An Investigation into Manipulations of Format and Predictability on the Description of Viewed Sequences

James Godber

January 2007

(2006

Submitted in partial fulfilment of the MSc in Speech & Language Sciences

Department of Human Communication Science
University College London

Word Count: 9,933

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

Contents

Abstract

A person's ability to convey events is an integral part of everyday communication. In the clinic, clients with aphasia are often asked to describe visually presented events to assess their event description abilities. Although there is a growing literature on the visual and cognitive factors that may facilitate event description for clients with aphasia, there has been very little research on whether dynamic depictions such as video, rather than static ones such as line drawing or photographs, would affect the quantity and quality of the descriptions.

This study investigated the effect of visual format on the event descriptions of typical (non-aphasic) and atypical (aphasic) participants. Participants were shown four narrative sequences depicted in video clips and photos derived from the videos. The number and type of situations and the characters involved were matched across formats. Language output was analysed for quantity of output, syntactic complexity, and informational content. No advantage for video was found for either the controls or the people with aphasia. In fact, two of the people with aphasia showed some advantage for photographs.

The study also considered whether varying the cognitive load by using event sequences of lower or higher predictability would affect the quantity or semantic accuracy of the descriptions. No advantage was found in using more predictable sequences; indeed, two of the participants with aphasia produced better descriptions for the more unpredictable sequences.

1. Introduction

Testing a person's ability to convey what they have seen is an inherent part of any analysis of the connected language output of people with aphasia. (e.g. picture descriptions in the Comprehensive Aphasia Test (CAT) (Swinburn, Howard and Baker (2004)), and the Boston Diagnostic Aphasia Assessment (BDAE) (Kaplan Goodglass & Weitraub, (1983)). Assessing narrative output is considered particularly useful because of its relevance to everyday communication. For example, explaining why you are late for a meeting, or telling a friend what happened in the latest episode of a favourite soap require event descriptions. Real life situations usually involve multiple events that overlap or are sequenced in time. Individual events must be identified and organised with respect to other events so that we can convey in language their communicatively important features and their relations with other events.

At the level of clinical assessment, the methods and materials used to elicit event description might be seen as a compromise. The skills needed to process and describe events are often tested by substituting 'real-life' with visually depicted scenes, using formats such as line-drawings or photos. The use of such formats may also reduce the number of extraneous variables acting on a person's language output (see Swinburn, 2004), It also makes it easier to reliably measure changes in narrative output, as the same stimuli can be used as part of an ongoing assessment over time, unlike real life events which cannot be exactly reproduced or repeated.

.

1.2 Describing Events

Most psycholinguistic research into how we process and describe events builds on the work of Slobin (1996), who labelled the process of translating conceptual information into language as 'thinking for speaking' (see also Levelt, 1989, Levelt, Roelofs, & Meyer, 1999., Dipper, Black & Bryan 2005) . Slobin identifies the main elements which determine descriptive output as: what has been seen, the perspective of the speaker, their purpose in conveying the information, and properties of the language used.

Dipper et al (2005) suggest that the conceptual information that results from seeing an event has to be 'pared' down in order to make it compatible with language. Thoughts have to be organised in a way that is compatible with the properties of language in general and with the specific language used to communicate. In effect, language may

act as an attentional device, directing the conceptual system, on presentation of visual stimuli, to select those parts of a scene most important for linguistic expression.

The main aspects involved in processing and describing a viewed scene, are roughly summarised in table 1.

Table 1: Summary of main aspects of event processing

Aspect	Explanation
conceptualisation of visual input	A person must translate what they are seeing into an abstract representation of an event. No language is necessarily involved in this stage.
Thinking for Speaking	The conceptualisation is translated into a linguistically appropriate format. The abstract representation of an event must be reshaped and schematised to that it is appropriate for linguistic description.
Accessing and Processing Language itself	The linguistic forms used to represent viewed events have a substantial effect on the way those events are described. Verbs and the syntactic frames or constructions with which they are associated, are especially important in determining which aspects of the event and which event participants are foregrounded. For instance, in English, selecting the verb *pour* rather than the verb *fill,* allows us to focus attention on the movement of the substance with respect to a container, rather than the change of state of the container. The existence of pairs of verbs like *lend* and *borrow* allows us to present what is essentially the same transaction from different perspectives (that of the lender as opposed to that of the borrower), while different syntactic frames for the same verb break make it possible to present a process of material destruction as either caused (the transitive frame as in *I broke the cup)* or uncaused (the intransitive frame as in *The cup broke*). (Black and Chiat, 2003 and in press) Describing events may be more difficult for many people with aphasia as impaired access to linguistic information may have a knock-on effect on the organisation of thought that is required to

Accessing and Processing Language itself cont.	conceptualise that event (Black and Chiat, 2000). Disorganised thought may, in turn, restrict access to linguistic meanings and forms. This would be particularly damaging when describing situations which, unlike single objects, involve relationships and features whose encoding is most likely to be language-dependent and vary from language to language. Any subsequent translation of this encoded information may therefore be poorly organised for "input to the linguistic system, further impairing the linguistic processing" (Dipper et al. 2005, p.424). Describing events, therefore, is likely to be particularly difficult for people with aphasia who have problems in accessing the meaning of verbs an/or the semantic and syntactic frames associated with verbs (Black and Chiat, in press; Dean and Black, 2005; Dipper et al., 2005).
Discourse constraints	Discourse constraints may act on all levels of processing described above. They relate to context-based speaker's assumptions about what their listener knows or can infer for themselves. For example, two friends, who are practitioners of a martial art, will probably discuss the skills seen in a training video in a very different way to a teacher attempting to impart those same techniques and skills to a new student. Factors such as the speaker's audience, their level of knowledge and the purpose of the communicative task may condition the quantity and quality of language output. These factors may impact on, and interact with the conceptualisation of visual input, the process of thinking for speaking and the accessing and processing of language itself.

Describing an event doesn't necessarily involve a serial sequence: from conceptualisation through translation into language and accessing, processing and outputting linguistic forms. Many current psycholinguistic theories (Henderson & Ferriera, 2004) suggest that there is parallel interaction between the different levels of processing. Because of these interactions, it's difficult to draw inferences about the factors that may impact on particular stages of event description. Each medium or format used to convey events brings different perceptual and cognitive challenges. A format that facilitates one stage may have a negative effect on another. Nevertheless, by systematically manipulating visual and/or cognitive features of a scene and

Acknowledgements

Thank you to the four participants with aphasia for the time, humour and good will they invested in this project.

Thank you also to Maria Black and Carolyn Bruce for their support and guidance.

measuring any resulting effects on the quantity and quality of the language produced, we can try to map the process of event description and the factors that may facilitate and improve event description for people with aphasia. The main aim of this study is to contribute to such an exploration.

1.3 Previous Studies Investigating the Description of Viewed Scenes

Previous studies have mostly focused on comparison of the following formats:

- Picture sequences vs composite pictures
- Line drawings vs photo
- Line drawings vs video

Many studies assume, implicitly or explicitly, that, for people with aphasia, increasing visual cues to facilitate event segmentation and identification should facilitate language access and/or production.

Picture Sequences vs. Composite Pictures

Although composite pictures are most commonly used in clinical test batteries [e.g. *The Cookie Theft Picture* in the BDAE, Kaplan, 1983) as O'Leary (2006) points out, there is little evidence that composite pictures are the best format to elicit event descriptions by people with aphasia. Composite pictures freeze certain variables inherent in real-life. Being a static format, the most notable variable to be frozen is time. However, composite pictures may be more 'realistic' in the sense that they combine multiple events into a single picture space, approximating the simultaneous occurrence of multiple events in 'real life'.

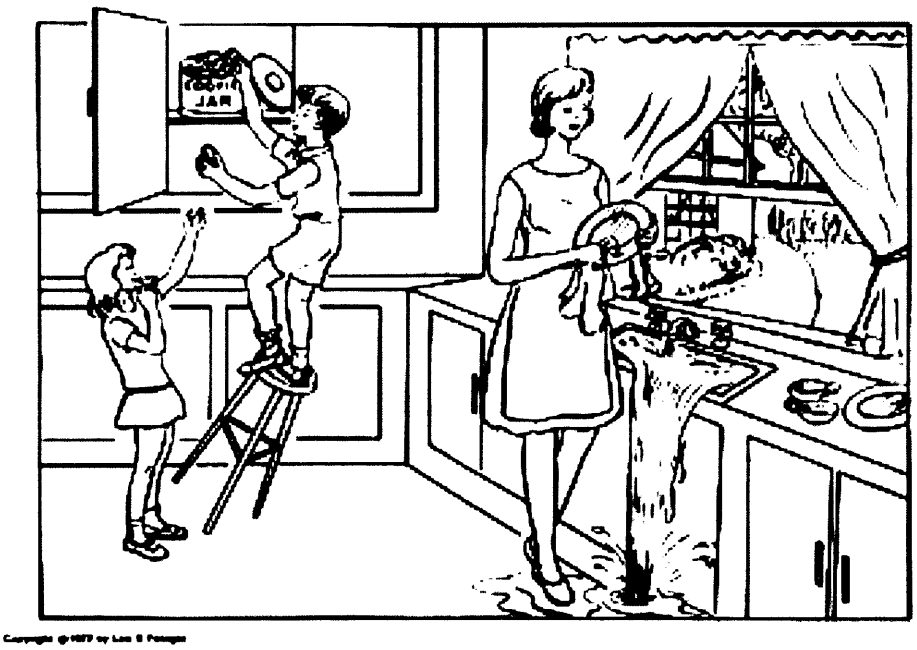
Lemme, Bottenburg and Hedberg, (1984) compared language output under two conditions: description of a painting, ('*Looking out to Sea*' by Norman Rockwell) (see Fig 1, overleaf) and description of a picture sequence showing a picnic. Participants had to 'tell a story' after either being shown the painting or the picture sequence.

