

Sue Savage-Rumbaugh's Research into Ape Language - Science and Methodology

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Abstract: The aim of the paper is to investigate, from the point of view of philosophy of science and philosophy of social science, the turn in the ape language project as accomplished in the works of Sue Savage-Rumbaugh and her collaborators. In this project took place a highly interesting turn from the orientation of research on natural sciences to that on humanities. We shall analyze all the relevant works of Savage-Rumbaugh from the point of view of the two central levels of ALP: its *scientific* level and the *methodological* level.

Key words: ape language project, Sue Savage-Rumbaugh, Lana, Kanzi, Austin and Sherman, behaviorism, ethnography.

The aim of this paper is to investigate – from the point of view of philosophy of science and philosophy of social science – the turn in the Ape Language Project (hereafter, ALP) as accomplished in the works of Sue Savage-Rumbaugh and her collaborators from the seventies of the 20th century till the first decade of the 21st century. In this project took place a highly interesting turn from the orientation of research on natural sciences to that on humanities. We shall analyze the relevant works of Savage-Rumbaugh from the point of view of the two central levels of ALP: its *scientific* level and the *methodological* level.¹

¹ In our paper we shall not report on, with few exceptions, the quantitative results of the experiments of Savage-Rumbaugh and her collaborators. The measure of a successful experiment was set by her at 90% or better, while 50% and worse were viewed as pure chance.

We shall present, first, the scientific level of the ALP. Then we will deal with the metascientific level and show how certain conceptual choices in this level lead to certain preferences in the methodological level, that is, to certain choices of applied methods and, finally, to a shift of the ALP to the realm of the humanities.

1 The Starting Points: The Late Sixties, Early Seventies, and the Lana Project

The attempts to use *nonvocal* ways of language communication with apes came under way after attempts at teaching ape human vocalization failed (see Hayes – Hayes 1951). In addition, it became clear, that the apes involved in experiments in that time were not able to control voluntarily their exhalation and thus to produce all those phonemic sounds humans are able to produce (see, e.g. Lieberman 1968). This led then to language projects in the framework of which the apes should be taught language by using specific symbolic systems, e.g., American Sign Language (ASL), as in the endeavor of Allen and Beatrice Gardner with the chimpanzee (*Pan troglodytes*) named Washoe.

Already here it is noteworthy that Gardners' endeavor was in its structure and course driven by the supposition that the main method of introducing new signs to Washoe should be *imitation*: "As a method of prompting, we have been able to use imitation extensively to increase the frequency and refine the forms of signs" (Gardner – Gardner 1969, 666). This imitation, which they viewed as an important principle of language acquisition both in human infants and apes, should have as its basis, they claimed, *instrumental conditioning* (Gardner – Gardner 1969, 668).

That basis was initially accepted also in the project initiated by D. M. Rumbaugh which involved a chimpanzee (species *Pan troglodytes*) named Lana (Gill – Rumbaugh 1977, 155-158).

However, the Lana project displayed, when compared with the Washoe project, two important differences. First, instead of the signs of the ASL, the medium of communication was purely visuographic symbols without any vocalization, so-called *lexigrams*, designed of basic 9 elements which could be combined into complex symbols, and were implemented on a computer keyboard (cf. Rumbaugh *et al.* 1973, 386; and Savage-Rumbaugh – Rumbaugh 1978, 271).

By selecting and depressing particular keys on which lexigrams were embossed, Lana could actuate a vending device, controlled by the computer, to provide her with a particular food, e.g., M & M, a piece of banana, a sweet potato, etc.

Second, in the project started by D. M. Rumbaugh, Lana was initiated into language not by teaching her from the outset particular lexigrams (like Washoe), but by teaching her whole "stock sentences", e.g., "Please machine give M & M." The ALP with Lana also involved a gradual enlargement of the vocabulary taught to her in such a way that new names of food items to be requested were introduced as well as new types of requests that could be addressed to the machine to provide either a food-type entity or a drink-type entity.

The *results* of the Lana project were twofold. *On the one hand*, Lana manifested skills of learning new lexigrams-words as well as the ability to hold to *syntactical* rules of stringing lexigrams into sentences. She also displayed the ability to apply previously learned sentences to novel situations, e.g., when a new type of food which she was not able to tag by a lexigram was put into the dispenser, she asked for the *name* of the food instead of the food itself (see Gill 1977).

On the other hand, the results of the Lana project, together with the results of the Washoe project subject, were subjected to a strong critic by Savage-Rumbaugh.² From this critique she drew the following conclusion: "We can find no definite demonstration that Washoe ... [and] Lana ... used symbols representationally" (Savage-Rumbaugh - Rumbaugh - Boysen 1980, 55), and that "there is no evidence that [they] achieved symbolization proper" (Savage-Rumbaugh - Rumbaugh - Boysen 1980, 60). This critique served at the same time as a starting point for the development of the ALP, now with the chimpanzees (*Pan troglodytes*) Sherman and Austin, and with the aim to find out if apes can come to terms with the semantics and pragmatics of communication.

2 The Sherman-Austin Project

In a series of experiments the apes were split into two subgroups: the event group (Sherman and Kenton) and the label group (Austin and Erika). The difference between these two groups was in the activi-

² On this critique see Savage-Rumbaugh - Rumbaugh - Boysen (1978) and Savage-Rumbaugh - Rumbaugh - Boysen (1980).

ties they were allowed and required to perform. The event group was subjected to an *active* paradigm while the label group to the *naming* paradigm. In the former, after finding in several sessions their members' order of preferences for food types (the order was M & M, sweet potato, chow, juice), the dispensers were loaded with foods/drinks of these types, and they were then tested for their ability to assign to them, while asking the machine for dispensing the respective food, the corresponding lexigram. Initially, only their ability to name just M & Ms was tested with only the M & M-lexigram lighted on the keyboard. After this test was mastered in an errorless way, an additional and irrelevant key (whose depression did not yield an M & M) was added to the keyboard. Once the ape was again able to choose the M & M-lexigram with a 90% rate of success, a third key, again irrelevant, was made operational on the keyboard.

