Apes in Conversation: The Role of the Human Interlocutor

Ape Language Research has primarily focused on formal linguistic abilities of apes, rather than on the cultural and pragmatic aspects of language found in socio-communicative interactions. Studies with humans exhibiting non-standard language abilities, such as autistic children, have shown that the interlocutor play a constitutive role in enabling communication with these individuals. This contrasts with a general view in primatology that human influence may lead to unjustified anthropomorphism. Through an analysis of conversations between symbolically competent bonobos and humans using the concept of conversational implicature, it will be shown that the assumptions made by the interlocutor are crucial in establishing communicative intersubjectivity. The communicative exchange takes the form of a more distributed activity, a feature also exhibited by non-standard human language subjects.

Introduction

For large parts of the 20th Century, the study of non-human primates was concerned with conserving scientific integrity through the avoidance of anthropomorphism. This fear of anthropomorphism was linked to, but cannot fully be equated with, the surge of radical behaviorism in psychology, a movement that sought to eliminate mental states not susceptible to direct observation and, it was assumed, scientific explanation (Skinner 1974). While a fear of anthropomorphism no longer characterizes the field as such, as primatologists today do employ some mental terms (Griffin and Speck 2004; Herrmann et al. 2006) and concepts such as “culture” (Bastian et al. 2008; van Schaik 2003; Whiten and van Schaik 2007) to describe and analyze nonhuman primate behavior, there is less agreement on whether or how to account for human-nonhuman primate interactions. This issue has received little attention and empirical elaboration in primatology, other than as something to be avoided (Strier 2003). The study presented here will

address one aspect of human-nonhuman primate relationships; the question of the human interlocutor in ape language research. Through the concept of conversational implicature, Gricean maxims will serve as an analytical tools to identify when and how utterances made by symbolically competent bonobos, *Pan paniscus,* function as elements of a conversation despite a fairly restricted literal content. I will argue that this can only happen as a matter of accepting the human interlocutor as a constituting part of the conversation. It will be shown that the interlocutor influences the perceived linguistic skills of these apes, based on a qualitative study of conversations between them and humans. The concept of conversational implicature, and the associated maxims put forward by Grice, will serve as a framework to study the assumptions made by human interlocutor when engaging in a conversation with a symbolically competent ape, and what happens if and when the contributions of the ape do not satisfy the assumptions thought to support successful human communication. However, in contrast to the human conversations examined by Grice, the implicature is not tacit: rather, the human states the interpretation (or understanding), then wait for the ape to confirm or elaborate. This suggests an active role for the human and the ape, and that the human interpretation is a not random imposition of anthropomorphic assumptions but an active co-construction of intersubjectivity (Sidnell 2015).

The goal of this study is to contribute more empirical analysis to the discussion of the role of the human in ape language research, more specifically the human interlocutor engaged in communicative exchange with these bonobos. In linguistic anthropology, studies of communication and the role of the interlocutor amongst people who are sometimes referred to as “un- natural language learners” (Reno 2012), such as autistic children or individuals with aphasia, have emphasized the role of the interlocutor in communication with individuals (Hoffmann-Dilloway 2011; Ochs et al. 2004). The present study will use those insights to further elucidate the role of the interlocutor in human-bonobo communicative exchange.

Apes and Language

Ape language research (Gardner and Gardner 1991; Johnson 1995; Savage-Rumbaugh and Lewin 1994) contains on one hand, the intriguing prospects of communicating with another species, and on the other hand, a concern with avoiding anthropocentric interpretations and biased results, as well as, on a deeper level, a concern with preserving human uniqueness.

Since apes are incapable of uttering the sounds of human language, either due to anatomical or neurological constraints (Lieberman 2007; Lieberman 2006), other modalities of communication than speech must be used in ape language research. Some of the famous ape language projects of the 70's and 80's used sign language for this purpose. Among these was project Nim led by Terrace, with the stated intention of studying whether a chimpanzee could learn to construct a sentence. According to Terrace and his associates (Terrace 1979), examination of video records showed that Nim merely imitated his teachers, rather than creating sentences (Aitchison 1995; Terrace 1985). However, another research program reached different conclusions using a different methodology. Instead of sign language and structured language sessions, Savage-Rumbaugh used visual symbols (lexigrams) on a keyboard (plastic laminated or electronic) and spontaneous acquisition of language through conversation during daily activities. The bonobos, Kanzi and the late Panbanisha, have been part of this language research program since their birth. The lives of the bonobos and their competencies have been thoroughly documented elsewhere (Savage-Rumbaugh and Lewin 1994; Savage-Rumbaugh 1993; Segerdahl, Fields, and Savage-Rumbaugh 2005) and the following merely aims at clarifying the context of the present study.