Fig 1. 'Looking out to sea' by Norman Rockwell

In Rockwell's painting a man, a boy and his dog stand looking out to sea. The man has his left arm on the boy's shoulder. Birds fly overhead. The scene contains far fewer events than many of the composite pictures commonly used in aphasia assessment. For example, *The Cookie Theft Picture* (BDAE, Kaplan et al, 1983; see Fig 2, overleaf) shows a boy standing on a dangerously teetering stool to reach the cookies, while a girl stands below him with an outstretched hand. In the foreground, a woman, facing away from the children, is wiping a plate in front of an overflowing sink which she seems not to have noticed.

The Cookie Theft Picture invites the viewer to infer 'what happens next' and provides many visual clues. For example, the angle of the teetering stool suggests it is likely to slip from beneath the boy's feet at any moment, causing him to fall. Meanwhile, water from the overflowing sink is pooling around the woman's feet, which may also cause her to fall, especially if she turns around quickly in response to the fallen boy. These events may help the viewer to predict climatic outcomes not shown in the picture itself. The Rockwell painting, however, provides relatively little indication of 'what happens next' and the limited actions of characters in the picture don't suggest the same type of climactic outcome.

Fig 2: The Cookie Theft Composite Picture (BDAE Kaplan et al, 1983)



Lemme, Bottenberg and Hedberg (1984) reported no clear effect of format on syntactic complexity or cohesion, though higher values for story grammar (see section 1.4 for details) were found in response to sequential pictures. The authors concluded sequential format provided a better framework for story production.

Bottenberg, Lemme and Hedberg (1987) compared *the Cookie Theft* [composite] *Picture (*BDAE, Kaplan et al, 1983) with two picture sequences (one about a fire and another about President Kennedy's assassination) in a study investigating the interaction of content, familiarity and emotional impact with format. Twelve participants with aphasia were asked to tell a story after viewing each format. No significant effects of format were found for the group overall, but for some participants, poorer organisation and construction of narrative was elicited for the *Cookie Theft Picture* compared to the two sequential formats. Additionally, three participants showed increased values across all measures for the Kennedy assassination sequence. The authors concluded that there was an effect of format, favouring sequences pictures over composites, and that the emotional impact of pictures could affect the quality of language production for some participants with aphasia. They concluded that clinicians are unlikely to elicit representative language samples using only one type of picture.

Shadden, Burnette, Eikenbery and Dibrezzo (1991) also compared the *Cookie Theft Picture* with a picture sequence depicting a cat getting stuck up a tree. They investigated

the connected speech output of twenty one non-brain injured and two aphasic participants.

Results showed that controls produced output that showed the lowest level of syntactic complexity, but the highest level of semantic accuracy in response to the picture sequence. There were few effects of format for the aphasic subjects but one non-fluent participant produced higher levels of syntactic cohesion in response to the sequenced picture format. The authors concluded that format type could affect language production.

Capilouto, Harris Wright and Wagovich (2005) investigated the influence of stimuli type on the connected speech output of thirty four non-brain-injured participants. Participants were asked to 'talk about what's going on' in two single pictures[1] ('The Birthday Cake' and 'Cat in Tree') and two six-frame picture sequences ('The Fight' and 'Directions'). The authors found higher values for informational content in response to sequential picture format. In conclusion, the researchers argued that sequential format provides temporal structure for the events depicted, whereas a greater degree of inference is required to order events depicted in the single picture into narrative output. Capilouto, Harris Wright and Wagovich (2006) also compared output in response to the two formats (two composite pictures and two six frame picture sequences) for eight non brain injured participants and eight participants with aphasia. Higher values for informational content were again found in response to the sequence format.

Hughson (2004) and Staveley (2004) compared language elicited by the CAT composite picture to sequenced pictures. The authors investigated variables that might constrain conceptualisation by manipulating foregrounding and narrative structure for each format, and hypothesised that this would have an impact on 'thinking for speaking'. Four participants with aphasia were tested: two had difficulty at the levels of linguistic access and selection, and two at the level of event processing. The participants were matched to four control participants.

Control results showed higher quantity of output for sequenced pictures but no other effects. Two of the four participants with aphasia showed higher quantitative and qualitative measures for the sequenced picture format: one had event processing

[1] In that these single pictures are described by the authors as depicting a "story-like situation, with a central focus and interaction" , they may be described as composite pictures.

difficulties and the other had difficulties at the level of linguistic access and selection. The authors therefore concluded that sequencing provides focusing cues which facilitate language output for some participants, regardless of the level of impairment.

O'Leary (2006) investigated the language output of ten control participants and four participants with aphasia using composite picture and sequenced picture formats. She criticised the materials used in several previous studies suggesting that the semantic type and numbers of situations and participants involved were not adequately controlled across formats making it difficult to draw reliable conclusions about format effects. In her study, number and type of visual events was carefully controlled across formats. O'Leary found that format affected the informational content of language for the control group, and also the quantity and syntactic/semantic complexity of output for some individual control participants. However, effects were not homogenous, leading O'Leary to conclude that people with and without aphasia are 'heterogeneous groups' in terms of the way they process viewed scenes for language production and that, therefore, a range of formats should be used in aphasia assessment.

Line Drawings vs. Photo

Dean and Black (2005) investigated the effect of format on two participants with aphasia. The formats used were photos and line drawings based on these photos where only the main event had been drawn and detail extraneous to the main events depicted had been removed. Photographs and line drawings depicted the same situations.

The line drawings, in effect, had already pared down the essential elements in the photos, in an attempt to facilitate 'thinking for speaking', especially for the participant who was believed to have difficulties at this level (EM). The other participant, MH, was argued to have difficulties in retrieving verb forms for output. The authors hypothesised that "as event processing involves selection of the set of entities deemed central to the situation described...it is predicted that an impairment at this level will lead to different entities being referred to in the resultant linguistic description"(Dean and Black, 2005, p.523) . As predicted, the elimination of irrelevant background objects elicited greater use of verb and event-relevant noun phrases for the participant who had an event processing impairment but not for the participant who had difficulty with linguistic access or selection.

Line drawings vs. video

Berndt, Haendiges, Mitchum & Sandson, J (1997a) studied production of nouns and verbs in picture and video naming by eleven chronic aphasic participants, both fluent and non-fluent. They used black and white line drawings and seven second video clips. Each drawing or video depicted a single action or object. The authors hypothesised that videotaped stimuli would yield improved verb production, as action naming difficulty could stem from conceptual difficulties in identifying the action component in a static picture. No improvement in verb production was seen when naming videotaped actions. Selective verb impairments were demonstrated for both fluent and non-fluent participants. The researchers concluded that verb impairment wasn't attributable to conceptual difficulty in identifying the action component in static pictures.

Berndt, Haendiges, Mitchum & Sandson, J (1997b) investigated the effects of format on sentence production from viewed scenes. Their study involved ten participants with chronic aphasia. Scenes targeting transitive verbs were depicted in either line drawings or in ten second video clips. The authors hypothesised that dynamic video format would improve recognition of cause and effect at a conceptual level, leading to improved sentence production, at least in terms of verb and actor production. However, no advantage of video format was found for sentence production from viewed scenes, leading the authors to reject their hypothesis.

Methods of Analysis in Previous Studies

In most studies, analysis understandably focuses on measurement of the language produced, since there are few other ways to measure the effects of format on event description. Although we may be able to measure eye movements to track aspects of scene conceptualisation (Henderson and Ferreira, 2004), it is difficult, or even impossible, to measure, directly, the processes involved in thinking for speaking. The output, or 'end product', is much easier to measure, as the syntactic, semantic and informational qualities of linguistic output can be analysed and quantified. However, the different methods of analysis employed by different researchers complicate interpretation of results across different studies.

1.4 Measures used in Previous Studies

Quantitative measures

Lemme, Bottenenberg and Hedberg (1984) and Bottenberg, Lemme and Hedberg (1987) focused on the number of words per utterance, syntactic complexity, measured in T units (Hunt, 1970) (an analysis of the number and type of clauses used in an utterance), and syntactic cohesion (the use of pronouns, conjunctions and lexical redundancy to create 'cohesive relations'). Shadden, Burnette, Eikenbery and Dibrezzo (1991) also analysed syntactic complexity using T units (Hunt, 1970) and used the same criteria as Lemme et al (1984).

Hughson (2004) and Staveley (2004) measured quantity of output by counting total number of words and utterances. As a measure of semantic and syntactic complexity, they also calculated the number of verb phrases and embedded sentences produced. Similar quantitative measures were also employed by O'Leary (2006) (see also the section on qualitative measures below).