In the label group the task was initially to assign the M & M-lexigram to the M & M held up by the experimenter; here also the number of irrelevant keys was gradually increased. In case of just one food type, M & M, the results in both groups were very similar. But, once additional lexigrams were introduced, the results were profoundly different. The apes in the event group learned very rapidly the names of all four food types introduced, while in the label group one ape learned to label only two types of food while the other just one. In fact, this latter result held only in the case when the *condition of difference of preference* was at work and the apes from the label group had to choose between two lexigrams for food where one food was much more preferred than the other. But, once that condition was cancelled in such a way that the apes had to choose from two food types for which they had approximately the same order of preference (say, M & M and banana, or, chow and sweet potato), then the apes from the label group failed while those from the event group succeeded.

From the point of view of *theory*, the differences between the event and label groups were interpreted by Savage-Rumbaugh to mean that the apes from the label group simply associated one symbol with a more preferred food and another symbol with a less preferred food. But, they failed to do this once the requirement was to perform the *purely referential operation* of assigning a symbol to a particular food when there were several symbols to choose from. In the case of the event group, its members were stimulated to take an active approach with respect to their environment – to bring the machine to vend a preferred type

of food – by choosing the respective symbol. That encouraged the recognition of the relation of the lexigram to the corresponding food item. However, Savage-Rumbaugh concluded that his relation was *not* recognized by the apes from the event group as one of *reference* because they displayed the following unusual behavior.

They were able to shift in their key-depressing behavior from a lexigram for the more preferred food to a lexigram for a less preferred food once the dispenser – placed in full sight of the apes – ran out of the former *and* its corresponding key was darkened by the experimenter. But, once the dispenser ran out of the more preferred food *and* the corresponding key was left illuminated by the experimenter, the apes persistently continued to press this key even after the machine had already stopped vending the food corresponding to this key. From this odd behavior Savage-Rumbaugh drew the conclusion that at this level of instruction a purely referential capacity (i.e., a one-to-one correspondence between a lexigram and its reference) was still not attained in the apes even from those in the event group. Instead:

their previous training had enabled Sherman and Kenton to encode food desires in a primitive way. ... At this point they employed symbols only in a primitive cause-effect manner—just as simple actions like pushing, shoving, or biting can be used to affect another directly—rather than to communicate. (Savage-Rumbaugh 1986, 74)

In order to attain in the chimpanzees a referential capacity, a set of experiments with an intricate structure was devised. Initially, the apes were taught to relate the vending of food with the state of the dispenser in such a way that only one dispenser was loaded – in full view of the apes – so that depressing the correct keys (say, “Please machine give beancake.”) yielded the requested food. At the same time, the dispenser was connected to the computer in such a way that once the correct sequence of keys/lexigrams was depressed, the dispenser started to rotate as though it was going to vend the requested food.

When the apes acquired this capability, the number of dispensers was increased to two, one located to the right and the other to the left of the keyboard, and with the key for the food-type in the left dispenser placed on the left side of the keyboard and the key for the food-type in the right dispenser placed on the right side of the keyboard. In this way the apes could coordinate more easily the type of food in a dispenser with its corresponding lexigram. Initially, *both* dispensers were filled

with the respective foods and once the chimpanzees mastered the naming task at this level, only one dispenser was filled with food per day, while the other remained empty during the same period of time. So, for example, if one dispenser was filled with pieces of banana and the other was empty, depressing the keys in the sentence "Please machine give beancake" only caused the rotation of the dispenser but no vending.

While till now the task was to teach the apes to correlate a *same-side lexigram with a food-in-a rotating (same-side) dispenser*, once this task was mastered, this complexity was gradually reduced. First, the respective lexigrams were removed from their side-location on the keyboard and randomly distributed on the keyboard, and the apes were then subjected to a series of tests. Once they mastered the correlations in this new arrangement – *lexigram and food in two rotating dispensers* – the number of dispensers was reduced to one, thus eliminating the dispenser factor and reducing the whole experiment exclusively to the semantics of the complex *lexigram-food-type*. After prolonged training the apes were successful in mastering these semantics at a rate of 90% or higher.

The experiments mentioned till were testing for Sherman's and Austin's (possible) *semantic* capacities and skills. Savage-Rumbaugh, however, proposed an additional series of tests aiming at their *pragmatico-linguistic* skills and capacities, that is, tests for "behavior characteristic of true speech episodes in which a listener and a speaker use symbols to control and coordinate each other's behavior in meaningful rule-bound exchanges" (Savage-Rumbaugh 1986, 113).

Initially, the experiment involved only one ape (hereafter, A_1) and only one human experimenter (hereafter, E_1) located in different rooms, each having a keyboard at his disposal. The experimenter baited a container with food from a refrigerator, while being watched by the ape who, however, did not know what particular food was put into the container because his vision was blocked by the door of the refrigerator. Then, the experimenter informed the ape about the content of the container by depressing a key on his keyboard. The ape, once being thus informed, in turn depressed the corresponding lexigram on his own keyboard, and in cases of a match of the lexigram with the food from the container, was rewarded by the experimenter.