The bonobos spontaneously developed comprehension of spoken English, which includes comprehending the meaning of novel sentences based upon simple grammatical rules at least at the level of a 2 ½ year human infant. Likely, their comprehension is even more developed (Savage-

Rumbaugh et al. 1993). The lexigrams they use for communication stand for and function as words. They are (with a few exceptions) non-iconic and have an arbitrary relationship to what they signify. That feature addresses the issue whether apes are capable of symbolic understanding, which is by some seen as a defining feature of human language (Benson, Fries, et al. 2002; Benson, Greaves, et al. 2002).

Some data suggest that the bonobos' comprehension of English far exceeds their productive skills. One reason could be the precedence of comprehension over production in human ontogenetic linguistic development (Elliot 1981; Hopkins and Savage-Rumbaugh 1986). Another factor might be the keyboard, which is a slow mode of talking. Even experienced humans rarely make long sentences on the keyboard; instead, their utterances are often completed by speech. The last, and maybe most important factor, has to do with the assumptions the humans made when the bonobos were infants. Even among the researchers working with them, it was generally not believed that they could develop as advanced skills as they did. Therefore, the humans did not make long utterances on the keyboard, and consequently, neither did the apes. However, following the results from project Nim, the short utterances of the bonobos have instead been seen as indicating a lack of linguistic skills (Wynne 2004).

To understand the abilities of the bonobos, Savage-Rumbaugh and associates (Savage-Rumbaugh et al. 2005) and other interpreters of the Kanzi studies (Shanker and King 2002) have argued for the socially co-constructed nature of the abilities of Kanzi and his family. Shanker and King argue that dynamic system theory account for the co-constructed and interdependent nature of bonobo-human interactions, while Savage- Rumbaugh and colleagues use the perspective of Wittgensteinan language games.

Beyond the formal features of the bonobos language competencies, research indicates that they engage in communicative exchanges above the level of the single utterance (Benson, Fries, et al.

2002; Pedersen and Fields 2008). According to the study by Pedersen and Fields (2008), the bonobo Panbanisha engaged in a communicative exchange with a human interlocutor, and showed competency in appropriate turn taking, maintaining a conversational topic, and negotiating her aim in accordance with the utterances of the human interlocutor. In the study, the goal of the bonobo was established based upon her keyboard utterance and the human interpretation of that utterance. Maintenance of topic was seen by the return to original utterances after engaging in exchange regarding other topics introduced by the human interlocutor. This brings us to the issue of how this is accomplished despite the brief utterances and what role the human interlocutor play. The concept of conversational implicature is central for this.

Conversational Implicature

This study builds upon the insight, from Sacks and forward, that human conversation is a co-constructed exchange structured around conversational turns, where each turn builds upon the previous communicative contributions (Sacks, Scheglof, and Jefferson 1974). From a different perspective, Grice (1975) provided a framework for studying the assumptions that facilitate ordinary conversation. The fundamental idea is that when conversing, we make certain assumptions about the conversational practice of our partner and what they imply in their utterances, despite not being directly stated.

Conversational implicature refers to the implied meaning in an utterance that is irreducible to its literal meaning. Rather than what is logically deducible from the statements in a conversation based upon a truth-conditional analysis, conversational implicature refers to what the speaker implied in her utterances and thereby what she intended it to mean (Davis 1998). In other words, if we have only understood the illocutionary act of the sentence, we have not yet provided an adequate account of what the utterance means. A full account needs to consider implicature, the meaning intended by

the speaker, to the extent that this is different from what was literally said (Grice 1989).

The framework of conversational implicature has not yet been applied to conversations between humans and other species. One reason for this might be the common assumption that other species do not possess language and, consequently, are unable to participate in a conversation. A related reason might be that the utterances of symbolically competent apes rarely consist of complete sentences, which Grice' theory typically presupposes. Nevertheless, research has shown the receptive and productive competencies of the bonobos. This opens up for interpreting their short lexigram utterances as informative and relevant contributions to conversations. The human interlocutor's contribution, then, should be analyzable drawing on Grice's insights and additional material on inter-subjectivity from conversational analysis. This would illuminate the interlocutor's role in ape-human conversations, and enable comparisons with human conversations. The comparative method, comparing the social and communicative competencies of human and nonhuman primates, further yields the prospect of elucidating the cultural and biological evolution of our human linguistic skills, and teasing apart the relationship between what has been seen as formal linguistic skills and the more general socio-communicative skills. Of particular interest in this study is the maxim of quantity; this is to say, the aim is to understand how the utterances made by the bonobos that often consist of merely a single or a few lexigrams are still are taken as conversational contributions by the human interlocutors, and thereby function as substantial contributions to the communicative exchange.

Gricean Maxims

Grice (1975) formulated the cooperative principle, which expresses the idea that in human conversation, the interlocutors assume cooperation on behalf of each other to engage in a coordinated and structured exchange rather than in a random succession of unrelated speech sounds.

The exact form of this coordination varies according to culture, time, and place, as do other conversational features (Stivers et al. 2009). The corporative effort contributes to a smooth and efficient communication; in an idealized conversation, the interlocutors themselves follow certain corporative principles and assume the other(s) to do the same.