Capilouto, Harris Wright & Wagovich (2005), analysed data on the basis of three measures developed by Nicholas and Brookshire (1993): words produced per minute, number of correct informational units (CIU)[2], and percentage of correct informational units produced.

Dean and Black (2005) measured the percentage of target verbs and noun phrases produced, and the production of event-irrelevant noun phrases.

Qualitative Measures

Lemme, Bottenenberg and Hedberg (1984) used a subjective measure for grading participants' ability to tell a story, based on their expression of relationships between characters and actions. This was based on Applebee's (1978) 'narrative level' rating scale. Bottenberg, Lemme and Hedberg (1987) analysed the organisation and construction of narrative superstructure using a "story grammar" descriptive framework (Stein and Glenn, 1979, Hedberg & Stoel Gammon, 1986).

[2] CIU is defined as a unit of information "being relevant to the stimulus and informative"

Berndt et al's (1997a) study focused on single word retrieval, not the ability to produce a narrative. Participant's abilities to depict the key relationships inherent in a narrative sequence were not measured. Berdnt et al's (1997b) study on sentence production also provided little information on the ability of each participant to convey relationships between characters, actions and events in the viewed scenes, as the focus of analysis centred on the ability to retrieve verbs.

Shadden, Burnette, Eikenbery and Dibrezzo (1991) measured informational content and semantic accuracy but the criteria for measuring semantic accuracy were not defined.

Capilouto, Harris Wright & Wagovich (2005) included a measure of 'main events expressed'. They defined 'main events' as events that were important to the story as a whole and independent of other events in the story. Events were counted as 'main events' if they were identified as matching these criteria by at least two of the three researchers.

The reliability of this 'main event' measure was verified in Capilouto, Harris Wright and Wagovich (2006). Researchers used a binary scoring system, whereby participants needed to provide all necessary information to be marked as correct. The rationale for this was that partial credit would have "masked a participant's ability to express the relationships of interest" and that the binary system didn't credited participants for simply listing events depicted without explaining the temporal and causal links between them.

Hughson (2004), Staveley (2004) and O'Leary (2006) used a similar system for measuring informational content, though it was not the researchers who identified the 'main events'. Instead, they used the situations most frequently expressed by control participants as their main events or "core situations" (Hughson, 2004, and Staveley, 2004) and "target descriptions" (O'Leary, 2006).

Summary

Although different types of format manipulations have been reported in the literature, most previous studies have focused on the comparison between composite and sequenced pictures. Type and number of events across formats, however, has only been

controlled in a few recent studies, making it difficult to draw systematic conclusions from the available literature. In spite of growing clinical and theoretical interest in event description in aphasia, differences between dynamic (video) and static (drawings or photos) presentation of events has hardly been studied. Furthermore, few studies have employed both quantitative and qualitative measures of similar aspects of event description. This study is an attempt to fill some of these research gaps. Given the importance of time to the conceptualisation of events, it tries to provide some preliminary data on whether dynamic video presentation facilitates output in comparison to static photo presentation. Because the type and number of events in the visual scenes is highly likely to affect the type and number of events described, a more conscious effort will be made to control for event type and number across formats. Finally, linked quantitative and qualitative measures will be employed to ensure that similar aspects of event descriptions are measured.

2. Methodology

2.1 Design

For participants with aphasia, effects of format on event descriptions were measured using a within subjects design. Language produced was measured according to the dependent variables of quantity and quality. The two independent variables of stimulus format were:

- The mode of presentation: Sequenced presentation of a scene using four photographs and presentation of the same event using four video clips.
- The predictability of the sequence shown in a given stimulus format (see section 2.2 for further details).

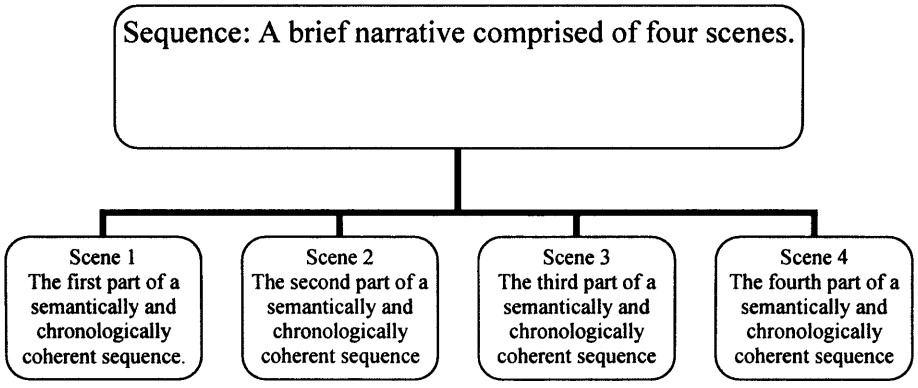
The materials were therefore designed to ensure the consistency of these variables across both formats (see materials section).

Non-brain-injured adults participated in a control study of a mixed design, following the same format as the subjects with aphasia.

2.2 Materials

Stimuli consisted of four short narrative sequences. Each sequence is comprised of four scenes (see Fig.1). The sequence as a whole depicts a main, overarching, event. Participants are shown the four scenes which make up a sequence in chronological order.

Fig 1 Diagrammatic representation of materials



Stimuli Formats

Each sequence is produced in two formats: five second, silent, colour, video clips (Format 2) or still photographs taken from those video clips (Format 1). Videos were recorded in AVI format using a Canon Ixus 40 Digital Camera.

Determining the Level of Predictability

The more possible outcomes part of a sequence might reasonably have, the lower the predictability of that sequence. Sequences one and two were considered by the author to be of high predictability (see Tables 1a and 2, overleaf). For example, in sequence one, a woman is filling a kettle with water from a sink, followed by the same woman placing coffee powder into a mug in front of the same kettle. There are arguably few outcomes that these events might lead to other than the woman making a coffee. Sequences three and four were considered to be of lower predictability than sequences one and two. In sequence four, for example, a person comes in through a door with a bag on their shoulder, placing the bag on a table in the following scene. The outcome of these events is arguably more ambiguous.

The author's assumptions about the levels of predictability were supported by the behaviour of several participants in both the control and test groups. For the first and second sequences, many participants came out with premature overarching descriptions of the sequence as a whole. For example, in the first sequence, after seeing the woman filling the kettle at the sink, comments such as "she/he's making coffee" or "she/he's making tea" were common. For the third and fourth sequences, however, very few such predictive statements were made by control or test participants (for examples, see full transcriptions of participants with aphasia in Appendix 2).

Given the correlation between the author's initial assumptions and the behaviour of participants in the study, sequences one and two were described as high predictability sequences and sequences three and four as low predictability.

The Sequences

Linguistic descriptions of short sequences that could be divided into four scenes were composed. For each sequence, an overarching main event was also described. These

linguistic descriptions were then translated into video format, with stills from each video scene providing the materials for photo format. The author's linguistic descriptions and corresponding photos are detailed below in Tables 1-4.

Table 1a: Sequence 1: linguistic descriptions and photos

Sequence Main Event	Scene	Example Photo	Predictability
1. A woman Makes a cup of Coffee	1. A woman fills a kettle with water		High
	2. The woman spoons coffee into an empty cup		
	3. The woman pours boiling water from the kettle into the cup		
	4. The woman adds milk to the cup filled with coffee.		

Table 2: Sequence 2: linguistic descriptions and photos

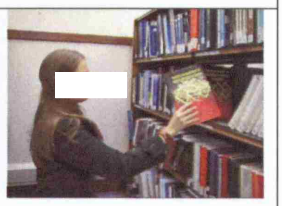
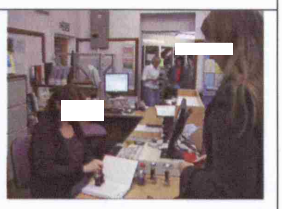
Sequence Main Event	Contingent Parts of Sequence (Scenes)	Example Photo	Predictability
2. A woman borrows a book from a library.	1. A woman looks at a shelf of books.		High
	2. A woman takes a book from one of the shelves.		
	3. A woman behind a desk stamps a book in front the woman who selected it.		
	4. The woman who took the book walks out of the door.		

Table 3: Sequence 3: linguistic descriptions and photos

Sequence Main Event	Contingent Parts of Sequence (Scenes)	Example photo	Predictability
3. A Cat steals some food from a plate on the table.	1. Person A places a plate of food on the table in front of person B who is reading a paper.		Low
	2. A cat appears on the table and sniffs/investigates the food.		
	3. Person B looks over the paper at an empty plate on the table and appears confused.		
	4. The cat is shown on the floor eating the food that was on the plate.		

Table 4: Sequence 4: linguistic descriptions and photos

Sequence Main Event	Contingent Parts of Sequence (Scenes)	Example photo	Predictability
4. A Burglar steals a bag from a house.	1. Person A enters a house with a bag on their shoulder.		Low
	2. Person A places the bag on the table by the door.		
	3. Person B, reaches for bag		
	4. Person A looking at empty table with confused expression and hands raised.		