What were the results obtained in the Sherman-Austin project? From the point of view of our paper the following three have to be

mentioned (Savage-Rumbaugh *et al.* 1993, 10-11; Rumbaugh – Savage-Rumbaugh – Washburn 1996, 117-118):

- (1) Chimpanzees have a capacity for *semantics* in the sense that they can assign to symbols their referents in the extra-linguistic world, and they can understand the *meaning relations between the symbols*, even in the absence of their referents;
- (2) they have a capacity for *pragmatics* in the sense that they can communicate mutually by means of symbols, once they develop skills of joint attention and if the environment puts a premium on their mutual cooperation;
- (3) the semantic and pragmatic use of symbols in chimpanzees is the prerequisite for the development of their *syntactic* competencies.

Even with these positive results, the following two “self”-critiques were addressed by Savage-Rumbaugh in the framework of the Sherman-Austin project. First, like in the Lana project, even when the ability to produce symbols was already in place, Sherman and Austin required prolonged and laborious training to display receptive/comprehension skills. Second, even though Sherman and Austin were exposed to spoken English for years, they never comprehended it.

The reasons for that problem and this failure were left unstated in the Sherman-Austin project; a clarification and solution was given only later, in the course of the Kanzi project.

3 The Kanzi Project

The Kanzi project started initially as an unforeseen consequence of the classical lexigram training to which Kanzi's step-mother Matata – a so-called pygmy chimpanzee/bonobo (*Pan paniscus*) – was subjected. During her training, Kanzi accompanied Matata and was separated from Matata only after reaching the age of 30 months. At this moment, unexpectedly for all the human experimenters around him, he purportedly started to use the lexigrams from the keyboard available to him. From this the experimenters concluded that Kanzi had acquired the ability to use lexigrams just by observing and imitating Matata and not by conditional training. While in the first week of separation from Matata he used 8 lexigrams for designating even absent entities, in the

16 months that followed his vocabulary – both single words and sets of their combinations – increased substantially.³

This unusual behavior was caused by a profound change in the way Kanzi and the human experimenters around him interacted. Instead of the explicit training regimen to which Lana, Austin and Sherman were subjected, Kanzi was integrated into a way of life where he moved around in the woods around the language laboratory compound and had to pick up objects he initially indicated by means of lexigrams as placed in certain locations and at the same time was interacting with the experimenters both by means of a mobile keyboard as well as spoken English.

In addition to the discovery that an ape from the species *Pan paniscus* is capable of comprehending communicative symbols not by training but by social integration, the experiments with Kanzi led to the following conclusions:

- (1) This species of ape is capable of comprehension of spoken and synthesized English.
- (2) He acquires lexigrams not only piecemeal but also in sentential complexes.
- (3) He is capable of passing the test for false beliefs, that is, he has a “theory of mind”⁴ in the sense that he is capable of knowing not only what is the state of affairs in the world of objects but also what another subject, say, a human experimenter, knows about that state of affairs, even if they mutually differ.
- (4) He is capable of producing stone tools, and he acquired this skill not by means of conditional training but by looking at another subject performing this activity.

In the case of experiments on the comprehension of English, both spoken and synthesized (Savage-Rumbaugh 1987b, 220; Savage-Rumbaugh *et al.* 1985, 184; Savage-Rumbaugh *et al.* 1986, 226–227), it came out that Kanzi was performing substantially better than Sherman and Austin. The propensity of apes of the *Pan paniscus* species to acquire

³ For a quantification of this increase see Savage-Rumbaugh – Rumbaugh – McDonald (1985, 659-663).

⁴ On this term see Premack – Woodruff (1978a) and Premack – Woodruff (1978b). On the results with Kanzi see Savage-Rumbaugh (1997).

symbol comprehension thus seemed to be markedly higher than that of apes from the species *Pan troglodytes*. There are at least two possible explanations: the basis of this difference is the difference given universally between these species and thus having the origin exclusively in *phylogeny*, or it is given exclusively at the level of *ontogeny* of the particular apes involved in the experiments. Savage-Rumbaugh, in order to test these competing hypotheses, created an experimental set up where the possible *differences in ontogeny* between a bonobo, on the one hand, and a chimpanzee, on the other, were eliminated by subjecting both to the same socializing conditions starting from the same age. This was accomplished by simultaneously teaching language skills to two apes of nearly same age – Panzee (*Pan troglodytes*) and Panbanisha (*Pan paniscus*) – from early infant age by means of observation. This enabled them to show the similarities as well differences⁵ between the *Pan* species. From the point of view of this paper the most important convergence is that both displayed *comprehension of spoken English*. Thus the mystery that surfaced in the Sherman-Austin project, namely, why these two apes had a comprehension of spoken English at the level of chance, found its natural solution. Both were introduced into an environment with spoken English too late in their ontogeny.

In another series of tests, in order to test Kanzi's ability to comprehend sentence, he was (at the age of six) subjected to 310 utterances in English – each composed of two or more words – having the nature of requests. These requests were also performed by the experimenters on a keyboard, and the result quantified was Kanzi's appropriateness of response to these requests. From these 310 utterances, whose structure is given in Table 5, Kanzi responded appropriately to 298 (Savage-Rumbaugh 1987b, 232).⁶

⁵ For intraspecies differences in the genus *Pan* see Sevcik – Savage-Rumbaugh (1994), Brakke – Savage-Rumbaugh (1995), Brakke – Savage-Rumbaugh (1996), and Savage-Rumbaugh – Rumbaugh – Fields (2006).

⁶ A-frame stands for a location in the woods where a hut with an A-shaped roof was located; childside is the location in the laboratory where research with children was carried out. "Would you like to ball chase?" stands for a situation when Kanzi picks a ball, goes with it to the keyboard and comments "chase."