The general cooperative principle is formulated as follows:

"Make your conversational contribution such as is required , at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged" (Grice 1975, 45).

Elaborating on this principle, Grice distinguishes four categories, or maxims, that speakers are assumed to adhere to:

Maxim of quantity

1) Make your contribution as informative as is required
2) Do not make your contribution more informative than is required

Maxim of quality

1) Do not say what you believe to be false
2) Do not say that for which you lack adequate evidence

Maxim of relation

1) Be relevant

Maxim of Manner

1) Avoid obscurity
2) Avoid ambiguity
3) Be brief
4) Be orderly

Grice did not imply that speakers always, or even mostly, follow all these maxims. Rather, they are assumptions made by the speakers to interpret the implicature of an utterance. When violated, there may be conversational and social evidence that certain expectations are not met (Brumark 2006; Eskritt, Whalen, and Lee 2008). This could take the form of attempts to repair the damage in the

conversation, using for instance reiterations. Intentional violations of the maxims are a source of many linguistic features such as humor and metaphor (Grice 1975).

The status of the maxims

Critique of Grice has focused on issues such as the form, function, extent, and source of conversational implicature (Davis 1998). Part of the criticism from the anthropological perspective has been ethnographic accounts of cultures that supposedly do not engage with the maxims, for instance guarding information in violation of the maxim of quantity (Keenan 1976). While it should be acknowledged that these accounts may fall short of showing that the cooperative principles or the maxims are not at play (Prince 1982), the Gricean maxims may also fall short of interpretative strength in that it becomes difficult to show how non-cooperation would manifest itself (Kroch 1972). While the Gricean maxims will function as tools for analyzing bonobo-human conversations, the focus will be on how the human interlocutor interprets the brief utterances of the bonobo interlocutor and how intersubjectivity is constructed across conversational turns. Further resources for analysis and interpretation will come from recent linguistic anthropology focused on non-standard language subjects in order to understand the extent of the interlocutor's influence, that, it will be shown, goes above and beyond the assumptions made by individual competent interlocutors according to Grice.

Non-Standard Language Subjects

The communication of the bonobos in this study will be shown to exhibit traits in common with human individuals not conforming to the standard Western model of a competent speaker (Goodwin 2004; Hoffmann-Dilloway 2011; Ochs et al. 2004). According to Goodwin, the standard Western model of language interaction assumes a "prototypical competent speaker, fully endowed with all

abilities required to engage in the process under study" (Goodwin 2004, 151). Goodwin's example of a person who does not conform to this model, but who still engages in communicative interaction with other language users, is a man with severe aphasia. Other examples include autistic children and deaf people in cultures lacking support for formalized sign language. According to Goodwin, understanding the communicative engagement, and life, of her study participant required going beyond the focus on individual mental abilities, above Chomsky's speaker-hearer model, and looking at communicative exchange as a public practice, where an man limited by aphasia participate by using and shaping the communicative contributions of others. In his discussion of the use of technology for language acquisition and use, Reno (2012) uses the term "unnatural language learners" to refer to individuals, such as the bonobos in this study and autistic children, who do not conform to the linguistic ideology of the "naturally speaking subject" (Reno 2012). Reno makes a similar point to Goodwin, that the inclusion of other individuals – and in this case, technologies – in communicative exchange opens up a broader, distributed, semiotic space that should not be discarded, as it is pertinent to the communicative culture under study and to our conception of language and humanity. Here, the term "non-standard" will be used instead of "un-natural", to indicate that the symbolic abilities of the bonobos are not as such against their "nature", to avoid the nation of a typological static species concept, but to still acknowledge that the symbolic abilities of the bonobos, as exhibited in the exchanges examined here, came about due to exposure to human language and through the aid of technology. In contrast to the assumption made by Reno, however, their abilities were not formally trained through the fading process used in the PECS training process and some other ape language projects. Rather, the process was more akin to immersed language learning through using the lexigram board and speech in daily interactions (Segerdahl, Fields, and Savage-Rumbaugh 2005).

The Gricean maxims rely upon assumptions of intentionality as mental constructs. While it has been

shown that apes do have some degree of intentionality and assume some degree of intentionality in other individuals through communicative signaling (Genty et al. 2009; Leavens, Hopkins, and Bard 2005), the extent and degree is widely debated. Interpreting the maxims and their function in the framework of non-standard language subjects rather than in a mentalist framework does not assume that the apes do not show intentionality in the utterances shown below: rather the aim is to look at another aspect, the distributed practice of communication and the role of the human interlocutor. On the level of communicative exchange, this means incorporating the notion from conversational analysis that intersubjectivity results from the interactional structure (Sidnell 2015).