Experimental Scene Descriptions:

As the descriptions given in Tables 1-4 were provided by the author independently of visual format, they were deemed inappropriate as the basis of control descriptions. These were instead derived from aggregates of the most common descriptions provided by non brain injured participants (see results section for further details).

Controlling For Confounding Variables:

As there is some evidence that characters appearing on the left of a picture or video are seen as more prominent (Hartsuiker & Kolk, 1998), positioning was taken into account so that central character in each scene appeared on the left in all scenes and formats.

Each sequence was shot twice in both formats. Different actors played the primary character in each shoot to compensate for practice effects.

Each video clip was five seconds in duration. This period of time matched the length of exposure each participant had to each scene rendered in photo format. This time period also allowed for closer matching of the number of events that occurred in each scene across formats. Early production of video clips involved longer clips and the longer time span made it difficult to depict the same numbers of events as the static photo format, without compromising the speed at which characters in each scene might realistically interact.

The photo sequences were stills derived from the video format to maximise the similarity of content between the two. As the main comparison was across formats, particular attention was paid to controlling for the number and type of events across formats.

However, it was not possible to match the number of events across levels of predictability. Taken across both formats, there were 32 events in low predictability sequences and 20 events in high predictability sequences. For the control group it was therefore anticipated that the higher number of events inherent in low predictability sequences might lead to increased quantitative measures of output. Predictability effects for controls would therefore have to be interpreted cautiously. For the test group, however, no definite predictions could be made. If high predictability sequences implied a decrease in cognitive load facilitating language output, then participants with aphasia might still produce more and/or more informative output for high predictability sequences, in spite of the lower number of events involved.

Presentation and Recording Media

The materials were all presented on a Fujitsu Siemens Amilo A1630 Laptop. Video and photo size were matched, measuring 12.7 cm x 16.3 cm. Descriptions given by all participants were recorded using a video camera using VHS C videotape. Recordings were transcribed by the author.

2.3 Procedure:

On the first week of the experiment, each participant was read scripted instructions for the task. They were also able to view a written copy of these instructions at this time (see Appendix 3 for complete transcription of instructions). Participants were then shown a practice sequence to test their understanding of the task and allow them to ask

any questions regarding what they were required to do. The four test sequences were then shown. After two complete sequences were shown and described, participants were given a short break and a short distractor test from the Test of Everyday Attention, involving different skills to those involved in event description, was administered. The remaining two test scenes were then shown.

A week later, the same participants were shown the practice scene and all four test scenes again. However, format type was reversed for each scene and the order of presentation changed. The second time each participant viewed the scenes (week 2), different actors played the primary character in each scene to compensate for practice effects.

Criteria for Prompting

Minimal prompts were given if participants had not attempted to describe the main event in each sequence. Prompting was used to remind participants of the instructions for describing each scene and re-direct responses, particularly where participants:

- Failed to identify an event, or focused on background events, without mentioning the main events.
- Predicted what would happen next, or gave a premature overarching description of the whole sequence

Prompts remained general to avoid directing subjects towards preferred output, e.g. "Can you tell me the main thing that happened?"

When all the contingent parts of a sequence had been seen, most controls didn't immediately provide overarching descriptions for the sequence as a whole. Instead, they tended to summarise what they had already said, suggesting difficulty understanding instructions for this part of the task. They were prompted accordingly and summaries weren't included in quantitative totals for control or test participants, provided a more concise description followed prompting.

Distractor Task

The map-search subtest from the Test of Everyday Attention ((TEA) Robertson, Ward, Ridgeway, & Nimmo-Smith, 1994) was adopted for use as a distractor test. During the

first test session, participants were given a white sheet of A3 which had a number of 'knife and fork symbols' on them. They were asked to circle as many of these symbols as they could in two minutes. In the second week, the participants were asked to perform the same task again, though on this occasion, participants had to search a large colour map of Philadelphia for the symbols. In map format, this subtest was designed to test the selective attention of participants.

Order of Presentation

The order of presentation of scenes was varied between test participants both in terms of order of predictability and order of formats (see Table 5, below & Table 6, overleaf). This same order was used for the eight control participants. As there were twice as many control participants, each of the four orders of presentation was used twice. The main aim was to ensure that participants were exposed to more than one order of presentation.

Table 5: Week One: Order of Presentation

Participant	1st Sequence	2nd Sequence		3rd Sequence	4th Sequence
RD and control no's 1 and 5	Scene 1 Video a	Scene 2 photo a		Scene 3 video a	Scene 4 photo a
AOD and control no's 2 and 6	Scene 1 photo b	Scene 4 video b		Scene 3 video b	Scene 2 photo b
JH and control no's 3 and 7	Scene 2 photo a	Scene 4 video a		Scene 1 photo a	Scene 3 video a
RT and control no's 4 and 8	Scene 3 photo b	Scene 1 photo b		Scene 4 video b	Scene 2 video b

DISTRACTOR

Table 6: Week 2: Order of Presentation

Participant	1st Sequence	2nd Sequence		3rd Sequence	4th Sequence
RD and control no's 1 and 5	Scene 4 Video b	Scene 3 photo b		Scene 2 video b	Scene 1 photo b
AOD and control no's 2 and 6	Scene 1 video a	Scene 2 video		Scene 3 photo a	Scene 4 photo a
JH and control no's 3 and 7	Scene 3 photo b	Scene 4 photo b		Scene 1 video b	Scene 2 video b
RT and control no's 4 and 8	Scene 2 photo a	Scene 1 video a		Scene 4 photo a	Scene 3 video a

DISTRACTOR

2.4 Participants

Eight non-brain injured participants, 3 male and 5 female, were involved in the control study. All were native speakers of English. Participants were selected with reference to the age and educational level of the participants with aphasia.

The majority of the control participants (five out of eight) were over sixty years of age, placing them in the same age range as the participants with aphasia. The remaining three participants were younger, though the mean age was over thirty. Four of the control participants were educated to postgraduate level, while four had an educational level broadly comparable to that of participants with aphasia.

Participants with Aphasia

Four people with aphasia participated in this study. All had experienced a left CVA and had English as their first language. A summary of the participants is shown in Table 7.

Table 7: Overview of Test group participants

	RD	AOD	JH	RT
Years Post Stroke	15	15	5	8
Age	74	62	71	57
Aphasia Quotient	68.5	65.6	71.4	69.5
Aphasia Type	Broca's	Conduction	Wernicke's	Broca's
Pre-morbid occupation	Businessman	Teacher	Printer, Union Spokesman	Chartered Surveyor
Additional Languages	French, Hebrew	French		
Visual Impairment		Right Heminopia	Right Heminopia	Right Heminopia

The test participants are the same as those involved in O'Leary's (2006) study. Information for each participant's psycholinguistic profile is an updated version of O'Leary's version. These participants were selected on the basis of their relative difficulties with event description and verb production relative to nouns.

Formal Assessment of participants

The Western Aphasia Battery, (Kertesz, 1982), The Event Perception Test (EPT, Marshall, Black and Byng, 1999), a subset of the Reversible Sentences Comprehension Test (RSCT) (Byng and Black, 1999) and The Object and Action Naming Battery (OANB, Druks and Masterton, 2000) were used as the basis of each participant's psycholinguistic profile. Descriptions of the assessments closely related to event processing are shown in Table 7a, overleaf.

Table 7a: Description of Assessments closely related to event processing

Assessment	Format	Relationship to Event Processing
Event Perception Test (EPT)	The EPT is a non-verbal test of event processing. Participants view a scene depicting an event. They are subsequently shown two further pictures and must match one of them to the original scene on the basis of common, linguistically relevant features. One of these pictures depicts the same events as the target. The other picture involves the same characters as the target scene engaged in a different event.	Poor performance on this test indicates difficulty identifying the properties of events which facilitate verb selection, or problems with the conceptualisation of a viewed scene leading to impairment in event processing.
Reversible Sentences Comprehension Test (RSCT) Byng and Black, 1999.	Participants hear twenty spoken sentences containing action and non action verbs. They must match each sentence to one of three pictures. One picture matches the description heard. Another picture depicts the same event and characters as the target picture but shows the characters in different event roles (Reverse Role Distractor). A third picture shows the same characters as the target picture but in a different event (Lexical Distractor).	Participants are assessed on their ability to access the semantics of verbs, and the ability to map thematic roles in sentence comprehension. To avoid selecting the lexical distractor participants must process the core meaning of the target verb. To avoid selecting the reverse role distractor, participants must process both the syntactic structure of the input sentence and the lexical properties of the main verb.
The Object and Action Naming Battery	Participants are shown pictures depicting actions and objects and are asked to name them, testing access to the semantics of verbs and nouns.	Provides information about difficulties specific to word class. Verb retrieval/production is crucial when describing situations depicted in a viewed scene. Without them, any description would simply be a list of entities labeled with nouns.

Participants' results for these assessments are shown below (see tables 8, 9 and 10).

Table 8: Results of EPT and RSCT

		RD	AOD	JH	RT
Event Perception Test		80%	96%	100%	96%
Reversible Sentences Comprehension Test		85%	80%	55%	79%
Errors	Lexical	0	1	1	0
	Reversal	2	2	10	3

RD's scores on the EPT suggest a mild difficulty identifying the properties of events which facilitate verb selection. AOD, JH and RT, however, perform at a high level.