Sentence Types Directed to Kanzi	Examples
Action-Object	Would you please carry the straw?
Object-Action	Would you like to ball chase?
Object-Location	Would you put some grapes into the pool?
Action-Location	Let's chase to the A-frame.
Action-Recipient	Kanzi, chase Kelly.
Action-Object-Location	I hid the surprise by my foot.
Object-Action-Location	Kanzi, the pinecone goes in your shirt.
Action-Location-Object	Go to the refrigerator and get a tomato.
Agent-Action-Object	Jeannine hid the pine needles in her shirt.
Action-Object-Recipient	Kanzi, please carry the cooler to Penny.
Action- Recipient-Object	Go play with the dogs on the childside.

Table 1: Utterance types and their examples addressed to Kanzi

Once Kanzi's ability to comprehend complex sentences surfaced, Savage-Rumbaugh brought in another subject, namely, a human infant named Alia (between 18 and 24 months of age during the test period). The aim here was to compare Kanzi's (at the age of 8 years) and Alia's abilities to comprehend novel English sentences with varying lexical units and syntactic construction, where both from an early age were exposed to both spoken English and lexigrams. Due to these commonalities of treatment (Savage-Rumbaugh *et al.* 1993, 24):

both species respond[ed] by learning how to (a) decode sounds into word units, (b) map these word units onto real-world cause-and-effect relations, (c) reconstruct the rules governing the combinatorial usages of different classes of these word units, and (d) use these relations and units in a productive manner to change the behavior of others so as to suit their own interests.

Savage-Rumbaugh and her collaborators then concluded the following (Savage-Rumbaugh *et al.* 1993, 98):

The clear outcome from the present study is that two normal individuals of different ages and different genera (*Homo* and *Pan*) were remarkably closely matched in their ability to understand spoken language. A 2-year-old human female and an 8-year-old bonobo male demonstrated that, under relatively similar rearing circumstances and virtually identical test conditions, they could compre-

hend both the semantics and the syntactical structure of quite unusual English sentences.

The results of the Kanzi project can be summarized as follows (Rumbaugh – Savage-Rumbaugh – Washburn 1996, 119; Savage-Rumbaugh – Shanker – Taylor 1998, 207; Savage-Rumbaugh 1987a, 289):

- (1) In both bonobos and chimpanzees, language skills appear spontaneously without formal training in the following order: first, comprehension of spoken words, then, comprehension of lexigram symbols and, finally, productive use of lexigrams.
- (2) These comprehension skills involve the ability to understand novel words as well as sentences.
- (3) They can learn to differentiate English phonemes and can understand their combination to be words.
- (4) They know the written symbol that corresponds to many of the spoken words, and they can use this symbol.
- (5) They have not produced any speech that is interpretable as English words.
- (6) They have not progressed in the development of language skills at the rapid pace displayed by normal human beings.

4 Methodology: From Behaviorism to Narrative Ethnography

Let us now move from the level of science of the ALP to that of *methodology* involved in ALP, because only by their analysis can one understand the basis and framework of the methods employed in the empirical theory.

The *pragmatic dimension of language* is understood by Savage-Rumbaugh as mutual communication of the subjects involved and aimed at entities in the extra-linguistic sphere (Savage-Rumbaugh 1990, 66). Such an understanding can be represented as follows (S_i and S_j stand for subjects involved in communication):⁷

⁷ We put meaning here as a mediating link, as Savage-Rumbaugh takes it into account Savage-Rumbaugh – Brakke (1990, 316).

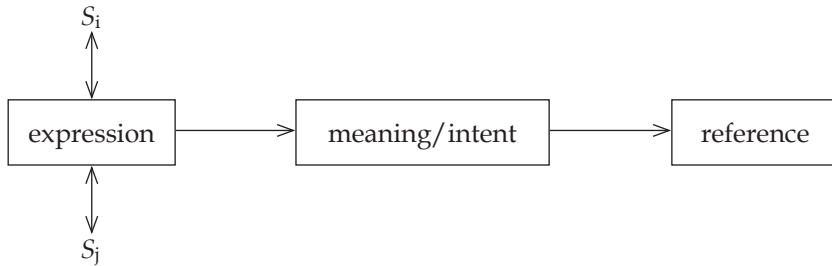


Figure 1: Savage-Rumbaugh on the pragmatics of language

This scheme enables to understand how in the framework of the ALP the respective experimental methods were developed, namely, based on reduction—as shown above—and by *variations* of the elements given in the language complex as symbolized in Figure 1.

In case of the Lana project targeting initially her syntactical skills, the mutual relations of lexigrams were varied by the experimenters. In the case of the Sherman-Austin project, in addition to these skills, semantic skills were also tested, in that (a) the number and types of symbols were varied with respect to pre-given reference(s) in such a way that a choice was provided from a set of symbols composed exclusively of lexigrams, or from a set composed of both lexigrams and photographs, or from a set composed of spoken English words combined with lexigrams, or exclusively from spoken English words; (b) the entities from which the apes could choose as references of pre-given symbols were varied both in number and type (e.g., food-items, inedible items); (c) the variation on the side of reference was also accomplished in such a way that a complex was experimentally constructed and then either reduced or further complicated in order to pinpoint by training and testing apes' referential capabilities; (d) apes' ability to comprehend the direction of relation in the language complex was tested by moving (i) from a reference (presented to the ape by a human experimenter) to its symbol (which was to be *produced* by the apes), or (ii) from a symbol (produced by the experimenter and communicated to the apes) to its reference (which was to be *picked up* and *presented/given* by the apes to the experimenter).

