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Framing ideas in aphasia: The need for thinking therapy

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Abstract

This paper argues that some of the patterns seen in aphasia may reflect difficulties in the cognitive preparations for language. In particular, some individuals may be unable to carry out processes of ‘Thinking for Speaking’ (Slobin 1996), which frame thoughts for language production. Evidence to support this proposal is presented, together with signs that such thinking can be assisted with cues and therapy. It is argued that these preliminary data need to be pursued via a more comprehensive investigation of thinking therapy.

What this Paper Adds

In order to express our ideas we need to frame them in ways that are compatible with language. For example, we have to adopt a particular perspective, or chose what to highlight and what to omit. Such cognition has been termed ‘Thinking for Speaking’ (Slobin 1996). Some of the patterns seen in aphasia, such as the typical advantage of nouns over verbs, may be due to difficulties with this type of cognition. This paper offers evidence to support this proposal. Preliminary data are also presented suggesting that Thinking for Speaking can be cued. In conclusion, it is argued that we need to pay more attention to the cognitive preparations for language when carrying out aphasia therapy.

It is a truth (almost) universally acknowledged that people with aphasia are not intellectually impaired. Rather they have a specific language disorder in the face of generally intact cognition. The evidence for this leaps out from any interaction with an aphasic person. As an example, here is a conversation between myself and RS. R had aphasia following a stroke in his early 40s. Before this he ran his own business, which he was now selling:

J Can you tell me how far you have got with selling your
 business R?

R er Mr N (Mrs S: Your accountant)

R Yes ... I've left it to him

J And how far has he got with it?

R er ... one chap has come up with a er fee ... but there's three
 more coming

J That's quite good isn't it? Are they offers that you can
 accept?

R Not really

J So you want slightly more?

R Yes

J How quickly do you want to sell it?

R As soon as possible ... just for me to call it a day but it could
 take as long as three months

J What will you do with the capital?

R Put it into the one in the What's name bank

J What's happening to the staff?

R er (waves) goodbye ... goodbye

(taken from: Marshall, 1989)

R was clearly following the negotiations around selling his business. He was oriented for time, e.g. knowing that the sale could take months, and was able to judge the value of the offers. R also had some cunning strategies for coping with his aphasic word finding difficulties. He substituted a close alternative for a blocked word ('fee' for offer) and used a gesture coupled with 'goodbye' to communicate the notion of redundancies.

We don't just have to use our observations here. There is plenty of more scientific evidence. Take the study by Varley and colleagues (2005). They tested 3 people with severe aphasia who were virtually unable to speak and had language comprehension problems, particularly with sentences. They also showed difficulties with number words, at least in terms of production. Despite this, they could carry out eye watering numerical calculations such as:

$$50 - [(4+7) \times 4] = ?$$

$$2 \times [(5 \times 2) + 10] = ?$$

$$36 \div (3 \times 2) = ?$$

The individuals could even do a 'bracket generation task'. Here they were presented with a string of digits and mathematical symbols, which they had to mark up with different sets of brackets, then calculate the result. In case anyone is still in doubt, there is also evidence that aphasic people can do algebra (Klessinger, Szczerbinski

and Varley, 2007) and Theory of Mind tasks, which involve speculation about other people's beliefs (Siegal and Varley, 2006).

Given these data, a defining characteristic of aphasia seems to be a problem in mapping intact ideas onto a defective language mechanism. Put more simply, aphasic people can think perfectly well, but have great difficulty expressing those thoughts, e.g. because they cannot access words or construct sentences.