RD, AOD and RT score within normal limits on the Reversible Sentences Comprehension Test. JH makes several reversal errors. This may be the result of JH's difficulties with working memory (see individual profile, below).

Table 9: Results of OANB subset: Objects

	Objects	Semantic Errors	Phonological Errors	Mixed	Perseverations	No Response
RD	88%	2	0	0	0	5
AOD	43%	13	9	0	2	18
JH	35%	6	27	4	5	0
RT	35% (not completed)[1]	12	0	0	0	0

Table 10: Results of OANB subset: Actions

	Actions	Semantic Errors	Phonological Errors	Mixed	Perseverations	No Response
RD	61%	8	0	0	0	3
AOD	20%	29	7	0	0	3
JH	67%	12	2	0	2	1
RT	25% (not completed)[3]	25	3	0	0	2

[3] This assessment was not completed for RT, the percentages indicate the proportion correct out of the number of items administered.

The results of the OANB show that all participants make approximately double the number of semantic errors when naming verbs. This suggests relative difficulty identifying the core meanings of verbs (compared to nouns) for all participants.

More detailed analysis of each participant's performance over the assessments is provided in the Individual Profiles section, below.

Individual Psycholinguistic Profiles

AOD:

AOD's language is characterised by frequent semantic circumlocutions. Previous reports indicated he had difficulties limiting his output. However, his current speech and language therapist has suggested that his use of strategies to restrict his output have improved substantially in the nine months since the assessments above were administered.

AOD's performance on the OANB suggests that he has a severe impairment in selecting the meaning of verbs for output purposes. An inability to process verb meaning could impair access to the verb's phonological form. A similar, but less severe, impairment is seen for nouns.

AOD's performance on the EPT and RSCT show he is able to identify the linguistic features essential to verb selection when processing an event and can access verb meanings from an input form and map thematic roles in sentence comprehension.

AOD also reports difficulties with visual processing. He wears an eye patch when viewing scenes to compensate for the effects of his heminopia.

JH

JH has frequent word finding difficulties. His expressive language is more reliable when written, and he often overcomes word finding difficulties which affect spoken output via the use of written or oral spelling strategies.

JH's score of 100% on the EPT shows intact event processing skills. His low score on the RSCT could indicate that he has difficulty mapping thematic roles. However, as the RSCT requires the listener to store the meaning of the input sentence and compare it with each of the pictures, JH's poor performance could also result from impairments to his working memory.

JH's results in the OANB were characterised by frequent perseverations, indicative of the over-activation of lexical items. His performance in this test suggests that he does not have a deficit for actions/verbs relative to objects/nouns overall. However, the type of errors he makes in relation to the two categories are quite different (see Tables 9 and 10). For actions/verbs, he makes predominantly semantic errors (twice as many as for objects/nouns), which can be interpreted as indicating difficulties in accessing meaning. For nouns, on the other hand, JH's errors are predominantly phonological (three times as many as for objects/nouns), suggesting greater impairments in accessing phonological forms.

RT

RT's participation in formal assessments was affected by fatigue, probably caused by changes in epilepsy medication. This impacted on the length of time he could focus on tasks. RT frequently requested that assessments stop and the test battery were therefore not completed. These incomplete test results were nevertheless included in this study since earlier tests confirmed they were representative of his abilities. For instance, in a previous test of non-verbal event perception, RT achieved a high score, supporting the interpretation reported here of his performance on the partially completed EPT. It seems RT is able to identify the properties of events which facilitate verb selection and does not have problems with the conceptualisation of a viewed scene.

In 2004, RT scored 29/30 on the Thematic Roles Video Test (Marshall, Pring and Chiat, 1993), suggesting little difficulty in event processing or understanding the roles played by event participants.

In naming actions and objects, RT made mostly semantic errors for both word categories and few phonological errors. This suggests that he has difficulty accessing the meaning of verbs and nouns, but the impairment is not severe enough to have a knock on effect on his access to phonological forms. RT was also able to correct his incorrect responses to action and object naming when given a phonological cue. Other participants did not respond in the same way to such cues.

RD

RD has severe word finding difficulties, oro-motor dyspraxia, and impaired sentence production.

RD's performance on the EPT indicates mild difficulty identifying the properties of events which facilitate verb selection. OANB results suggest that has relative difficulty with the selection of verbs (over nouns) for output. RCST results were within normal limits suggesting RD can access the core meanings of the target verbs and is able to use information about syntactic structure to interpret thematic roles correctly.

2.5 Analytical Measures

The output of the control and test groups was analysed for quantity of language produced, semantic and syntactic complexity and informational content.

Quantitative Analysis

Quantity of language was measured by counting the number of words and utterances produced in response to each format. Mean Length of Utterance was not considered to be particularly revealing or appropriate to this kind of study and was therefore not included. Numbers of verb types (as opposed to tokens) were counted to measure semantic and syntactic verb diversity in relation to each format. To provide a measure of syntactic and semantic complexity, embedded sentences[4] were also counted.

[4] Any semantically coherent [NP VP] sequence that occurred as either a complement or adjunct to elements of the main sentence was counted as an embedded sentence.

Qualitative Analysis

Each event in a scene that was commonly described by 50% or more of the control participants was labeled as a 'target description'. The data from participants with aphasia was analysed to identify how many target descriptions they used. Some variation from the target descriptions was accepted (see Appendix 1 for full criteria for the qualitative analysis of output).

Criteria for exclusion of words

Set criteria were used to discount elements from the word counts of both groups of participants (see box 1).

Box 1: Criteria for excluded output

Criteria (see bullet points below) were selected on the basis of the performance of control participants or with reference to observations about the communicative style of participants with aphasia (see individual profiles for further details).

- Repetitions (e.g. RD: sequence 4 scene 1, discounted repetition highlighted *"You, um, came in the room and um, I don't* [redacted]
- Fillers and exclamations (e.g., *er, um, well, aha*)
- Comments at the beginning of an utterance indicating that stimuli are part of a sequence when describing each part of a scene (e.g. 'after that', 'next', and utterance -initial *and)*
- References to items from a previous sequence/session (e.g. For the opening scene of sequence 4: "walking in...just left...maybe the library or somewhere near')
- Predictions about the main event of an overall scene prior to all parts of a scene being shown and described individually (e.g. the second scene in sequence one: "Tape [phonological error – 'make'] cup o' tea").
- Comments about the materials (e.g. "Normally she'd have left a mess all over it")
- Declarations of uncertainty about a scene (e.g. might be, could be, I think it's)[5]
- The presentation of an alternative following the naming of a target noun was also omitted (e.g. for the output: 'it could be a cup of tea or a cup of coffee', only the words 'cup of coffee' would be included in the count)
- Corrected semantic and phonological paraphasias
- Phonological groping (e.g. 'tuh_tut' for target 'cup')
- Oral spelling strategies e.g. 'C' 'A' 'T' (followed by production of 'Cat').

[5] During the pilot study, such output was frequent, suggesting that participants were likely to 'hedge their bets' in order to avoid a direct error.

3. Results

3.1 Control Group

Effects of format:

There is no effect of format on measures of quantitative output for the control group (see Table 12).

Table 12

Effect of format on quantitative measures for control subjects

	Group Totals				Group Means			
	Photo Totals	Video Totals	Mean Across Formats	Standard Deviation	Photo Means	Video Means	Mean Across Formats	Standard Deviation
No. of words	1618	1716	1172	5.66	404.5	429	416.75	17.3
Total Utterances	171	172	171.5	2	42.8	43	42.9	0.14
No. of verb types	221	221	221	0	55.3	55.3	55.3	0
No. of verb tokens	264	270	267	4.2	66	67.5	66.75	1.22
No. of embedded sentences	23	22	22.5	0.71	5.8	5.5	5.65	0.56

Effects of Predictability:

A consistent effect of predictability was seen in all quantitative measures (see Table 13, overleaf). Lower predictability sequences yielded higher quantitative values across both formats. This effect is common to all eight participants. Higher measures of quantity were anticipated for the control group, though, given the increased number of events inherent in low predictability sequences effects have to be interpreted cautiously.

Table 13: Effect of predictability on quantitative values for control subjects

Predictability	High		Low	
Value	Total	Means	Total	Means
No. of words	1349	337.3	1985	496.25
Total Utterances	165	41.3	178	44.5
No. of verb types	184	46	258	64.5
No. of verb tokens	199	49.8	335	83.8
No. of embedded sentences	7	1.8	38	9.5

3.2 Test Group: Quantitative Results

Effects of Format:

There is no consistent effect of format on the quantitative values of the test group as a whole.

The group shows higher values in response to photo format for total numbers of words, utterances, verb tokens and embedded sentences. However, the differences are slight and a higher number of verb types are seen in response to the video format for some participants.

Effects of Predictability:

There is an effect of predictability on the test group, as for the control group. Higher quantitative values are seen in response to lower predictability sequences.

For the control group, it was suggested that the effect of predictability should be interpreted cautiously, given the higher number of events inherent to low predictability scenes. For the test group, however, investigation into the effects of predictability stemmed from the clinical assumption that lowering the cognitive load of language-based tasks can facilitate more language output from people with aphasia. If this assumption is correct, we would expect more output for the higher predictability sequences, precisely because they contain fewer events than low predictability sequences. The quantitative results for participants with aphasia do not, therefore, support this assumption.