So, for example, in the experiments described above where the apes were split up into two groups: the event group and the label group, Savage-Rumbaugh applied the technique of *experimental reduction/clo-*

sure⁸ (see Figure 2) of a complex initially composed, on the one hand, of foods of certain types to which different preferences were assigned by the apes, and, on the other hand, a set of lexigrams from which they had to choose. The reduction/closure performed stood for the replacement of those foods by foods of other types where their mutual difference in order of preference was eliminated. Thus, the apes were – by means of closure/reduction – purportedly led by the experimenters

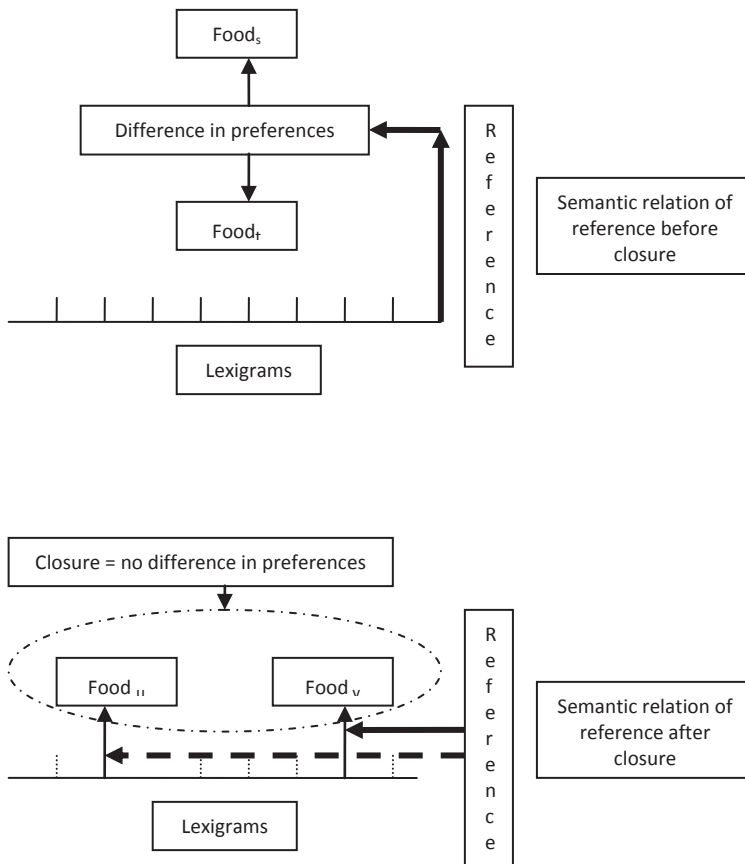


Figure 2: Operation of experimental closure/reduction

⁸ On the concept of closure see Pawson (1989).

into a situation were only the *purely semantical relation of the foods to their corresponding lexigrams was given while the mediating and interfering non-semantical condition of a relation of preference to food types was eliminated.*

In the experiments with Austin and Sherman described above and involving the rotating dispensers, Savage-Rumbaugh proceeded from the methodological point of view by a *method of a successive reduction of experimentally produced complexes to their – from the point of view of the aims of the respective experiments – basic relations to be trained and then tested for their presence.*

In addition to the gradual shift at ALP's meta-scientific level from syntax via semantics to pragmatics, another shift happened, namely, the shift of the ALP into the realm of humanities. This shift appeared in a discussion of Savage-Rumbaugh concerning her own behavioristic approach to language, which she, at least partially, initially held.

As early as 1978 she and D. M. Rumbaugh put *cognition and generalization linked to language learning into mutual opposition with reinforcement and conditioning of behavior linked to language learning* as follows (Rumbaugh – Savage-Rumbaugh 1978, 120):

Cognition, the one ability absolutely essential to language, is held by the authors to be an advanced form of intellectual function that provides for the perception of relationships among the attributes of diverse things and events. ... cognition can and does result in major alterations of an organism's behavior patterns, not through the arduous selective reinforcement of certain responses at the expenses of others, but rather because of new comprehensions or understandings that come about through the emergence of perceived relationships. Based on generalized experience ... an organism becomes cognitive in its functioning.

All learning holds the potential for enhancing adaptation through behavioral alterations. ... classical and instrumental learning result in behavioral alterations through selective reinforcement of certain behaviors, at times in combinations or chains, the behaviors so "learned" are essentially basic to the response repertoire of the organism. Conditioning can and does alter the morphology of responses and the occasions for selected responses to be manifest; however, conditioning does little more than to rearrange the basic response elements of an organism's capacity and their probabilities.

Both spoke in this article in favor of the former approach and set as their aim to find out if the cognitive and generalization capabilities, once linked with language acquisition, could be traced in the apes involved in the ALP.

However, contrary to the views presented in this paper, Savage-Rumbaugh published another, later article (1984) that claimed to show that "the behavior-analytic framework, and the procedures devised to produce language-skills in apes, provide strong support for several of the major positions set forth in Skinner's (1957) *Verbal Behavior*" (Savage-Rumbaugh 1984, 223). However, a careful analysis of this article brings to the surface rather ambiguous results. *On the one hand*, she shows how the arrangements of experiments with Sherman and Austin correspond to an implementation of Skinner's terminology.

On the other hand, she has to acknowledge that "[c]ommunication as a process, is not dealt with in all detail in *Verbal Behavior*" (Savage-Rumbaugh 1984, 244), and "[u]nfortunately, Skinner does not go on to provide a vocabulary that does apply to the phenomenon of communication" (Savage-Rumbaugh 1984, 244). At the same time she quotes from Skinner, who brings in the concept of *intentionality* – namely *belief* – in order to conceptualize the behavior of a listener with respect to a speaker.