Method

The data for this study are non-scripted conversations between humans and symbolically competent bonobos. By symbolically competent is meant that the individual bonobo has documented receptive and productive competencies as a result of early rearing conditions. The communicative interactions were transcribed from video sequences, identified from a video archive containing recordings of the life of the bonobos and their human companions going back to the initiation of this research project some decades ago. A qualitative analysis, elaborated on below, was then applied to the conversations.

The video sequences were selected to meet the criteria of illustrating conversational settings containing a short bonobo utterance that was then interpreted by the human interlocutor to contain a significant and substantial contribution to the conversation.

Based upon this consideration, four video sequences were selected. Two of these were conversations between a bonobo and a well-known human, while the other two included a person without extensive experience in interacting with the bonobos. A well-known human was still present.

The conversations were transcribed from the video recordings following standard conventions (Jefferson 2002). This is to say that (.) signifies a short pause and ? signifies rising intonations. Capitalized letters are words spoken on the keyboard, e.g. when a human or a bonobo point to the lexigram to communicate. PB is abbreviation for Panbanisha, KZ stands for Kanzi, and different human individuals are identified by numbers, such as HUMAN1 and HUMAN2. Names of humans referred to in the conversations have been altered.

Subjects

The bonobo subjects in this study are Kanzi and Panbanisha. Their language competencies have been thoroughly documented elsewhere and explained above. Panbanisha was born in 1985, while Kanzi was born in 1980. While the data analyzed are from different dates, the bonobos are adults with advanced experience in using the lexigram keyboards and communicating with humans.
The human subjects are scientists, long-term caretakers, a male visitor, and Japanese school children conversing with Kanzi through web conference. The male visitor does not know the bonobos, and the Japanese children are talking with Kanzi for the first time.

Quantity and relevance in bonobo-human discourse

The short, often telegraphic, lexigram utterances of the bonobos have been seen as evidence of lacking linguistic skills (Wynne 2004) and as evidence that the utterances are almost exclusively requests (Tomasello 1999). Others have argued these utterances should be interpreted only as partial utterances since gestures and vocalizations may add to the complexity, at least from a developmental perspective (Greenfield, Lyn, and Savage-Rumbaugh 2008). Some illustrations of the phenomenon of short lexigram utterances can be seen in appendix one, line one, and appendix two, line two. Panbanisha (PB) utters SOAP and WASH, respectively, on the lexigram keyboard.

Superficially, this could be seen as a violation of the maxim of quantity in that the bonobo does not provide enough information for the meaning of the utterance to be obvious. However, as the transcripts show, despite the almost telegraphic nature of the bonobo utterances, the conversations do not break down, but are carried on and the central topic is preserved. HUMAN1 contributes to this by interpreting the bonobos' utterances as conversational inputs and seeking to supply the needed content; this is to say: to supply the interpretation of the utterance. In appendix one, this next move by the HUMAN1 can be seen in line two, uttering *"soap? is there soap (.) do you want SOAP it's on the (.) where is CABINET (.) you want that soap that is over there on the cabinet?"*. A single utterance by PB is taken as having significance and more content is added to the exchange by the human interlocutor to get at that significance. This suggests that the missing quantity in the bonobo utterances is not so much a violation of a maxim but rather a feature of their communication which experienced interlocutors have developed ways of overcoming. Short utterances are recurring feature and how they are dealt with is the pertinent question.

Episodes of maxim violations

Table one through four below show instances of the maxim of quantity being violated, followed by assumption of relevance, and addition of additional semantic content. The discussion will show how these may not be actual violations in their conversational context, but rather features of the bonobos' language. However, the term "maxim violation" will be used both for ease of comprehension and for facilitating comparison with human language. It is noteworthy that some utterances can be seen as simultaneously violating other maxims, but it is not clear whether these other maxims would still be violated had the maxim of quantity been observed.

To illustrate this, PB's contribution in appendix one, line eighteen, summarized in table one, can serve as an example. She utters "COKE YES COKE COKE COLLAR" the human responds "oh

you wanna put your collar on and go look for the coke" and PB vocalizes excitedly in return. Her utterance could be said to violate the maxim of manner, "Avoid Obscurity", in that its meaning is not clear. She repeats "COKE", taken from a previous utterance by the human and adds "COLLAR" without a clear semantic link between coke and collar. This might not have been the case had PB instead uttered "I wish to put on my collar and go look for the coke myself", which is the implicature, the meaning, as HUMAN1 understands it. The excited vocalization is understood by the human as a confirmation of this interpretation and PB's utterances rely upon the human supplied content, both in her repetition and in her confirming vocalization.