Yet are the difficulties purely at the language end of the process? We know that in aphasia certain types of language can be easier than others. Here are some common patterns:

- Automatic, formulaic language, such as social chit chat, serial speech or swearing, is often relatively preserved, or at least more so than propositional language (Van Lancker Sidtis and Postman, 2006).
- Concrete language is often more intact than abstract, both for production (Franklin, Howard and Patterson, 1995) and comprehension (Franklin, Howard and Patterson, 1994; Franklin, Turner, Lambon Ralph, Morris and Bailey, 1996).
- Nouns are often easier than verbs (e.g. Berndt, Mitchum, Haendiges and Sandson, 1997; Breedin, Saffran and Schwartz, 1998; Bastiaanse and Jonkers, 1998; Edwards and Bastiaanse, 1998; Webster, Morris and Franklin, 2005; see also Druks, 2002, for review). There are also differences within the verb

class, in that verbs taking multiple arguments can be particularly problematic (Thompson, Lange, Schneider and Shapiro, 1997; Kim and Thompson, 2000; McCann and Edwards, 2001).

Why do these patterns emerge? A number of factors almost certainly play a role. For example, automatic language is often constructed from highly frequent words, which may contribute to its availability in aphasia. Another factor is age of acquisition, whereby language that is learnt early in life is more resistant to damage than language that is learnt late (Hirsh and Ellis, 1994). This may help to explain the concreteness effect, although it is perhaps less explanatory in the case of automatic language and word class. It also needs to be acknowledged that the patterns although common are not universal, and may even be inverted. RG, for example, showed a preference for abstract over concrete words and for verbs over nouns (Marshall, Pring, Chiat and Robson 1996; Marshall, Chiat, Robson and Pring 1996).

Despite these caveats, I would like to consider another explanation for these very typical patterns. It could be that production in aphasia, to some extent, depends upon the ‘cognitive labour’ involved in translating thoughts into language. So at the easiest end of the continuum is language that is highly automatic and barely mediated by cognition at all – as is the case for swearing, reciting numbers or trotting out social phrases. Producing words that correspond in a very direct manner with their referents, as is the case for concrete nouns, is also relatively straight forward.

Abstract language, on the other hand, requires much more cognitive mediation. Take the following sentence:

‘The Head Teacher heard about the trouble during break and asked staff to identify the offenders’

Here we have moved away from simple labelling. People are referred to by their job (‘Head Teacher’, ‘staff’) or in terms of their role in the event and our consequent reaction to them (‘offenders’). That event has been abstracted as ‘trouble’ (was it a fight, stealing, drug taking, sexual shenanigans or what?). Finally we are told that staff have to ‘identify’ the children involved. Again the abstract verb gives us no indication of how they will do this – interrogation, CTV evidence or an identity parade? Overall this account is clearly the product of some vigorous cognitive filtering, a process that is reflected in the abstract terminology used.

What about verbs? On the face of it simple action verbs label events in a fairly one to one fashion, with none of the abstraction seen with the school incident. Yet this is not the case. We can illustrate this with the event shown in Figure 1.

Insert Figure 1 here

Despite its concrete nature this event can be construed in a number of ways. To take just two of the available options, we might focus on what the man is doing with the boxes or the effect on the van. Each of these construals will map onto different verb and sentence options. So if the focus is on the movement of the box verbs like ‘lift’ and ‘carry’ will be selected that map theme onto the direct object; whereas if the effect on the van is focussed verbs like ‘fill’ will be used that map goal onto direct

object. Even if the same verb is selected, subtle differences in focus can result in subtle shifts in mapping, as these sentences illustrate:

The man loads the lorry with boxes (implies that lorry is full)

The man loads the boxes into the lorry (implies that the lorry may not be full)

It seems that even a simple action requires considerable selectivity and cognitive mediation before it can be described. This takes our thinking away from real world imagery towards the abstracted and pared down structures that map readily onto language. Here is how Pinker puts it in his recent book:

‘when I think about a typical scenario in everyday life, like putting water into a glass, my mind has a well fleshed out image – a thirsty person walking over to a faucet with a clear tumbler in hand and turning a tap to let water flow into it just short of overflowing. Yet when I talk about the scenario, most of this flesh melts away, leaving behind one of several skeletons. If I use the verb *pour*, my field of vision narrows to how the water is caused to move, ignoring its destination; that’s the reason we can say *pour the water* but not *pour the glass*. But if I use the verb *fill* my field of vision narrows to the fullness of the glass, ignoring the trajectory of the water; that’s why we say *fill the glass* but not *fill the water*’ (Pinker 2007; p 112 – 3)