A departure from her attempts to conceptually unify intentionalistic and behavioristic approaches at the meta-level can be traced to her (1993) article, where she conceptualizes *reference* as that to which one points, to which one draws attention; "a specific thing, idea, goal or particular activity that is desired etc." (Savage-Rumbaugh 1993, 460), while the *act of reference* "is assumed to be an intentional act that is carried out for a specific purpose" (Savage-Rumbaugh 1993, 460) and which always takes place between individuals "sentient of the nature of the communicative system that they employ" (Savage-Rumbaugh 1993, 460).

This shift from a behavioristic to an intentionalistic conceptualization finds its continuation in (Rumbaugh – Savage-Rumbaugh – Washburn 1996). Here, for the first time, it is viewed as a turning away from a *natural-science-research paradigm*, because the behavioristic approach is now understood as an extension of concepts and research methods of physics and chemistry into the realm of life. This extension, however, brings in concepts and methods that are alien to life, while life is at the basis of the existence of animals and humans. The *methodological* consequences are then spelled out by Savage-Rumbaugh as a critique of the means available to *Science*, where Science is understood as the sum of accepted methods of her time in primate behavioral research (Savage-Rumbaugh 1999, 115). The critique runs as follows:

The real difficulty here is that living organisms do normally interact, and the “observer” stance is not the same as the “participant” stance. We cannot treat primates like particles of matter, for which the mixing and treatment procedures of one chemist can be replicated by those of another. Primates have memory, and the history of one’s past interactions determines the nature of future interactions. One participant is not equal to another because their histories are not equal. And an observer is not equal to a participant because an observer stands outside. ... In the arena of ape language, the participants are also the researchers. There are no other “observers” standing by observing the participants. ... Observers, by themselves, cannot change Kanzi’s perception of the woods, nor can Kanzi’s behavior change their perceptions. Thus a true observer would never encounter the effect of language. By the current standards of Science, I must have an observer of all my actions and all Kanzi’s actions in order to validate any report. ... Kanzi and I, however, are not like vials of sodium and chloride waiting to interact, unaffected by whatever means is used to join us or to watch us. We are constantly interacting, and the nature of our interaction is affected by the observer. Moreover, each observer affects the nature of that interaction differently. ... Thus Science, as currently structured, will not take the participant’s account and does not recognize as real the effect of the observer. (Savage-Rumbaugh 1999, 161-162)

The final meta-scientific and methodological shift in Savage-Rumbaugh’s ALP came in the form of a turn towards *narrative ethnography*.⁹ Its focus is the conduct of life of both and humans living together in a *Pan/Homo* culture, where through

the living of a joined life, one learns about shared emotions, shared intentions, shared goals, shared perceptions of time, shared ethical norms, shared health and shared illness, and shared mythologies,

⁹ On narrative ethnography see Tedlock (1991) and Tedlock (2004). “Some fieldworkers have used the term narrative ethnography to highlight *researchers’* narrative practices as they craft ethnographic accounts. This use features the vibrant interplay between the ethnographer’s own subjectivity and the subjectivities of those whose lives and worlds are in view. These ethnographic texts ... take special notice of the researcher’s own participation, perspective, voice, and especially of his or her experiences in relation to the experiences of those being studied” (Gubrium – Holstein 2008, 251).

among many other culturally instantiated ways of being. These shared perceptions of reality serve as a sort of clay from which the events of daily living become co-molded and co-interpreted. Experiential knowledge of these events becomes verifiable through simple daily acts of joint living and joint engagement. This happens as it does because if perceptions emerge that prove to be inaccurate, nearly all attempted joint actions will fail. (Savage-Rumbaugh *et al.* 2005, 312-313)

From the point of view of *methodology*, this argues for the scientific superiority of "participant-based ethnographic studies" (Savage-Rumbaugh *et al.* 2005, 311) that rely "upon insight, intuition, and analysis of the observers, who are ... participant observers in the classical anthropological tradition. Narrative accounts, by definition, describe events. They do not predicate events, nor do they focus upon quantitative data" (Savage-Rumbaugh - Fields 2006, 223).

At the same time, the turn of the ALP to narrative ethnography represents a *sociocultural perspective*; "We seek to innovate ... [by] emphasizing ethnographic facts of a Pan/Homo society that speak to the socio-historical heritage of Soviet psychology spearheaded by Vygotsky, Leont'ev, and Luria" (Fields - Sagerdahl - Savage-Rumbaugh 2007, 164).

Based on that turn and that perspective, she and her collaborators draw the conclusion that the ALP for a long time was based on at least four incorrect suppositions. First, it was supposed that the testing language of human experimenters was somehow *neutral* in respect to the subject-matter - "objects (= apes)" - to which it was applied in research. Second, it was not realized that the subject-matter to which it was applied was *also a language*. Third, it was not realized that Savage-Rumbaugh and, for example, Kanzi were communicating in the testing language, e.g., when the former explained to the latter the experimental arrangements, the language to be tested was much simpler than the testing language (Fields - Sagerdahl - Savage-Rumbaugh 2007, 182-183). This thus should witness "[t]he absurdity of ape language research" (Fields - Sagerdahl - Savage-Rumbaugh 2007, 182) in its *pre-ethnographic form*; the latter being characterized also *as science in its objectivistic claims* that Savage-Rumbaugh and her collaborators refuse to accept: "Our view is not the classic one of studying what is 'out' there according to one or another disciplinary perspective" (Savage-Rumbaugh *et al.* 2005, 312).