The utterance in appendix three, line two, may serve as another example of this. Strictly speaking, Kanzi answers the child's question incorrectly, stating "COKE" in response to the girl's request that he locates the lexigram for hotdog. However, in another sense, he violates the maxim of relation. Because Kanzi's ability to locate the lexigram for hotdog upon request, as well as his knowledge of what COKE stands for, is established beyond doubt, his response is unlikely to be a mistake of knowledge of the lexigrams or the spoken words, but rather a violation of the principle of staying on the current topic of conversation. Instead of answering the question directly, his utterance is introducing another topic altogether. Though, if he had uttered a longer sentence, he might have said something along the lines of 'here is HOTDOG and I would like to have a COKE with mine". Such an utterance would not be a violation of any maxims as such. This is how HUMAN1, an interlocutor with long background of interacting with KZ, understands Kanzi's utterance. Thereby, the violation of the maxim of relation becomes a consequence of the violation of the maxim of quantity rather than a violation in itself.

Table. 1: Maxim violations, Appendix 1

Line	Subject	Maxim violated	Semantic content interjected	Assumption of relevance	Reaction to assumption of relevance
1	PB	Quantity (and relation)	By HUMAN1, lines 2 and 4	Using maxim of relation, assuming that PB's utterance is relevant. Asking questions to confirm appropriate interpretation	PB's vocalization, line 3, taken as confirmation of human's interpretation of her utterance, and PB moving, line 5
18	PB	Quantity (and relation)	By HUMAN1, line 19	Using maxim of relation, HUMAN1 interprets the additional lexical information in relation to both her own prior utterances and her experience with the significance of use of collars by the bonobo	PB vocalizing in line 20, an vocalization that is then further interpreted as meaningful and confirming: the human interlocutor's next move in line 21 assumes that interpretation of the vocalization.

Table 2: Maxim violations Appendix 2

Line	Subject	Maxim violated	Semantic content extended	Assumption of relevance	Reaction to assumption of relevance
	PB	Quantity (and relation)	By HUMAN1, lines 7 and 9 connecting the previously added WASH to GORILLA, as well as adding the idea of filming PB, lines 16 and 18, adding BALLOON and LATER.	The human interlocutor assumes PB"s utterance is relevant through connecting apparently disjointed utterances and interprets those utterances on the base of the habitual role of Gorilla as a character that caretakers make videotapes about for the bonobos. Human further interprets through creating lexical connections in line 23.	Repetition by PB lines 8, 10, 12 an14. Addition of information by PB in line 16, and vocalization in line 22 and 25,
34	PB	Quantity (and relation)	By HUMAN1, line 35 where PB's utterance COFFEE is connected to the prior turns in the interaction.	The human interlocutor assumes PB's utterance is connected to the ongoing communicative interaction, and that COFFEE is relevant to the prior discussion about Gorilla and tv.	PB repeates COFFEE in line 36 and human interlocutor in lines 37 and line 40 adding additional content as PB's further utterances are assumed to be relevant.

Table 3: Maxim violations Appendix 3

Line	Subject	Maxim violated	Semantic content interjected	Assumption of relevance	Reaction to assumption of relevance
2	KZ	Quantity (relation, manner)	By HUMAN1, line 3, connecting the question by an unknown human and Kanzi's seemingly disjointed response.	Human assumes Kanzi's utterance is relevant rather than an incorrect answer. This is based on knowledge of Kanzi's competencies with the lexigrams and his food preferences.	Kanzi vocalizes in line 4 and repeats COKE in line 5, which is taken to be confirmation of the human's interpretation in line 6.

Table 4: Maxim violations Appendix 4

Line	Subject	Maxim violated	Semantic content interjected	Assumption of relevance	Reaction to assumption of relevance
13	PB	Quantity (and relation)	In line 14, HUMAN1 connects prior utterances in the exchange to PB's seemingly too brief utterance.	Assuming that PB's utterance is relevant, the human interlocotur makes connection across the interchange and base her interpretation of PB's utterance on what they have previously experienced together, more precisely dogs living in a trailer on the laboratory grounds.	None

The tables above contain six instances of bonobos violating the maxim of quantity, all of which are simultaneous violations of the maxim of relation. In all instances, the human interlocutor assumes the bonobos utterance is relevant, and supply additional content that is then either used by the bonobo later or taken as confirmed by the human interlocutor through an excited bonobo vocalization or other behavior. This happens in five instances, appendix one line 20, appendix two, lines 22 and 29, and appendix three, lines four and five.

A feature worth noting is that while the bonobo utterances are brief and a significant amount of quantity has to be filled in, the interpretation is not random, but informed by knowledge obtained by daily interaction with the bonobos, a common ground shared by the bonobos and close human companions.

Another pertinent feature is that the bonobos sometimes supply additional quantity in response to human questions. This additional semantic content is then interpreted as relevant. We see this in appendix two, line 18, where PB answers, COLLAR, as response to who should get the coke. Given their shared background, COLLAR means Panbanisha going outside, for both human and bonobo.

However, the addition of “collar” to the conversation is initiated by the human interpreting her utterance as relevant. PB’s utterance, then, functions as an elaboration on the implicature of her initial utterance, which is facilitated by her conversational partner assuming that her utterance has a meaning irreducible to its literal content. In other words, the conversational partner aims to get at the implicature and because of this, PB’s utterance is taken as clarifying her intended meaning. On the level of the communicative exchange, this functions as a co-construction of a dialogue and the human interlocutor uses PB’s utterances to establish a common aim shared by the interlocutors: In this case who should make a trip to pick up Coke, is clarified.