Pinker argues that whenever we set out to describe an event we have to apply some rather specialised forms of thinking, a process that has been termed ‘Thinking for Speaking’ (Slobin, 1996). This thinking re-casts our general thoughts into forms that are compatible with language. As already suggested, it entails processes of

perspective taking and selectivity, whereby we home in on some features of the event or situation while back-grounding others. Levelt (1989; 1999) argues that it also requires us to build propositional structure, or to delineate the main referents in the event and the relationships between them. We need additionally to ensure that these referents correspond with lexical concepts. Depending on the language that we plan to use there will be further demands. For example, a speaker of a tense marking language such as English will need to specify the temporal properties of the event.

This last point underlines a further property of Thinking for Speaking. It is not language independent. Rather, the way in which we frame our thoughts for language must pay attention to the particular requirements of the language that we plan to use. Imagine that we are describing an event in which a man takes a stanley knife to a sheet of paper. In English we can describe this event as ‘cutting’ and so discard the specific manner and instrument information. This option is less available to users of British Sign Language (BSL), where the verb is marked for instrument. So there is a different verb for cutting with a knife, as opposed to cutting with scissors. Thus people who use BSL have to pay much more attention to instruments than people who use English. In line with this there is some evidence that BSL users are indeed more likely to categorise events along instrumental lines than speakers of English (Vigliocco, Vinson, Woolfe, Dye and Woll, 2005).

So why is this relevant to people with aphasia? If language is underpinned by specialised, linguistically sensitive cognition, that cognition could be a site of impairment. The loss of access to language will further impact upon the problem, in that it will make it difficult to frame ideas in ways that are language compatible.

Returning to the example in Figure 1, it is difficult to know which perspective to adopt when describing a loading event unless we know about the perspectives available in our verb lexicon. Without access to this information a vicious circle may be established whereby impaired access to the lexicon deprives us of the very conceptual constraints that make lexical access possible. This is not to say that aphasic people are, after all, intellectually impaired, far from it. Rather some of their problems may reside at the boundary between thought and language, including at the thinking end of that boundary (see similar arguments in Dipper, Black and Brian, 2005)

By now you will be wanting evidence for this. We need evidence that this form of cognition has psychological reality. We also need evidence that it can be impaired in aphasia.

The study by Kita and Ozyurek (2003) offers evidence that the way that we frame ideas for speaking, and indeed gesturing, is linguistically sensitive. They asked speakers of English, Japanese and Turkish to describe a series of cartoon events. They were interested in whether their co-speech gestures would reveal subtle differences in the way these speakers thought about the events and, in particular, whether those differences reflected the specific demands of the 3 languages. In one event a cat attempts to catch a bird by swinging between high buildings on a rope. This event is interesting because neither Turkish nor Japanese have a verb corresponding to the English verb 'swing'. Speakers of these languages, therefore, are likely to ignore the trajectory of the motion when describing the event. Sure enough, their descriptions employed verbs equivalent to 'go', 'fly' and 'jump',

whereas virtually all the English speakers used ‘swing’. Intriguingly, these differences also manifested in their gestures. English speakers who gestured overwhelmingly used arc gestures in isolation, with fewer than 10% employing straight gestures. In contrast, 70% of the Japanese and 50% of the Turkish speakers used straight gestures, and very often these occurred in isolation. It seemed that these speakers had filtered out the arc nature of the movement from their representation of this event, so much so that this was even eliminated from their gesture.

So what about aphasia? Is there any evidence that this form of cognition can be impaired? Some of the evidence is rather circumstantial. The noun>verb effect is an example, as is the evidence that the number of arguments commanded by a verb can affect production (Thompson et al, 1997; Kim and Thompson, 2000; McCann and Edwards, 2001). As already discussed, this is in line with the proposal that verbs involve more cognitive mediation than concrete nouns. Those which entail multiple arguments describe more complex relationships than those with just one or two, which raises the cognitive bar even further.

