

## The Ideational Metafunction and Nonhuman Signalling

[SLIDE – INTRODUCTION]

You've probably spotted that this is an odd subject for a linguistics conference, and even odder for a conference dedicated to one particular aspect of one particular way of looking at language. However, I believe that Halliday's four metafunctions offer perhaps the best way into understanding how language is comparable to – and different to – other forms of animal signalling. Welcome to the functional linguistics twilight zone.

A quick look at the other main theory of language, formalism, shows that it has not proved too successful in establishing the interface between language and other signalling forms. Chomsky himself has taken the view that language is completely different to all that has gone before: It constitutes a genetic change so fundamental that any similarities between language and nonlanguage signalling are pure coincidence.

The formalists who have tried to link language structure back to nonlanguage structure – Pinker, Jackendoff, Bickerton, and so on – have all fallen foul of Chomsky's dictum that language is a near-optimal solution. All we need to do is work out the problem it solves, and we will see just how optimal it is. However, in all of the formalist solutions to the origins of language there are part-way stages which must be less than near perfect; and there remains a major unasked question: why should we assume that the current state is the final state? Could this thing that we call language be just one more part-way stage?

Let's leave formalist theory to one side for now, and concentrate on Halliday's model. First, I should say that I am not going into great detail about clause structure. You'll hear a lot more about this during the rest of the conference, and from people with much more knowledge about it than I have. Instead, I want to take an overview of the four metafunctions, and see how – or whether – animals would use them.

The first metafunction I want to consider is probably the most controversial: the interpersonal metafunction. I intend to demonstrate that this is not needed for nonlanguage signalling, even though it would seem to be a minimal requirement for communication. Contrary to anthropocentric common sense, I want to show that signalling does not need to be communicative.

[SLIDE – BEE WAGGLE DANCE]

Let's start with eusocial hymenoptera – bees, ants and wasps. The most famous case here is the bee waggle dance, which was initially discovered by Karl von Frisch and has been analysed by many others since. The bee dance enables a returning worker to indicate to other bees the direction and distance of food sources. The other bees do not need to have visited the food source themselves, and they do not even need to have been outside the hive before. The dance codes the direction and distance as a series of indexical values, both within the individual signs used in the dance, and in their interrelationship.

Obviously, the signal is not consciously coded or decoded, this happens at the genetic level. Nonetheless, the bee waggle dance would seem to be a good example of a successful communication device in nature.

However, if we look at it from a different viewpoint, it isn't communicative at all.

Stephen Budiansky says that signals are used in Nature not because they mean something but because they work – and this signal definitely works. But if it has no meaning for the sender or the receiver, why does it work?

[SLIDE – TWO STIMULUS-RESPONSE PAIRINGS]

If we see the dance as a response by the signalling bee to the stimulus of arriving back at the hive with food, then we have a simple stimulus-response pair working on the sender. If the dance also works as a stimulus to other bees to go out and forage then we have another stimulus-response pair, working on the receiver. What makes the signal work is not a comprehension by the receiver of the intention of the sender,

it is simply the fact that hives where workers do the dance and respond to it do better than hives where they don't dance. As long as the two stimulus-response pairs continue to be selected for by evolution, they will continue to get more elaborate – even though no model of communication is involved, in the minds of either sender or receiver.

If we look at primates we see that the model is more sophisticated. Vervets making an eagle call switch to the leopard call if the eagle is about to attack vervets on the ground. The implied action of 'out of the trees' is replaced by a more appropriate 'into the trees' call. There would seem to be some awareness that the action-response of the receiver is linked to the call-response of the sender: the sender appears to be telling the receiver what to do rather than what is happening.

[SLIDE – LINKED MESSAGE]

I think it is reasonable to label this as communication; but it is not interpersonal in the same way as language. The sender does not need to be aware that the receiver has intentions, only that there is a link between the call and the receiver-action. Similarly, the receiver does not need to be aware that the sender has intentions in making the call.

In fact, when the receiver does become aware of the sender's intentions they also become aware that the sender can manipulate the call. This is machiavellian intelligence, and it breaks the link between the referent and the receiver-action. Calls are no longer automatically trustworthy, and only costly signalling works.

Let's now have a look at the interpersonal metafunction itself: what is the minimum requirement to be able to say it's operating? Fortunately, Halliday and others have given clear definitions against which we can judge the interpersonal metafunction.

First, it enacts social relationships, which means that the sender and receiver need to be aware that they are both part of a social organisation. But most signals in nature have no need of social relationships to work. From bacterial DNA exchange mechanisms through to the challenge calls of chimps, the normal signal relies on the

sender treating the receiver as, at best, a thing to be manipulated rather than an intentional being with its own agenda. The sender and the receiver need no concept of *you* and *me* for the signal to work.

[SLIDE – VERVET MONKEYS]

Second, the interpersonal metafunction enacts an exchange of information. However, in nonhuman signalling we see no need for the sender and receiver to attach the same information to a signal. The vervet eagle alarm call is a response by the sender to the stimulus of an eagle, but to the receiver it means “leave the trees”. It works for the receiver not because they become aware of the eagle but because they carry out a procedure which saves their lives. There is no information exchanged, only genetically coded responses invoked.

Third, the favoured structure of the interpersonal metafunction is prosodic. However, there is little room for prosody in nonhuman signals: the signal has value only inasmuch as it is clear and unambiguous. In human language, prosody is used to mitigate or adjust meaning, but in nonhuman signalling there is little scope for variance of signal value. Prosody is used in nonhuman signalling, but it has very specific values. An example is the black-capped chickadee call, where the final ‘dee’ sound of the warning call is repeated to indicate a greater level of danger.