In appendix two, lines 35 – 42, HUMAN1 points to several humans asking who should have or get coffee, but this is not decided until Panbanisha confirms that she herself should have the coffee and a specific human should make a run to pick it up. In this process, her utterances are taken as indicating that she has an intention of how she would like to see events unfold. Her utterance “PANBANISHA”, which lexically builds upon the human utterance preceding it by containing the same word, is taken by the human interlocutor to confirm who should have coffee.

On a deeper level, your assumptions about your conversational partner influence what kind of conversation you will be able to have; the communicative exchanges between the bonobos and humans hinge upon the interpretation made by the human of the bonobo utterances.

The Role of the Interlocutor

As illustrated above, the assumptions made by the conversational partner, influences how the conversation proceeds. As discussed above, PB and KZ are taken as cooperative conversational partners co-constructing the conversation with human because their utterances are treated as relevant contributions. But like the Nepalese deaf individuals studied by Hoffman-Diloway (2011), the utterances of the bonobos do not stand alone but emerge through the contributions of the

interlocutors. In both cases, copying, or repeating, is central.

According to Reno (2012) individuals with autism may face skepticism regarding the role played by other individuals in their communication, similar to the skepticism faced by ape language research, in which case it may be perceived as anthropomorphism. However, anthropomorphism, in the sense of treating the bonobos' utterances similar to human utterances, functions not as a source of error or over-interpretation, but rather as a constitutive part of the communicative interaction. It might even be a necessary precondition in order for the apes' to develop linguistic abilities. According to Savage-Rumbaugh and her associates, these bonobos acquired their linguistic skills essentially because they were treated as intentional beings in infancy just as human infants are (Segerdahl, Fields, and Savage-Rumbaugh 2005). Miles (1997) has elegantly argued that we must assume what we wish to create when the subject is language, both in apes and in human infants. Further arguing for a focus away from "proof" of individual intentionality, Goodwin (2004) argues that moving beyond the focus on individual mental constructs is necessary and warranted in order to understand and theorize those who do not conform to the standard model of language: their communication and life world depends upon the shared semiotic space, something linguistic anthropology should account for.

However, the role of the human as evidenced in appendix one through four and touched upon above goes above interpreting the bonobo's utterances. The human interlocutor not only contributes semiotic content through interpreting the ape's utterance, but also states this interpretation and invites a response from the ape for confirmation and/or clarification. Constructing a form of inter-subjectivity through the sequencing of turn-taking in conversation has been emphasized in conversational analysis and linguistic anthropology (Sidnell 2015). In appendix one, this is seen in line 17, where the human interlocutor asks for clarification from Panbanisha, who then elaborates in line 18. In line 19, the human interlocutor then states her interpretation, and waits for Panbanisha to

confirm, a move that takes place in line twenty. A similar structure is seen in appendix five. The human interlocutor states her interpretation in line three and invites a response from the ape, Kanzi, through the question-structure of the statement. In line four, Kanzi confirms the interpretation. While this structure is not exactly the same as seen in the examples examined by Sidnell (2015), the principle of constructing intersubjectivity through turn-taking is similar.

Common Ground

The human interlocutor's interpretation of the bonobos' utterances is made based upon a background of shared experiences, an assumption of a common ground of shared beliefs and knowledge. The human interlocutors use this assumption of common ground (Lee 2001; Stalnaker 2002) as they engage in communicative exchange with Panbanisha and Kanzi. An example of this is the term "COLLAR" discussed above: only on the basis of using collars to visit places around the campus in daily life can that term be properly interpreted.

The data also indicates that when a new person is introduced, this common ground is lacking and experienced humans serve as the mediator assisting in the interaction (appendix three and four) in the sense that they interpret the implicature of the bonobos' utterances. In appendix four, line one and line three, the unknown human asks Panbanisha about dogs. Panbanisha repeats "DOG" and "LIKE" in response to his questions, and then a well-known human enters the exchange, supplying additional information.

"panbanisha do you want to play with dogs? (PB vocalizes loudly) you do would you like to go to the house? and get surprises? PB vocalizes loudly and excitedly".

In this exchange, we see information supplied by humans, such as "dog" and "like" being incorporated by the bonobo. The human uses experiences from life with the bonobos, their habits and social activities, to inform the implicature of the brief utterances. Similarly, Reno (2012)

notices that the use of PECS and communicative gestures by an autistic child rely upon interpretation by others in the context of his daily habits and prior interactions. In both cases, standard language users use their experiences with the non-standard language user to place their, often brief and unclear, utterances in context and provide the additional content.