Another manifestation may be a feature that we have termed ‘hyper-naming’. We have observed that some people with aphasia tend to list often rather extraneous nouns when they are attempting to describe events. Indeed their noun production far exceeds that of control participants when carrying out the same task (Marshall, Pring and Chiat, 1993; Cairns, Marshall, Cairns, and Dipper, 2007). Figure 2 gives an example. Here ‘Ron’, a man with non-fluent aphasia, is describing an everyday event in which a fairy sprays a swimmer with a hose:

Insert Figure 2 here + caption

Rather than homing in on the main event Ron seems to circle it with ever increasing object detail. It is as if he is unable to plump for a focussed perspective that would at least give him a chance of verb selection.

While suggestive, the above evidence is far from conclusive. Verb impairments in aphasia arise for many different reasons (see arguments in Marshall 2003). Problems with Thinking for Speaking may be just one contributory factor, and one that only applies in some cases. Similarly, a tendency to hyper-name may point to problems of focus, or a desire on the part of the aphasic speaker to reveal an aspect of language that is relatively unscathed.

Such difficulties have motivated more direct attempts to explore the cognitive underpinnings for language (e.g. Dipper 1999). One such attempt involves a task called the Role Video (Marshall et al 1993). This requires the person to make judgements about the roles played by participants in various videoed events, with judgements signalled by photo selections. So, in one item, the video shows a woman shooting a man (the event is very obviously staged!). The photos for selection are: the man dead on the ground (target), the woman dead on the ground (reversal distractor) and the man wearing a coat (event distractor). Three non-brain injured controls were tested, with none making any errors. However, MM (Marshall et al 1993) made five. Her problems were not general. Rather they occurred with reversible items, where one person does something to another, and involved the selection of the reversal

distractor. It seemed that, for her, the processing of event roles was insecure, which, in turn, made it difficult to express role information in language.

There is, of course, a catch with tasks like the Role Video. The specialist cognition that we are concerned with occurs only in the run up to language. Yet these tasks have necessarily floated away from that environment. So, when probing the person's knowledge of event roles we had to use a rather contrived task that was disconnected from language production. It could be argued, therefore, that such tests explore general cognition rather than the particular cognitive preparations for language.

Cairns (2006) attempted to circumvent this problem through novel tasks that entailed an element of language production. In one such task she asked people to gesture action pictures either silently, or immediately after a verb was produced. Cairns hypothesised that gestures produced after a verb might be less complex than those produced silently, because now Thinking for Speaking had taken place. In other words gestures would reflect the discarding of real world detail that necessarily occurs during such thinking. A further question was whether similar paring down would be observed in a speaker with aphasia.

The experiment involved 10 controls and Ron, the aphasic person who described the fairy picture above. Ron was tested because he was hypothesised to have problems with thinking for speaking. He had difficulties with verb production and made errors on tasks designed to test event processing, such as the Role Video, on which he scored 27/32.

Each participant had to gesture 40 actions in three conditions. In the first condition this was done silently from a picture. Then, at least a week later, the pictures were presented again and the person was asked to name the verb and gesture the picture (condition 2). Finally the person was asked to produce a gesture purely in response to a given spoken verb (condition 3). Complexity of the gestures was determined by ratings collected from 11 people who were blind to the purpose of the experiment. In a separate procedure two raters also coded the gestures qualitatively, i.e. for how they communicated the nature of the event.

Figure 3 here

Let's take the control data first. Figure 3 shows that the complexity ratings were very much in line with the prediction, in that once a verb was produced, either by the participant or the examiner, gestures became less elaborate. A one factor ANOVA revealed a significant main effect of condition ($F(2,18) = 7.47, p < 0.01$), with planned comparisons showing that conditions 1 and 2 differed ($p < 0.01$), but not conditions 2 and 3. In other words gesturing in response to a verb and a picture was significantly less elaborate than gesturing from a picture alone. One participant's response to figure 4 exemplifies the point.