3.3 Quantitative Results for Individual participants with aphasia:

RD

RD produced the least output of all participants.

Format:

There is no consistent effect of format on quantitative measures for RD (see Table 14, overleaf).

Values are higher for total number of words and verb tokens for video sequences. However, the number of verb types is the same across both formats and any differences present between formats are slight.

Table 14: RD: Totals and Means for Quantitative Measures: Format

	Photo Total	Photo Mean (/4)	Video Total	Video Mean (/4)
Number of Words	142	35.5	156	39
Number of Utterances	27	6.8	24	6
Number of verb types	23	5.8	23	5.8
Number of verb tokens	26	6.5	29	7.3
Number of embedded sentences	0	0	0	0

Predictability:

There is no consistent effect of predictability on RD's quantitative results (see Table 15).

Two of the five measures of quantitative analysis show higher values for low predictability scenes. The number of verb types, however, shows a slight reversal of this pattern and no embedded sentences are produced.

Table 15: RD: Totals and Means for Quantitative Measures: Predictability

Predictability	High		Low	
Value	Total	Means	Total	Means
Number of Words	147	36.8	151	37.8
Total Utterances	26	6.5	25	6.3
Number of Verb Types	23	5.8	23	5.8
Number of Verb Tokens	26	6.5	29	7.3
Number of embedded sentences	0	0	0	0

AOD

AOD produced the most output of all participants with aphasia. Much of his output included commentary on the materials, particularly in the second week of testing when AOD frequently compared the materials with the sequences he had seen in the preceding week. These elements have been discounted according to the criteria described in the methodology, whereas AOD's references to objects not relevant to main events were counted but treated as irrelevant.

Format

There is an effect of format on AOD's quantitative results. Higher values are produced in response to photo format for all measures (see Table 16, overleaf).

Table 16: AOD: Totals and Means for Quantitative Measures: Format

	Photo Total	Photo Mean (/4)	Video Total	Video Mean (/4)
Number of Words	410	102.5	335	83.8
Total Utterances	33	8.3	29	7.3
Number of verb types	54	13.5	46	11.5
Number of verb tokens	79	19.8	64	16
Number of embedded sentences	7	1.8	2	0.5

Predictability

There is an effect of predictability on AOD's quantitative results. Less predictable scenes yield higher values for four out of five measures, mirroring the effect seen for the control group (see Table 17).

Table 17 AOD Total and means for Quantitative Measures: Predictability

Predictability	High		Low	
Value	Total	Means	Total	Means
Total Words	329	82.3	416	104
Total utterances	30	7.5	32	8
Number of Verb Types	41	10.3	59	14.8
Number of Verb Tokens	61	15.3	82	20.5
Number of embedded sentences	6	1.5	6	1.5

JH

JH expressed frustration at word finding difficulties he experienced during this study, particularly in the first week of testing. This contributed to nervousness, which may have impacted on his language output.

Format:

There is an effect of format on measures of quantitative output for JH. Higher values are yielded across all measures in response to video format (see Table 18).

Table 18: JH: Totals and Means for Quantitative Measures: Format

	Photo Total	Photo Mean (/4)	Video Total	Video Mean (/4)
Number of Words	177	44.3	237	59.3
Total Utterances	25	6.3	31	7.8
Number of verb types	27	6.8	41	10.3
Number of verb tokens	39	9.8	50	12.5
Number of embedded sentences	1	0.3	5	1.3

Predictability:

There is an effect of predictability on JH's quantitative data (see Table 19, overleaf). Higher quantitative values are seen in response to sequences of lower predictability across both formats. JH therefore follows the same pattern, in this respect, as the control participants.

Table 19 JH Total and means for Quantitative Measures: Predictability

Predictability	High		Low	
Value	Total	Means	Total	Means
Total Words	141	35.3	273	68.3
Total utterances	24	6	32	8
Number of Verb Types	28	7	40	10
Number of Verb Tokens	36	9	53	13.3
Number of embedded sentences	2	0.5	4	1

RT

Format:

RT produces a slightly higher overall quantity of output and greater number of verb tokens in response to photo format (see Table 20, overleaf).

However, a higher number of prompts were required to elicit descriptions from photographed sequences and descriptions contained a greater number of irrelevant words (see qualitative analysis for further details). RT shows a slightly wider range of verbs (number of verb types), however, in response to video format.

The difference in values between formats, in all cases, is slight, suggesting an inconsistent effect of format on quantitative measures of output. Overall, therefore, an effect of format is unlikely.

Table 20: RT: Totals and Means for Quantitative Measures: Format

	Photo Total	Photo Mean (/4)	Video Total	Video Mean (/4)
Total Words	264	66	240	60
Total number of Utterances	31	7.8	28	7
Number of verb types	12	3	13	3.3
Number of verb tokens	21	5.3	17	4.3
Number of embedded sentences	0	0	0	0

Predictability:

There is an effect of predictability on RT's quantitative data. Higher values are seen in response to sequences of lower predictability across both formats. RT therefore follows the same pattern, in this respect, as the control participants.

Table 21 RT Total and means for Quantitative Measures: Predictability

Predictability	High		Low	
Value	Total	Means	Total	Means
Total Words	219	54.8	285	71.3
Total utterances	29	7.3	30	7.5
Number of Verb Types	8	2	17	4.3
Number of Verb Tokens	11	2.8	27	6.8
Number of embedded sentences	0	0	0	0

Summary of Quantitative Analysis

Control Group

The control group showed no effect of format on quantitative measures of output. There was, however, a clear effect of predictability. Scenes of lower predictability yielded higher quantitative values.

Test (Aphasic) Group:

The two non-fluent participants, RD and RT show no overall effect of format on quantitative measures of output. However, the two fluent participants, AOD and JH show an effect of format on quantity of output. Though these two participants have some similarities in their psycholinguistic profiles, they show the opposite effects of format. AOD produces higher quantitative values in response to photo format, whereas JH's quantitative values are higher in response to video format.

As for the control group, there is an effect of predictability on three of the four participants with aphasia: for AOD, JH and RT, scenes of lower predictability yielded higher quantitative values.

3.4 Qualitative Analysis

Target Descriptions: Target Situations Expressed by Control Participants

Tables 22 – 25 show target descriptions provided by at least 50% of the control subjects.

Table 22: Summary of target responses: Sequence 1

Sequence & Scene	Photograph	Video
1.1	The girls filling the kettle with water/at the sink/from the tap	A woman filling a kettle from the tap (accept: She's/Gemma's for 'woman' and /in the kitchen/with water for 'filling a kettle')
1.2	She's/thegirl/the woman's putting some coffee into a cup/	She's putting coffee into a cup (accept 'in' for 'into' and coffee powder for 'coffee')
1.3	(she's) Pouring hot/boiling water into the cup	She's pouring hot/boiling water into the cup /onto the coffee / She's filling the cup with boiling water
1.4	Adding/putting milk to/into the coffee/mug/cup	she's adding milk to the coffee (accept topping up/putting milk/cup of coffee)
1 Final	she's/the woman's/the girl's making (a cup of) coffee	She's making coffee (accept she's making a cup of coffee)

Table 23: Summary of target responses: Sequence 2

Sequence & Scene	Photograph	Video
2.1	She/Isla's/a woman/a young lady's looking for a book/some books/looking at sheves in a library	She's looking for a book (on a shelf) Also: A woman, the girl, looking at/ through a shelf of books
2.2	She's chosen/picked/taking/ selected a book	She's found/selected/taken/chosen a book
2.3	she's having the book stampted/The book is being stamped/the librarian/they is/are stamping the book	The librarian's checking the book out for her/stamping the book or passive, the girl's being issued the book, having the book checked out (librarian included in 5 of 8 descriptions
2.4	She's leaving the library	She's leaving the library with the book
2 Final	She's taking a book/borrowing a book from the library	She took a book from / out of the library (accept the woman/got a book/borrowed a book/got a book out)

Table 24: Summary of target responses: Sequence 3

Sequence & Scene	Photograph	Video
3.1	A man/woman's reading a paper and a girl/man's putting something on the table	A woman/man's reading a paper and a man/woman's put some biscuits on the table (accept a tray of biscuits, 2 biscuits, guy, girl)
3.2	The man/lady's still reading the paper. A cat is sniffing/investigating what's on the table/the biscuits/cheese	A cat has come / jumped onto the table and is sniffing/eating/investigating the biscuits) man/woman (still) reading newspaper.
3.3	The woman is looking at/has noticed. The biscuit's something is missing from the plate/dish/the biscuit's/cheese have gone is/are/missing	The man/woman has noticed/realised that the biscuit's are gone/missing/plate is empty 50% mention cat gone/missing. 1 says stuart is trying to scare cat away, 3 mention/imply that the person has stopped reading the newspaper
3.4	the cat is eating/has got/pinched/stole the cheese/biscuits/contents of the plate	the cat is eating the food/cheese/biscuits
3 Final	the cat stole the cheese/food/contents of the plate/table	The cat stole the biscuits/food/cheese (the man's food, 3 imply the theft was unseen or that he person reading was distracted)