Fourth, the dominant view was that experiments with apes should yield predictably similar results, that is, they should lead to the discovery of *universals of behavior* independent of the rearing background of these apes (Savage-Rumbaugh *et al.* 2005, 312). Contrary to this, once the shift to narrative ethnography with its sociocultural perspective took place, the ALP held to the view that experiments with subjects from different, particular *Pan/Homo* cultures will yield different results. With respect to Kanzi's stone tool-production, whose results lacked the features of stone tools produced in the Oldowan period, this means that

[f]rom a postmodernist's view, there is nothing universal about the cultures that produced Oldowan technologies ... The absence of Oldowan features in our stone tools is meaningless, unless one assumes that God is broadcasting Oldowan algorithms and you simply have to have the right kind of humanlike brain to access this universal. (Savage-Rumbaugh – Fields 2006, 240)

5 Critique

With the foregoing as relevant background, let us now offer a *critique* of Savage-Rumbaugh's most recent methodological views. In her analysis of how to understand the communicative systems of primates she states that one faces a problem similar to the following:

what would happen if a scientist tried to decode an unknown human language by looking only at the relationship between the words of a speaker and the behavior of the listener. ... If an outside observer does not understand any of the words, nor even whether one is hearing individual words as opposed to phonemes, it is impossible to rely upon the correlations between the words of the speaker and the listener to gain an understanding of the meaning of the sounds emanating from the speaker. (Savage-Rumbaugh *et al.* 1996, 173)

An additional problem comes in due to the fact that even an

[i]ncreasingly sophisticated grammatical analysis cannot provide greater insight into the basic phenomenon of symbolic communication, because the meaning transferred by the words often does not lie in grammar but in the mutually understood intent of the speaker. (Savage-Rumbaugh *et al.* 1996, 173)

A possible *way out* of these problems in the study and discovery of symbolic communication in non-human primates could be to approach it in the same way as we approach symbolic communication in our own species, namely, *via language*. This, then, means that the "primary problem, that of breaking into language," can be accomplished only *via language* (Savage-Rumbaugh *et al.* 1996, 174). Thus, one faces here a "chicken-or-egg" problem: *in order to trace and study language in any species – human and/or nonhuman – one already needs language*.

Accordingly, since symbolic communication is by its very nature permeated with *intents*, Savage-Rumbaugh emphasizes that our "current analytical and quantitative methods determining whether or not a purported 'fact' about animal communication is verifiable" do not allow us to break into that circle. Furthermore, we lack "the scientific tools to decode the communicative systems of other species in an objective manner" (Savage-Rumbaugh *et al.* 1996, 175). As a result, she proposes the following alternative method of approaching and identifying the language in a non-human species (Savage-Rumbaugh *et al.* 1996, 175):

- 1) The scientist asks: "If an ape ... were to have a language, what might it look like?"
- 2) The scientist then asks: "What might an ape ... need to do that would require a symbolic system of communication?"
- 3) If the scientist succeeds in discerning a form of behavior in apes that requires language, then he/she could then investigate into their particular actions.

However, if one takes a closer look at the methodological norms proposed by Savage-Rumbaugh, one finds that she has not really proposed a way out of the circle of language. Even in step #1, above, she implicitly presupposes that anyone who tries to locate a language in the realm under investigation *already knows in advance at least what language is*. The same holds for the proposal listed under step #2. Only by knowing what language is can one know what types of behavior could involve language. Stated otherwise, *it is not possible, by using a language free of concepts referring to language – that is to say, from the position of an outside observer not employing language as a research "instrument" – to discern behavior in apes that requires language*.

This norm has to be stated even more robustly, in the case of attempts to track language in another species and establish intra-species communication: *One needs both the mastery of language and a meta-reflec-*

tion on language in order to find out whether language is present in the "alien" species under investigation.

As a test of our critique of Savage-Rumbaugh's proposals in the realm of methodology of the ALP, let us analyze her articles Savage-Rumbaugh *et al.* (1996) and Savage-Rumbaugh (1998), where she deals with the attempts to trace symbolic communication in feral bonobos. The issue at stake was to find out if separate subgroups of bonobos belonging to one group communicate when moving on the ground in a dense forest. The type of movement, the forest's presence, and the distance between the subgroups precludes both gestural and vocal symbolic communication. The task was to explain how it is possible that even in the absence of these two types of communication, still the subgroups were able to keep track of each other by some form of knowledge. The presence of the latter was evidenced by the fact that the subgroups always reunite at some distant feeding or nesting sites and usually take the same path to these sites. Now, the question for Savage-Rumbaugh was whether that knowledge was passed on from one subgroup to another by some form of communication. In order to answer this question, Savage-Rumbaugh drew on the knowledge given to trackers that guided her in the forest. The trackers were able to follow the routes of the subgroups by identifying vegetation altered by the bonobos in the following ways: (i) plants' leaves were tamped down by the bonobos' feet, (ii) branches were broken off and stuck perpendicularly into the ground, and (iii) plants were smashed in the middle of the path pointing in one direction (Savage-Rumbaugh 1998, 163).