Conclusion

Conversational implicature, and more specifically the Gricean cooperative principle, can be understood as the assumptions conversational interlocutors make about not just what their conversational partner is literally saying but what she implies to convey. The Gricean maxims illustrate how conversing people assume a collaborative effort on behalf of each other in order to accomplish goals such as influencing each other, controlling events, and making things happen. Conversational implicature has not previously been studied in a cross-species interchange, a major reason being the lack of subjects with the relevant linguistic skills. However, such subjects do exist in the form of symbolically competent bonobos. This study shows that the maxims of quantity and relevance play a central role in communicative exchanges between bonobos and humans. While the bonobos' utterances are usually short, persons experienced in communicating with them and sharing a large part of their life with them, use their shared experiences as a common ground to interpret the bonobos' utterances. Thereby, they become treated as relevant and additional semantic content is supplied by the human interlocutor. As with Goodwin's study of the communication of a man with aphasia (Goodwin 2004), the bonobos rely on the contributions made by the human interlocutor to participate in the joint interaction. Their status does not conform to what Goodwin calls the prototypical competent speaker. Instead of focusing on the linguistic production of an individual as evidence for specific mental content, both the capacities of the bonobos and other non-standard language subjects might be better understood as relying on a more distributed

communicative interaction where others utterances are taken and used in a shared semiotic space. A common ground is the foundation for the construction of intersubjectivity, where the human interlocutor not only interprets the utterances made by the apes, but state the interpretation out loud and invites a response from the ape. According to Sidnell (2015), one difference between humans and apes in terms of the architecture of inter-subjectivity, is the lacking evidence of apes engaging in repair mechanisms and, more generally, using repetitions to confirm or elaborate on how a previous turn is understood. However, the data analyzed for this study showed how apes enculturated into symbolic communication are able to use repetitions for sequential moves such as confirmation, and that the human interlocutor participates actively in the co-construction of inter-subjectivity by stating the interpretation and inviting a response from the ape. Intersubjectivity, in the conversational analysis perspective, is less a question of mental content than of behavior, of the organization of conversational turns.

A central objection to ape language research has been centered on anthropomorphism; (Aitchison 1995; Terrace 1979). In its core, this objection holds that the researchers are seeing abilities that are not really present in the apes but rather constructs of the researchers' eagerness to observe these behaviors; or at least, there is no way of proving otherwise. In this view, the language abilities of the bonobos cannot be demonstrated to really be there, but are merely a result of researcher's imagination. This objection could be directed towards the human interlocutors assuming the bonobos' utterances to be relevant conversational contributions. However, such as objection assumes the prototypical competent speaker model that even some human individuals do not conform to. It also overlooks the other roles of the human interlocutor in co-constructing inter-subjectivity I would argue that, given the controlled experiments that have proven beyond reasonable doubt the language comprehension of KZ and PB (Savage-Rumbaugh 1993), it is appropriate to study what happens when assumptions of relevance and communicative collaboration

are made by the human interlocutors. Further, a more general question of how anthropomorphism is used, in which cases it is a legitimate objection and in which cases it functions as a methodological tool, is raised by this data. This issue has already been addressed by other researchers (Miles 1997; Waal 2001), and accounting for the role of the interlocutor, adds another dimension to this discussion.

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Appendix 1

Transcript of video filmed in 1998. HUMAN1, PB, and baby NY together in room. They were playing with a costume, then starting to talk about m&m's in one of the bonobos' rooms, the T-room.

1. PB: SOAP
2. HUMAN1 soap? is there soap (.) do you want SOAP its on the (.) where is CABINET (.) you want that soap that is over there on the cabinet?
3. PB : (vocalizes, a peep)
4. HUMAN1: WILL YOU TAKE A (.) will you take a bath in the BATHROOM (.) will you go in the bathroom?
5. PB vocalizes and turns to move down the table she is sitting at
6. HUMAN1: look up here (.) (PB returns to keyboard) can you show me bathroom up here?
7. HUMAN1: are you ready to take a bath in the bathroom with your soap?
8. PB: SOAP
9. HUMAN1: you are ? can you stay right here (.) would you like to have some ice-coke after your bath?
10. PB vocalizes
11. HUMAN1: would you like to have ice-coke after your bath?
12. (Conversation is interrupted by play, and the film is clipped)
13. HUMAN1: come sit up here (.) we're talking about joe going not you we are talking about joe (.) joe is going to go look for coke
14. (PB vocalizes)
15. HUMAN1: where should he go look?
16. PB: (vocalizes) COKE
17. HUMAN1 coke? where should he look for coke where do you want joe to go get the coke?
18. PB: COKE YES COKE COKE COLLAR
19. HUMAN1: oh you wanna put your collar on and go look for the coke
20. PB vocalizes excitedly
21. HUMAN1: maybe go to criss-cross corner and all those places
22. PB: CRISS-CROSS CORNER
23. HUMAN1: ah ha that's what i thought
24. PB: BLACKBERRIES
25. HUMAN1: and look for blackberries at crisscross corner, (PB vocalizes excitedly) aha and look for coke were you gonna go look for it at the a-frame?
26. PB: COKE COKE
27. HUMAN1: were you gonna look for coke at the a-frame or the house?
28. PB: COLLAR
29. HUMAN1: you were gonna go(.) did you (.) come back up here please it did not say house could you say it again
30. PB: ICE
31. HUMAN1: could you say house cause that's where you wanna go look for the coke
32. PB: BUBBLES