Table 25: Summary of target responses: Sequence 4 :

Sequence & Scene	Photograph	Video
4.1	A girl/man/you coming into/enters a room/house with a bag	Man/woman coming into the room/entering the house/coming in the door/walked through the door with a bag/carrying a bag/ruckasack
4.2	she/he/ you /a man put the bag on/onto the table	he/she/the man/you put the bag on the table
4.3	a man/woman (50% imply a burgular/theif/bad person) comes in/enters reaches for/grabs/takes the bag	a woman/man's come in and reached for/taken the bag. Implication of theft/strange intruder in 50% of descriptions (not a member of household/theif/sneaked/burgular)
4.4	The girl / man /you discovers / noticed / finds the bag /is surprised that the bag is missing / gone	A man / woman realises / discovers / wonders /expresses amazement that his / her bag has gone / is no longer there / is missing
4 Final	The bag was stolen/somebody stole her bag/the bag you she left on the table (accept nicked/pinched)	a bag was stolen/pinched/theft/been burgled

Commentary on Control Descriptions:

Some previous studies arrived at target descriptions on the basis of consensus between small numbers of researchers (e.g. Capilouto et al (2005).For this study, it was hypothesised that it was methodologically safer for the author not to make assumptions about what constituted a target description in each case. Researchers may assume more complex structures in their descriptions, and include more specific lexical items, especially in the case of verbs. It was therefore decided that control subject descriptions would be used to measure the semantic accuracy of the test group. This decision was further validated by the differences found between the control descriptions (see tables 22 -25) and the author's descriptions of each sequence, which are outlined below. The main differences were:

- Researcher's descriptions often included more detail, and had a more complex syntactic structure, with a higher number of preposition phrases and adjective phrases (see Table 26) and a higher number of embedded sentences (see Table 27)

Table 26: Differing use of detail in researcher's descriptions: (italics indicate such differences)

Sequence and Scene	Researcher's description	Control subjects' description
Sequence 1 scene 2	The woman spoons coffee into *an empty cup*	She's putting coffee into *a cup*
Sequence 4 scene 1	Person A enters a house with a bag *on their shoulder*	A girl/man/you coming into/enters a room/house with a bag (photo format)

Table 27: Differences between controls' and researcher's descriptions: 1: Syntactic complexity: Embedded sentences (italics indicate an embedded sentence)

Sequence and Scene	Researcher's description	Control subjects' description
Sequence 3 Scene 1	Person A places a plate of food on the table in front of person B *who is reading the paper.*	A woman/man's reading a paper and a man/woman's put some biscuits on the table (video)
Sequence 2 Scene 3	A woman behind a desk stamps a book in front of *the woman who selected it*	she's having the book stamped/The book is being stamped/the librarian...is... stamping the book (photo).

- Researcher's descriptions often foregrounded different entities or aspects of the situations (see Table 28)

Table 28: Differences between controls' and researcher's descriptions: 2: Differences in perspective: (italics indicate such differences)

Sequence and Scene	Researcher's description	Control subjects' description
Sequence 1 Scene 3	The woman *pours coffee from the kettle* into the cup	She's *filling the cup* with boiling water [6] (video format)

- More specific verbs were used in the researcher's descriptions (see Table 29)

Table 29: Differences between controls' and researcher's descriptions: 3: Narrow vs. wide focus verbs: (italics indicate such differences)

Sequence and Scene	Researcher's description	Control subjects' description
Sequence 1 scene 2	The woman *spoons* coffee into an empty cup	She's *putting* coffee into a cup (video format)
Sequence 4 scene 2	Person A *places* the bag on the table…	she/he/ you /a man put the bag on/onto the table (photo format)

There was also considerable variability in labels used by controls to describe characters, e.g. the man/the woman/the girl/he/she/they. Participants with aphasia were not, therefore, penalised for providing generic labels for characters appearing in sequences, or for omitting those labels. Participants with aphasia were also not penalised for providing alternative verbs and nouns to describe events if their alternative verbs were semantically very close to the target descriptions (see Appendix 1 for full details of qualitative analysis criteria).

Qualitative Analysis of Test Participant Data

Expression of Target Situations:

Test subjects' data was analysed to find out how closely the data they produced matched the core descriptions given by the majority of the controls. Each correctly identified event in a narrative was given a global score of one point.

Occasionally, control descriptions depicted a greater number of events for a given scene in one format, than occurred in the same scene of the alternative format. For example, in act 3 scene 2 (see Table 30, below) the photo scene depicts two events: a person reading a paper and a cat on the centre of a table investigating something. However, during the five second video clip for this scene, three events are mentioned, as the cat's movement from the floor to the table is also captured. This additional information about the direction of the cat's movement, prior to arriving on the table, caused the majority of control participants to mention this third event: the cat jumping onto the table.

Table 30: Example of need to sometimes control for differences between the numbers of events across formats

Act 3 Scene 2: Photo	Act 3 Scene 2: Video
The man/lady's still reading the paper. A cat is sniffing/investigating what's on the table/the biscuits/cheese	A cat has come / jumped onto the table and is sniffing/eating/investigating the biscuits man/woman (still) reading newspaper

In order to ensure the scores of participants with aphasia could be evenly matched across formats, the number of events each participant identified was scored as a proportion of the maximum number of events inherent in each scene. This provides a percentage of target situations identified for each format, as shown in the tables below.

Participants were not expected to produce output which exactly matched the control descriptions, but their samples were analysed taking into account features of their aphasia. For example, participants with aphasia sometimes demonstrated pronoun confusion in everyday speech, ascribing the female gender to male characters, and vice versa. Therefore, in descriptions of viewed scenes, participants were not penalised for such errors (see Appendix 2).

Prompts and Irrelevant Words: Links to Qualitative Results

Two outstanding differences between the control group and the test group are the amount of prompts required to elicit output and the amount of irrelevant output produced. As a group, participants with aphasia produced a substantially higher percentage of irrelevant output. The test group also required a higher total number of prompts to elicit output than the controls.

The criteria for prompts are detailed in section 2. In summary, prompts were usually only provided when a participant had not, in the first instance, described the target situation appropriately. A greater number of prompts and a higher percentage of irrelevant output may suggest the need for support in the processing of the target situation for output. If a substantially greater number of prompts/higher percentage of irrelevant output occur in response a particular format or level of predictability, this may provide additional information about the effects of those variables. Details of the number of prompts and percentage of irrelevant output are therefore included in qualitative results.

Effects of Format on Qualitative Results of Individual participants.

JH (fluent)

JH showed the strongest effect of format on the percentage of target situations identified. He produced a greater percentage of target descriptions in response to photo format (see Table 31)

Table 31a: JH: Effects of format on qualitative measures

Percentage of descriptions that match Control descriptions: By Format	
Photo	Video
52%	40.7%

JH produced a slightly higher percentage of irrelevant words in response to video format and required more prompts for this format (See Table 31b)[7]. The need for more prompting and higher percentage of irrelevant output suggest that JH might have found it more difficult to convey events in video format. This possibility is supported by JH's greater semantic accuracy in response to photo format.

Table 31b: JH: Prompts and irrelevant words: format

	Format	
	Photo	Video
Prompts	3	7
% of irrelevant words	1.1%	2.5%

There was no clear effect of predictability on the informational content of JH's output (see Table 32, overleaf)

[7] Increased quantitative output, in response to video format, may be partly explained by the number of prompts required to elicit output in this format.

Table 32: JH: Effects of predictability on qualitative measures

Percentage of descriptions that match Control descriptions: By Format	
High Predictability	Low Predictability
45%	46.9%

Error analysis also shows little clear effect of predictability on JH's output. He produces no irrelevant output for low predictability sequences but does produce irrelevant output for high predictability sequences. However, JH requires less prompting to arrive at target descriptions for high predictability sequences (see table 32b).

Table 32b: JH: No. of prompts and irrelevant words: Predictability

	Predictability	
	High	Low
Prompts	4	6
% of irrelevant words	5.7%	0%

AOD (fluent)

Format: AOD shows a slight advantage of photo format for the percentage of target descriptions produced (see Table 33), though the difference between formats is too small to draw any firm conclusions.

Table 33: AOD: Effects of format on qualitative measures

Percentage of descriptions that match Control descriptions: By Format	
Photo	Video
56%	51.9%

There is more irrelevant content in photo format for AOD (see Table 33a,), which might be impacting on the effect seen on quantitative values, where AOD shows an advantage of quantity and syntactic complexity in response to photo format.

Table 33a: AOD: No. of Prompts and irrelevant words: Format

	Format	
	Photo	Video
Prompts	3	4
% of irrelevant words	15.9%	10.7%

Predictability: AOD produces a substantially higher percentage of target descriptions in response to low predictability sequences (see Table 34).

Table 34: AOD: Effect of predictability on qualitative measures

Percentage of descriptions that match control descriptions: By Predictability	
High Predictability	Low Predicatability
40%	62.5%

AOD produces less irrelevant output in response to scenes of low predictability and requires less prompts to elicit that output – further suggesting an advantage for low predictability.

