class. The part we are interested in starts on line 5. Saul asks the students if they have questions. Without a video recording of the class it is not possible to be certain that Saul is typing during the gap between S02's turn on line 3 and Saul's question on line 5, but it is very likely that it is the reason for this gap. S01 answers Saul's turn with a question about some content that was discussed earlier in the class in relation to saving a document on a computer. Saul clarifies the content on lines 7 and 8 after a 28-second gap when he uses the device to prepare his answer. This is typical of the type of situation when Saul asks the students if they have questions. He often varies the formula that generally includes *any* and *question*s with other words such as "now" or "before leaving". This indicates that he probably produces the text as he interacts and that the questions are not pre-programmed.

Conclusion

In this chapter, we showed the trajectory of the linguistics-based research on AAC users' discourse in the workplace from its beginnings to its current state. This work is ongoing, and ongoing explorations of the ANAWC corpus will provide more information on the topic. We also demonstrated how quantitative corpus linguistics can inform us about the particularities of AAC users' discourse in the workplace when they use their devices as compared to when they vocalize. We used qualitative analysis to substantiate our quantitative findings and show how some of the keywords are used in interaction on a turn-by-turn basis. Finally, corpora-based analysis proved to be an efficient way of uncovering the features of AAC users' discourse in the workplace. Future directions for research looking at AAC users' interactions in the workplace using corpora include focusing on specific lexical items and the environments in which they are used, developing similar corpora encompassing a wide range of workplaces with the addition of video recordings to facilitate the use of varied research methods, and the possibility to add an analysis of gesture to the analysis of spoken text.

Note

1 It has been noted that there is a great variation in AAC users' communication rate based on the type and severity of disability of the users and on the type of chosen interface. Although over the years AAC technology has greatly improved, most literature still reports 1990s data on communication rates as up-to-date information: "2–10 words per minute, whereas unimpeded

speech proceeds at 150–200 words per minute" (Alm et al., 1992, p. 54; see also Newell, Langer, & Hickey, 1998, and Beukelman & Mirenda, 2013). According to more recent information of a AAC manufacturer (Tobii Dynavox, 2014), speech rate for non-AAC adults is slightly wider, assessed between 150 and 250 wpm (words per minute); it is also reported that the approximate speed of communication for stored phrases and sentences is calculated between 50 and 70 wpm, word by word between 10 and 12 wpm and letter by letter between 4 and 6 wpm. Some scholars, though, have pointed out that words per minute measure "fails to capture multimodal contributions, producing results which are at variance with performance" (Beukelman, 2012).

Further reading

Fager, S.K., Fried-Oken, M., Jakobs, T., & Beukelman, D.R. (2018). New and emerging access technologies for adults with complex communication needs and severe motor impairments: State of the science. *AAC: Augmentative and Alternative Communication*, *35*(1), 13–25. https://doi.org/10.1080/07434618.2018.1556730

This article offers a clear description of how AAC technology has evolved to accommodate individuals with diverse motor and communicative issues. The authors explain that initial prototypes of AAC devices restricted users from accomplishing various tasks. This issue was reported by all concerned parties, including AAC device manufacturers, and led to the production of new technologies such as movement-sensing technologies, brain–computer interfaces, and supplemented speech recognition devices. While the authors acknowledge the progress made in AAC devices, they propose that more person-centered research is required to assist users with speech and motor impairments.

McNaughton, D., Light, J., & Arnold, K.B. (2002). "Getting your wheel in the door": Successful full-time employment experiences of individuals with cerebral palsy who use augmentative and alternative communication. *AAC: Augmentative and Alternative Communication*, *18*(2), 59–76. https://doi.org/10.1080/07434610212331281171

This article addresses the experience of AAC users with cerebral palsy in the workplace. The researchers identify six themes for critical discussion: descriptions of employment activities; benefits of employment and reasons for being employed; negative impacts of employment activities; barriers to employment activities; supports to employment; and recommendations for improving employment outcomes. Their analysis shows that educational background, experience, and support of the community are essential for the success of workers. What distinguishes this study is the narratives it includes from AAC users which give a better understanding of their perspectives on their work situation.

Pickering, L., Di Ferrante, L., Bruce, C., Friginal, E., Pearson, P., & Bouchard, J. (2019). An introduction to the ANAWC: the AAC and Non-AAC Workplace Corpus. *International Journal of Corpus Linguistics, 24*(2), 230–245.

This article provides a detailed description of the Augmentative and Alternative Communication (AAC) and Non-Augmentative and Alternative Communication (Non-AAC) Workplace Corpus (ANAWC). The corpus comprises two sub-corpora focused on the discourse of comparative AAC and non-AAC users in the workplace. Eight focal participants in parallel professional contexts wore voice-activated recorders for 5 consecutive days, resulting in more than 200 hours of recorded interactions with a wide range of interlocutors encompassing a broad range of both routine and novel topics. This million-word corpus has been cleaned and transcribed using an enhanced orthographic transcription scheme (BNC). Short descriptions of sample publications based on the corpus are also included, and these studies investigate areas that have not previously been extensively explored in AAC research.

Friginal, E., Pickering, L., & Bruce, C. (2016). Narrative and informational dimensions of AAC Discourse in the workplace. In L. Pickering, E. Friginal, & S. Staple (Eds.), *Talking at work* (pp. 27–54). London: Palgrave Macmillan.

This book chapter focuses on some of the findings from the analysis of the AAC and Non-AAC Workplace Corpus (ANAWC) described above. This report demonstrates that the discourse of

AAC users is more informational and restricted in comparison to non-AAC users. In fact, AAC utterances more closely resemble written discourse (e.g., academic writing and professional letters or emails) than spoken conversation. Studies such as this show the clear need to increase the efficiency of AAC devices in order to enhance communication between AAC users and their co-workers.

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Transcription conventions

Talk	Talk
"talk"	Talk using the device
Talk	Focus words in the analysis
(Talk)	Uncertain transcription
()	Untranscribable talk
(())	Transcriber's notes
(.)	Micro pause
(0.5)	Silence timed in tenth of a second
=	latching
.	Falling intonation
?	Rising intonation
:	Lengthened sound
[	Beginning of overlapping talk
]	End of overlapping talk