Figure 4 here.

When asked to gesture this just from the picture the person mimed a sequence of actions: putting out the tea things, picking up the tea pot, pouring tea into the cup, putting the pot down and finally drinking from the cup. Unsurprisingly this was given

a whopping complexity rating of 7. When this person had to first label the event with a verb much of this detail melted away. Now he simply mimed picking up the pot, pouring and putting it down again, an effort that gained a measly rating of 2.

Ron's results were rather different. First of all his ratings in all conditions were higher than the controls', indicating that his gestures were more elaborate. It was also difficult to interpret his performance in condition 2, where he was required to name the verb and gesture the picture, since his attempts at verb production were often unsuccessful. Figure 5, therefore, presents his scores for conditions 1 and 3 only, with comparative control data. This shows that in condition 3, when the verb was provided, his gestures were no less complex than when they were produced purely in response to pictures. There was another qualitative difference in his gestures. Ron often outlined the objects involved in the actions (for example, he might outline the shape of the teapot when gesturing figure 4) a strategy that was virtually never used by the controls.

Insert Figure 5 here

What does this mean? In the case of the controls it seemed that their thinking about the events became more constrained and stripped of real world detail once a verb was produced and that, as a result, the complexity of their gestures went down. Ron on the other hand showed less of this effect. While not wishing to over-interpret, it could be that Ron finds it difficult to constrain his thinking in the way that is needed for verb selection. His use of outlining in gesture may offer another clue. This suggests that Ron is focussing, perhaps excessively, on the objects involved in the pictured

events, rather than the actions associated with those objects. Once again, his thinking seems to be out of kilter with the controls' and taking him in directions away from verb selection.

So far I have argued that, although general cognition is intact in aphasia, and often strikingly so, the specialist cognition that frames thoughts for language may not be. If this is right, then one goal of therapy could be to help aphasic people think about situations and events in a way that makes them communicable. In particular, some people with aphasia may need help in formulating the cognitive specifications needed for verbs.

How might this be done? Cairns and colleagues explored one possible cueing task called the Sharon and Paul Test (Cairns 2006; Cairns, Marshall and Dipper, in preparation). In this task participants had to label video events with a single verb. The stimuli exploited perspective dilemma situations which can be described from alternative points of view. An example would be a scene in which a man legs it down the garden, hotly pursued by an irate woman. This can be described by any number of verbs. But an obvious dilemma is whether to focus on the man, resulting in verbs like 'run away' and 'flee', or on the woman, resulting in verbs like 'chase' and 'pursue'. Making perspective decisions such as these is one of the tasks involved in thinking for speaking, a task that may be particularly problematic for people with aphasia. In line with this there are a number of accounts in the literature of individuals who seem to have impaired access to verb perspective information (Byng, 1988; Marshall, Chiat and Pring, 1997).

The main aim of the Cairns et al study was to find out if aphasic people could be helped to make perspective decisions, with the hypothesis that if they could more verbs should be forthcoming. Two types of help were explored. One involved manipulations of filming in such a way that one of the perspective options was given far greater visual prominence than the other. So in the chase/flee example one presentation focussed on the unfortunate Paul, while the other zoomed in on the fearsome Sharon.

The next level of help re-presented the manipulated films, this time accompanied by a sentence frame cue. So, for the chase/flee example the person saw one film focussing on Sharon and heard 'Sharon (buzz) Paul'. Elsewhere in the test they saw a different film, focussing on Paul, and heard 'Paul (buzz) from Sharon'. In line with previous research (Fisher, Hall, Rakowitz and Gleitman, 1994) it was hypothesised that these sentence cues would act like a 'zoom lens' on the event, removing all ambiguity as to the perspective being adopted.

Of course, one problem with this task is that the person being tested sees the same events over and over again, albeit with slightly different presentations. If their verb access improves, therefore, it could simply be due to practice. To investigate this possibility a 4th condition was administered which re-presented the original neutral stimuli. If these were named less successfully than the intervening cued conditions we can dismiss practice as the source of change.