[SLIDE – BLACK-CAPPED CHICKADEE]

Other interpersonal features are missing from nonhuman signalling. There is no back channel to the signal, there is no negotiating to an agreed meaning, and the signal does not act as an exchangeable currency in social relationships. In fact, the interpersonal metafunction seems to be completely absent from nonhuman signals.

We run into a similar set of problems when we try to identify the textual metafunction in nonhuman signalling. The textual metafunction creates relevance to context: it defines the message between sender and receiver as a negotiation of meaning. However, in nonhuman signalling the context of a call is invariant: if the context is

present the call has value; if it is not, the call is deceptive – and deceptive calls don't survive.

There is also the problem of relevance. Nonhuman signalling is not concerned with building relevance in the same way as language. The relevance of a call is intrinsic to the signal: the call is not made to be relevant because it is only produced if it is already relevant. Also, the relevance of the call to the sender is not the same as that for the receiver: the signal has different values to sender and receiver, there is no negotiating to an agreed meaning.

There are also problems for the favoured structure of the textual metafunction. The culminative structure relies on certain parts of the signal being privileged over others, but most nonhuman signals are monolithic, in production as well as receiver value. There can be no emphasis of parts of the signal because there are no parts to the signal.

[SLIDE – DIANA MONKEYS]

Once again there are exceptions, like the chickadees, or the Diana monkey 'probably' boom. With the 'probably' boom a Diana monkey downgrades a call from a stimulus for immediate action to a stimulus for increased vigilance. However, this particular prosodic effect is specific and invariant.

Halliday & Matthiessen describe the language metafunctions as kinds or patterns of meaning. As I have already shown, meaning does not need to be a feature of either production or reception of a nonhuman signal: the question is not "what does it mean?" but "does it work?" However, there is one level of meaning which is not directly involved in negotiating a commonality of meaning, and that is the ideational metafunction.

As you know, the ideational metafunction consists of two effects, so let's look first at the experiential part. Halliday & Matthiessen describe this as "construing a model of experience". In nonhuman signalling, the signal represents a direct experience of the referent by the sender: if the referent is present as a stimulus then the call is

produced as a response – no stimulus, no response. And, because the signal has a one-to-one mapping with the referent, it stands in place of the referent for the receiver of the signal. The signal thus has a direct experiential value to the sender, and an indirect referential value to the receiver.

It may seem odd to be claiming that, on the one hand signals do not have the same value to sender and receiver, and on the other hand they refer to the same referent for both parties. However, the value of the referent to the sender is that it generates a signal which enhances the survival of conspecifics – who are probably related to the signaller. The value therefore lies in kin selection or reciprocal altruism. For handicap principle supporters, demonstrating fitness is also a good source of value for the sender.

For the receiver, the value of the referent is in the one-to-one correspondence with the signal. It is the fact that the call stands in place of the referent, and therefore enhances survival without the receiver needing to be immediately directly aware of the referent. The signal works not because the referent has the same values to sender and receiver but because it has different values.

The logical metafunction is more difficult to justify as present in nonhuman signals. This metafunction is concerned with what happens between signals and not what happens within a signal. Nonhuman signals are essentially stand-alone events which carry their whole value within themselves, so the opportunities for intersignalling significance would seem to be nil.

[SLIDE – CHIMPANZEE]

There is a level at which intersignalling significance occurs, but it is locked within individual minds and is never communicated. If an individual is aware that, for whatever reason, the signals given by another individual have been unreliable, the reliability of past signals will reflect on future signals. Obviously, this is leading us into the realm of machiavellian intelligence, social calculus and theory of mind, all of which are not directly significant in this paper. If anyone is interested in them then catch me at lunchtime and I'll bore you rigid with the whole self-awareness schtik. For

now I'll wimp out with the bald statement that the logical metafunction is missing from nonhuman signalling, although it is likely to be used in nonhuman cognition.

This leaves only the experiential metafunction active in nonhuman signalling. Should we be surprised that only one metafunction is involved? If we look once again at the requirements of a nonhuman signal then the answer has to be no. Nonhuman signals rely on the fact that they are unambiguous and directly truthful: ambiguous signals cannot cause automatic responses, and untruthful signals are not worth responding to at all. There is only room for one level of meaning, or value, in nonhuman signals. So we would expect only one metafunction, or kind of meaning, to be active in any nonlanguage signal.

However, the fact that it is the same metafunction in every signal is significant. The interpersonal metafunction cannot apply because there is no need for interpersonal communication in nonhuman signals – there is no need for *me*, as sender or receiver, to have any concept of *you*, as receiver or sender. Only the signal itself is important.

Similarly, the textual metafunction cannot apply: I am not interested in how the context of the signal is relevant to you, only in how it is relevant to me. If it is not relevant to me then there is no meaning, and no value, for me in the signal. It is not a signal, it is environmental white noise.

Formalist linguistics offers a structural view of language: it shows us how language is internally organised, but it tells us nothing about why and how it is used. Functional linguistics, in contrast, offers a process view of language: it shows us language in use between real speakers and listeners who do not need to be ideal. If the structure of language is truly unique in Nature, as it seems to be, then looking for the sources of language using a Formalist methodology is unlikely to identify the important similarities between language and other signalling forms. Functionalist methodologies, on the other hand, are very likely to identify the processes of language which have analogues in nonhuman signalling. There is already some evidence that functionalist approaches work best in understanding human

nonlanguage communication, and I hope I have shown that the same approaches reveal useful information about nonhuman signalling, too.

So:

[SLIDE – THANK YOU FOR LISTENING]