Based on the identification of these alterations, Savage-Rumbaugh then stated the following methodological generalization:

To determine if symbols are being utilized, it is essential to begin by looking for some sort of telling pattern in the occurrence of events. If a pattern of similar symbolic events exists across many dissimilar instances, can a symbol system be assumed to be operative? This is true of human communication systems as well as those of bonobos. For example, one of the communication systems used by the trackers was vegetation-based. ... This system was very inconspicuous, both by its nature and by the manner it was in which the trackers left the signals. The meanings of such symbols could not have been deciphered without the extensive effort had not the trackers explained it. A language-based explanation of a symbol defines for the listener the regularities of occurrence that are permitted for that

symbol and thereby the events to which it can be linked and which define its meaning. Lacking a bonobo translator, one can only work diligently to try to discover any patterns of regularity for oneself. ... Imagine trying to determine the pattern inherent in Morse code without knowing the language in which it was being sent. (Savage-Rumbaugh *et al.* 1996, 179)

But, this means that *only a being already using symbols for communication* (i) *can use symbols – in a meta-reflective move – to identify a symbolic pattern in a set of otherwise different events*; (ii) *knows what are the regularities of occurrence permitted for particular symbols, that is, he/she knows what are their respective meaning/intent and reference*. Finally, only by fulfilling conditions (i) and (ii) can the being (iii) *function as a translator*. In the example given above, the trackers functioned for Savage-Rumbaugh and her collaborators initially as a bridge into the (possible) communication between the bonobo subgroups, that is, as translators for feral bonobos.

Let us now turn to Savage-Rumbaugh's view that one lacks "the scientific tools to decode the communicative systems of other species in an objective manner" (Savage-Rumbaugh *et al.* 1996, 175), as well as her claim that "[o]ur view is not the classic one of studying what is 'out' there according to one or another disciplinary perspective" (Savage-Rumbaugh *et al.* 2005, 312).

If our critique above applies, then this means, first, that the attempts to find out if another species is (capable of) using a language have an *objective aim* – to find out a state of affairs in that species and what one can use in order to reach that aim is, and in fact can only be, language. This, in turn, means that in the process when a species' language should identify and recognize the existence and structure of another species' language, this identification and recognition not only yields claims with a pretension to *objectivity* and *truth* but also with an *essentialist* pretension.¹⁰ The basic concepts and rules of the former language should reconstruct the rules at work in the latter language; *the former should lock on the latter by means of understanding*. Contrary to this, in the natural sciences (e.g., physics, chemistry) hypotheses are stated that initially do *not* have any objectivistic/essentialist pretension: the hypotheses with their concepts are introduced, initially, as pure *conventions* because they need not lock on to (understand) a pre-existing language system in the realm under investigation.

¹⁰ Here we draw on Habermas (2001, 9-10).

Second, the issue of objectivity and the need to apply natural and technical sciences to the realm of intra-species communication also surfaces when one looks at the history of the ALP from the early 1970's on. In order to find out if apes are capable at all of symbolic communication with humans and comprehension of spoken English, a great deal of effort was vested into finding ways to bridge the *somatic differences between the apes and the human experimenters which distorted their (possible) mutual communication*. This means that the claim that the ALP is part of the humanities, and that it proceeds by the methods of narrative ethnography, has as its background the (successful) attempts to restore the somatically distorted intra-species communication by the employment of technical means having their origin in the natural/technical sciences (e.g., the implementation of the lexigrams in the computers and their display on monitors).

The methodological theories that put into opposition natural/technical sciences and humanities in the field of ape language research do not reflect the fact that all actual communication involves the employment of bodies.¹¹ This fact is usually hidden in the background in the case of *inter-species* communication, but surfaces when one deals practically/experimentally with attempts at *intra-species* communication.

Let us, finally, turn to the above mentioned denial of the existence of *transcultural universals*. The central question – with respect to that denial – for Savage-Rumbaugh and her collaborators is as follows: “Are there limitations to great ape cognition that are not culturally based? Is brain size and/or brain wiring a basic constraint in some yet unexplained way?” (Savage-Rumbaugh *et al.* 2005, 324). The answer they give runs as follows:

We know that human children who suffer hemispherectomies at an early age still acquire language and human culture ... even though their brains are half the normal size and clearly must become differently wired. These simple facts point us in a new direction of self-understanding and awareness. They emphasize the strength of cultural realities ... Minds do not arrive preformed and minds do not emerge in precise stages. Minds are bended and folded by culture forces that are operating at a level we are only beginning to understand. (Savage-Rumbaugh *et al.* 2005, 324)

¹¹ On this see Krüger (1999) and Krüger (2010).

But, this answer hopelessly contradicts the results of experiments accomplished in the framework of the ALP, namely, those comparing the cognitive/linguistic capabilities of Alia and Kanzi were compared. The human infant took off in its development at a rapid space at the age between 2½ and 3 years, and clearly left behind the cognitive/linguistic capabilities of Kanzi (at that time already over 8 years old). *The elimination of differences in the sociocultural rearing conditions between Alia and Kanzi – on which those experiments were based – points to differences in universals given in the bonobo species and Homo species.* So, since these universals cannot belong to a single socio-cultural matrix, they can be explained only phylogenetically “as biological adaptation in the sense of an explanation by means of the theory of natural evolution” (Krüger 2010, 130), that is to say, *not by concepts of sociocultural disciplines but of natural science disciplines.* And these universals can be viewed as enabling structures, in the sense that they *enable* but *do not determine* such phenomena as intentionality and inter- and intra-species mutual understanding and communication.¹² This view, in turn, leads to a new direction in research that by its nature is of the *non-natural-science type*, namely, research into what those universals *enable* and what they *block off* in the sense of a comparison of intra-species *differences* in the early (infant) ontogeny of cognition, learning, tool-use, language, etc. This is the path taken by Michael Tomasello and his collaborators,¹³ starting in the 1980's. Unhappily, a meta-scientific and methodological analysis of their findings is beyond the confines of the present paper.

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¹² Here we draw on H.-P. Krüger's (2010) where the German term “Ermöglichkeitsstrukturen” is introduced for these structures.

¹³ On this see, for example, Tomasello (2008).

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