So, to summarise, the experiment had 4 conditions: (1) Neutral; (2) Perspective Cues (manipulated films); (3) Perspective + Language Cues (manipulated films

accompanied by a sentence frame); (4) Repeated Neutral. In each condition the task was the same. The person watched the film and had to produce a single verb to say what happened. There were 19 items in the neutral conditions and 38 in the cued (i.e. here there were 2 presentations per event, each taking the alternative perspective). Of interest was whether aphasic verb production would increase in the cued conditions. If it did, this would suggest that these conditions helped the person to make the perspective decisions needed for verb access.

The task was carried out with 20 healthy controls and 6 people with aphasia, one of whom was Ron whom we met above. The aphasic participants all had impaired verb production in the face of much better access to nouns. They also had difficulties with verb and sentence comprehension, especially when reversible sentences were involved.

Unsurprisingly, the controls found the task easy. There were only 2 occasions when a control failed to produce a verb, out of a possible 2280 responses. The range of verbs produced was high, in line with the proposal that these stimuli offer multiple perspective options. For example, across all controls and all conditions the chase/flee items elicited 12 different verbs (assault, attack, chase, escape, fight, flee, hit, pursue, quarrel, retreat, run, threaten).

The wide range of control responses encouraged us to adopt liberal scoring criteria when evaluating the aphasic data. Accordingly a response was judged to be correct if it:

- fell within the control inventory for that item

- was a synonym of a control verb for that item (as listed in the New Oxford Thesaurus of English, 2000)
- was judged correct by a naïve external rater, who was blind to the purpose of the experiment

Insert Figure 6 about here

Using these criteria, figure 6 shows the mean number of correct verbs that the aphasic people produced in each condition (expressed as a percentage of the total). You can see that the cued conditions did indeed raise verb access, although most markedly in the perspective + language condition. The fact that production drops down again in the 2nd Neutral condition (this condition scored lower than both the cued conditions) suggests that our participants were not simply benefiting from practice. Rather we like to think that our cues helped them to organise their focus on these events and so kick start access to the verb lexicon.

Figure 6 makes it clear that the aphasic participants were helped most by cues that combined the perspective manipulation with language. It is difficult to know how these cues worked. It is possible that they simply functioned like a sentence completion task. However, for six of the items the language cue comprised just one or two words. For example, the verb ‘fall’ was cued with ‘Paul (buzz)’. Yet these very minimal cues, which simply highlighted the agent, were as helpful as those that supplied more syntactic and semantic information, such as ‘Paul (buzz) a radio to Sharon’. While only suggestive, this observation may indicate that the cues did in

fact help primarily by constraining perspective. In other words they may have offered an anchoring point from which the event could be described.

Although the direction of the results was in line with our predictions the size of the effect was very small. You can see that even the best condition (perspective + language) only raised verb production by just over 10% compared to the first neutral condition. However, although small this difference was significant (Wilcoxon signed ranks test, $T = 0$, $p < 0.025$). It is also important to remember that here participants were responding purely to a 'one off' cue. We think, therefore, that our optimism is justified. If we can get a small but significant result from cues, what might we get from therapy?

This question has largely gone unanswered. An exception is our study with MM (Marshall et al 1993; and see Marshall and Cairns 2005). She had agrammatic speech in which verbs were almost entirely absent. There were also problems with her comprehension of verbs and sentences.

There were signs that MM's problems with verbs might originate, in part, with a difficulty in framing her thoughts for language. She was an exponent of hyper-naming and made errors on tasks designed to test event concepts, such as the Role Video. We therefore embarked on a programme of event therapy. This was heavily influenced by Jones's work with BB, which posed a series of questions about written sentences (Jones 1986). So BB was given a sentence and asked first to identify the verb, then the person carrying out the action and the object or person affected by it. Our questions were similar, but revolved around the event itself. So MM was shown

a video of an event and asked questions about who was responsible for it, what was changed or moved, and the nature of the action. The therapy differed from Jones's original mapping therapy in that the stimuli comprised videos of events, rather than sentences, and all the questions could be answered non verbally, e.g. by selecting a photo of the people carrying out the different roles or by gesturing the action.