33. HUMAN1: you want bubbles out of the t-room?
34. PB: (vocalizes) BUBBLES
35. HUMAN1: mm that's what you've been trying to tell me all this time about the t-room
36. HUMAN1: you know what I tell you no collar

Appendix 2

Transcript of video filmed in 1989. HUMAN1 and Panbanisha are hanging out, baby Nyota playing around.

1. HUMAN1: washed? We washed didn't we (.) you were good washing
2. PB: WASH
3. HUMAN1: wash?
4. PB: BAD GORILLA
5. HUMAN1: we need to wash the gorilla?
6. PB: (INAUDIBLE) GORILLA
7. HUMAN1: we need to wash the gorilla?
8. PB: GORILLA GORILLA
9. HUMAN1: you want (.) we could ask ed to be the gorilla (PB vocalizes) would you like to ask ed to come be the gorilla
10. PB: (vocalizes) GORILLA
11. HUMAN1: maybe he could wash you
12. PB: GORILLA GORILLA
13. HUMAN1: would you like to do that? would you like to have ed come be the gorilla
14. PB: GORILLA GORILLA GORILLA
15. HUMAN1: you want joe to be the gorilla? You want somebody to go out
16. PB: GORILLA BALLOON
17. HUMAN1: you want the gorilla to have a balloon
18. PB: LATER LATER
19. HUMAN1: you want the gorilla to have a balloon later on tv?
20. PB: LATER LATER
21. HUMAN1: should we make a gorilla balloon tv?
22. PB vocalizes excitedly
23. HUMAN1: oh, we're gonna make a gorilla balloon tv later
24. HUMAN1: joe and ed could make you the gorilla balloon tv would you like that? You want them to have the gorilla chasing a balloon on the tv?
25. PB vocalizes
26. HUMAN1: okay we'll tell them that on the radio
27. (HUMAN1 talks on the radio, the assistant HUMAN2 arrives, they tell him what they want him to do)
28. HUMAN2: Panbanisha would you like a tv of gorilla?
29. PB: TV
30. HUMAN1: yes she wants the tv did you hear that joe?
31. HUMAN2: yes I did
32. HUMAN1: make sure she wants you and ed to do it
33. HUMAN2: me and ed will
34. PB: COFFEE

35. HUMAN1: you want coffee as part of your tv too? Should the gorilla have coffee? Or you want joe to have coffee?
36. PB: COFFEE YES COFFEE
37. HUMAN1: you need max to have some coffee? max can you have some coffee on the tape?
38. HUMAN3: oh yes I can
39. HUMAN1: we'll have a gorilla balloon tv and max can have some coffee or do you need someone to get coffee for you?
40. Does panbanisha PANBANISHA want coffee?
41. PB: PANBANISHA
42. HUMAN1: ah, ok, panbanisha wants coffee

Appendix 3

Transcript of video with Japanese children talking with SSR and Kanzi over web conference call including webcam. They ask him to find lexigrams and pictures corresponding to various words.

1. JAPANESE GIRL: can you find hotdog?
2. KZ: COKE COKE (KZ continues pressing the lexigram)
3. HUMAN1: is that what you would like with your hotdog?
4. KZ vocalizes excitedly
5. KZ: COKE COKE COKE
6. HUMAN1: that's what kanzi wants to have with his hotdog

Appendix 4

Transcript of video of a male visitor communicating with Panbanisha and HUMAN1 who are in one of the bonobo rooms. Baby Nyota plays around.

1. HUMAN2: panbanisha, i have another question. what do you think about dogs?
2. PB: DOG
3. HUMAN2: do you like dogs or do you
4. PB: LIKE
5. HUMAN2: like – do you ever. have
6. PB: (points to lexigram board without it sounding. HUMAN1 takes her hand)
7. HUMAN1: panbanisha do you want to play with dogs? (PB vocalizes loudly) you do would you like to go to the house? and get surprises?
8. (PB vocalizes loudly and excitedly)
9. PB: COKE
10. HUMAN1: nyota please don't push the keyboard. panbanisha likes to play with the dogs but I don't know. If. she can..
11. PB: (vocalizes excitedly) DOG DOG (keeps pressing the lexigram and vocalizing loudly and excitedly)
12. HUMAN1: what would you like to do with the dogs
13. PB: TRAILER (keeps vocalizing loudly)
14. HUMAN1: go to the trailer – and see the dogs there used to be a dog that lived in the trailer we could go visit there is dogs at the house we can go visit