This therapy had some positive benefits, in that MM became more able to describe pictured events. She produced more verbs and more word order structure after therapy than before and her production became more comprehensible to observers. So, for example, observers who knew MM could comprehend 26/50 of her picture descriptions after therapy, compared to just 13/50 before; and there was a similar gain for observers who were not familiar with her (7/50 pre therapy vs 19/50 post therapy). However, this skill was limited to simple events, involving no more than 2 participants. The moment she was asked to describe multiple events or events involving more people her production broke down. Possibly related to this was the fact that her spontaneous speech showed no signs of change.

So where do we need to go next? We need to develop and investigate a full blown programme of thinking therapy. This will build upon the cueing and therapy tasks described in Cairns et al (in preparation) and Marshall et al (1993). So, therapy stimuli will comprise films of events that are manipulated to help the person make perspective decisions. In addition to the manipulations already described we need to explore 'zooming in' devices, e.g. to help the person identify the agent over other participants, or eliminate peripheral detail from complex scenes.

These events will be presented for description, with a hierarchy of cues. Initially cues will comprise the sentence frames of the type employed in the Sharon and Paul Test. They will then progress to more minimal cues, eg consisting of just the first word. Therapy will also involve role decision tasks, e.g. where the person has to identify the agent, theme and other entities in the event. A range of therapy stimuli need to be developed, progressing from very simple events, (e.g. where a single person acts upon an object), to more complex (e.g. where a man feeds a child at a table while listening to his wife, who is also cooking the dinner). A further development might experiment with distant modes of delivery, so that face to face therapy can be supplemented with self administered practice. Finally, conversation partners should be involved, e.g. so that they are trained to ask the sort of questions that help the aphasic person to frame their thoughts for language.

If the hypothesis presented in this paper is correct, such therapy should help at least some aphasic individuals to communicate events and relational ideas more successfully. This should be marked by gains in verb production and word order, but may also manifest in more structured and effective use of non verbal devices like gesture. Most importantly effects need to be evaluated not just with clinical tasks, but also via tasks that mimic real language, such as conveying gossip and explaining why a 15 year old is not allowed to stay out till 4am.

This paper has argued that aphasic people, despite having generally intact cognition, may have difficulties in the conceptual preparations for language. Such difficulties may account for some of the patterns that we see in aphasia, such as the Noun>Verb effect and greater ability to use concrete rather than abstract language. They may also

be uncovered by specific investigations, such as the Role Video (Marshall et al 1993) and the gesture task developed by Cairns (2006). If this view is correct then our therapy needs to take more account of the thinking that occurs just before speaking. Indeed there is some evidence that this thinking may be helped by cues (Cairns et al, in preparation) and therapy (Marshall et al, 1993). We now need to act upon these hints and investigate a fully fledged programme of thinking therapy.

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Figure 1

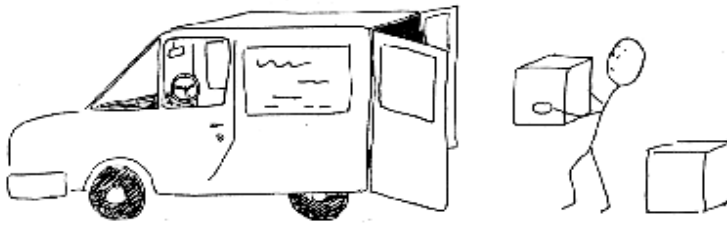
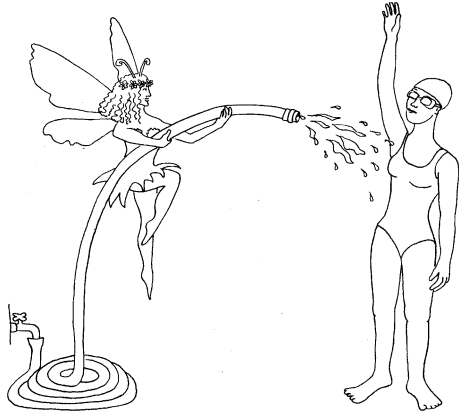


Figure 2:



Ron's Description: 'tap, hose, and pixies, elf, woman, long hair – no, short – no, bob, and pixie and then swimming woman, and cap, obviously, and (gestures goggles)'

Figure 3: Mean Complexity Ratings of Controls' Gestures

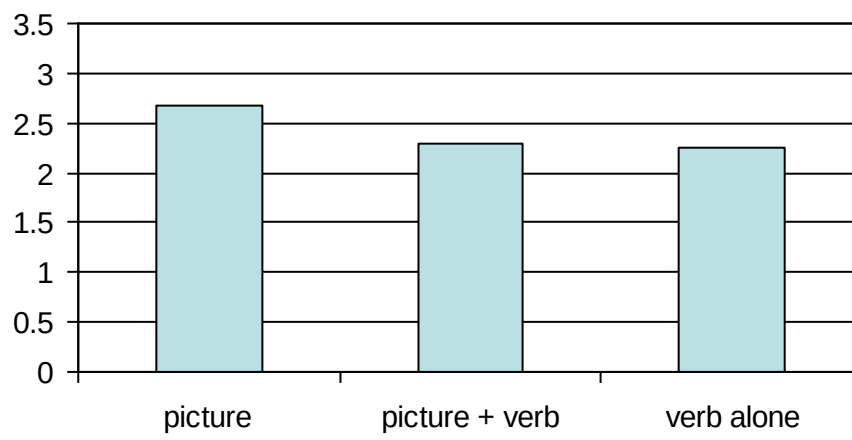


Figure 4: An example stimulus from the gesture task



Figure 5: Mean complexity ratings of gestures produced by Ron and Controls in response to pictures and verbs

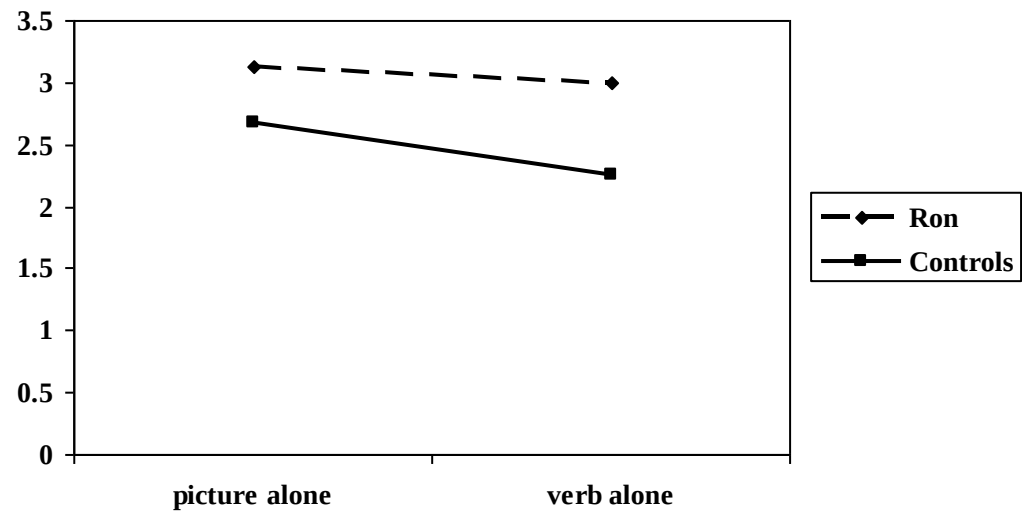


Figure 6: Mean % of Verbs Produced by Participants with Aphasia in the Sharon and Paul Test