Table 34b: AOD: No. of prompts and irrelevant words: Predictability

	Predictability	
	High	Low
Prompts	5	2
% of irrelevant words	14.9%	12.5%

RD (Non Fluent)

There is little effect of format on the percentage of target descriptions produced by RD (see Table35).

Table 35: RD: Effects of format on qualitative measures

Percentage of descriptions that match Control descriptions: By Format	
Photo	Video
17.5%	20%

RD required fewer prompts to elicit output in response to photo format (see Table 35b). He does not produce any irrelevant output for either format.

Table 35b: RD: No of Prompts and Irrelevant words: format

	Format	
	Photo	Video
Prompts	4	2
% of irrelevant words	0	0

RD produces a substantially higher percentage of target descriptions in response to low predictability sequences (see Table 36).

Table 36: RD: Effects of predictability on qualitative measures

Percentage of descriptions that match control descriptions: By Predictability	
High Predictability	Low Predictability
15%	37.5%

RD required substantially fewer prompts to elicit output for low predictability sequences (see Table 36b). This may support the conclusion that RD has an advantage for measures of informational content for low predictability sequences.

Table 36b: No of prompts and irrelevant words: predictability

	Predictability	
	High	Low
Prompts	5	1
% of irrelevant words	0	0

RT (Non Fluent)

RT produces a higher percentage of target descriptions in response to video format (see Table 37), though he produces so few target descriptions that it is difficult to conclude that format has an effect.

Table 37: RT: Effects of format on quantitative measures

Percentage of descriptions that match Control descriptions: By Format	
Photo	Video
5%	10%

A higher number of prompts were required to elicit output and a higher percentage of irrelevant words produced in response to photo format (see Table 37b). This may suggest a slight advantage for video format but there is too little data to draw reliable conclusions.

Table 37b: RT : No. of prompts and irrelevant words: Format

	Format	
	Photo	Video
Prompts	7	5
% of irrelevant words	32.7%	14.2%

RT's data shows little effect of predictability on the percentage of target descriptions produced (see Table 38).

Table 38: RT: Effects of predictability on qualitative measures

Percentage of descriptions that match control descriptions: By Predictability	
High Predictability	Low Predictability
10%	12.5%

A greater number of prompts are required to elicit output for high predictability sequences, though slightly more irrelevant words are produced in response to low predictability sequences (see Table 38b). These data suggest that predictability has little effect on the informational content of RT's output.

Table 38b: RT : No. of prompts and irrelevant words: Predictability

	Predictability	
	High	Low
Prompts	7	5
% of irrelevant words	22.4%	25.1%

Summary of Qualititative Results

One fluent participant, JH, shows an advantage of photo format for measures of informational content. This does not correlate with JH's quantitative measures of output, where increased values are found in response to video format. The other three participants with aphasia do not show a clear advantage of format for measures of informational content.

One fluent participant, AOD, and one non-fluent participant, RD, show substantially higher measures of informational content in response to low predictability sequences. For AOD, this effect correlates with quantitative measures, which show increased levels of output for low predictability. RD only shows this effect on measures of informational content.

JH (fluent) and RT (non-fluent) show no clear effects of predictability on the informational content of their output.

Overall Results Summary:

By Format:

In analysis of output in response to viewed sequences which were closely matched for type and number of events across formats, control subjects showed no effect of format on quantitative output. The non-fluent participants with aphasia, RD and RT, also showed no consistent effects of format on quantitative measures of output.

The two fluent participants with aphasia, AOD and JH, however, did show an effect of format on both quantity of output and measures of syntactic complexity. The effect for these participants was not homogenous. AOD showed higher quantitative values in response to photo format and quantitative values for JH were higher in response to video format.

Only one participant, JH, showed a strong effect of format on informational content. He produced a higher percentage of target descriptions in response to photo format.

By Predictability:

All control subjects produced higher quantity of output, and higher measures of syntactic complexity in response to scenes of low predictability. Three of the participants with aphasia also followed this pattern: AOD and JH (fluent) and RT (non-fluent). RD, the other non-fluent participant, showed no clear effects of predictability on quantitative measures of output.

One fluent participant, AOD and one non-fluent participant, RD, produced a higher percentage of target descriptions in response to low predictability scenes.

JH (fluent) and RT (non-fluent) showed little effect of predictability on the percentage of target descriptions produced.

4. Discussion

4.1 Format effects

The results reported in section 3 show that viewing events in a more dynamic video format, which may provide more temporal and directional cues to the events involved, does not improve event description for typical or atypical speakers. For the control group as a whole, as well as for individual participants, there was no indication that more, and more syntactically and semantically complex, output was produced in response to video in comparison to photographic representation of the same events. These results are clearly preliminary given the limited scope of the study, both in terms of the size of the control group and the number of events sampled. Nevertheless, the results are interesting as a range of events of different types in four different sequences were tested. Thus, describing filmed rather than photographed events does not seem to be intrinsically easier for typical speakers.

No overall advantage for video was found for the test group either. In this respect, the results of this study support the negative findings reported by Berndt et al. (1997 a and b) discussed in section 1.3. Only one participant with aphasia, JH, produced more output in response to video in comparison to photos. This advantage, however, was reversed when the quality of his output – its informational content or semantic accuracy – was considered.When he had to describe events from photos, JH produced a higher percentage of target events, provided less irrelevant information and required less prompts. The other participant with non-fluent aphasia, AOD, also showed an advantage in describing photographed events in comparison to video. Unlike JH, AOD's advantage for photos was particularly pronounced with respect to quantity and syntactic/semantic complexity of output, while the difference between the two formats with respect to quality of output was very slight. Given these discrepancies between quantity and quality of output in response to particular formats, it may be that different individuals with aphasia may benefit from different formats as more effective triggers of conceptual and/or linguistic activation, although a particular format may not also improve selection of the relevant conceptual and/or linguistic representations so that more informative or semantically accurate descriptions are produced. For example, AOD produced a syntactically and semantically complex description after viewing the photo for sequence three, scene three: "*He was not aware of and he came along looked up in his paper and looked where he could find a little place where she put the two*

things." Such complexity, however, does not correlate with accuracy of informational content; the same scene was described by controls as *"The woman has noticed something is missing from the plate."*

For the two non-fluent participants with aphasia, there was no clear evidence of a format effect. RD's quantity and quality of output was similar irrespective of format. RT's event descriptions were slightly more semantically accurate for video events but the paucity of his output makes it impossible to draw any firm conclusion, and there was no quantitative increase in output when he described videos. So, type of format did not have a uniform effect for participants with aphasia, a finding that corresponds to those reported in the literature on other types of format manipulation (see Bottenberg, Lemme and Hedberg, 1987, Shadden, Burnette, Eikenbery and Dibrezzo, 1991, O'Leary, 2006).

In addition, the results of this study support the claims of previous studies that format effects are not necessarily related to aphasia type (see Hughson, 2004, Staveley, 2004 Dean and Black, 2005, O'Leary, 2006). Neither the two fluent participants (JH and AOD) nor the two non-fluent participants (RD and RT) showed similar patterns of performance in relation to format. It may be that this lack of relationship between format effects and aphasia type is simply due to the lack of more developed models of event description, our primitive understanding of how manipulation of the visual properties of events may affect their description, and the inadequacy of our understanding of language impairment.

4.2 Predictability effects

The study also investigated the possible effects of the predictability of an event sequence (see section 2.2). A secondary aim of the study was to test a common clinical assumption that more predictable event sequences are cognitively less taxing, and therefore allow people with language impairments to focus processing resources on language access and production. No evidence was found to support such an assumption, although the results have to be interpreted with caution because sequences of different levels of predictability had not been closely matched for number of events. Because of this confound, only the qualitative results for the participants with aphasia will be considered here. Since informational content has been calculated as a

percentage of target events for each sequence, the difference in number of events for sequences of different levels of predictability is of less consequence for qualitative measures.

For the test group as a whole, there was no evidence that more informative or semantically accurate language output was produced in response to high predictability sequences. Indeed, the reverse was true for two participants, AOD and RD, who produced more accurate informational content in response to low predictability scenes. AOD produced a higher percentage of target situations and a slightly lower percentage of irrelevant words for low predictability sequences, where he also required fewer prompts. Similarly, RD, who never produced irrelevant words, described a higher percentage of target situations with less prompts for low predictability sequences. There was no evidence of an effect of predictability on the quality of the output of the other two participants with aphasia, JH and RT.

If higher predictability does not decrease cognitive load in a way that facilitates language output, why should lower predictability make a difference to at least two of the participants with aphasia? There are a number of possible explanations. First, it may be that when a sequence is less predictable, speakers are more inclined to provide listeners with more information since listeners cannot be expected to infer some events from shared assumptions or cognitive 'schemas', as they can do for a predictable sequence. In this sense, predictability would act as a discourse constraint, limiting or increasing the amount and type of information provided, as long as the speaker had the psycholinguistic means to adjust his production in this way. It is worth mentioning, in this connection, that all the controls produced not only more but more semantically and syntactically complex language in response to lower predictability sequences (see sections 3.3, 3.4). Although the greater quantity may simply be due to the greater number of events for these sequences, as it has already been mentioned, the fact that they produced five times as many embedded sentences may indicate that controls were also providing the kind of additional, background information that is often encoded in embedded rather than main sentences. Since a detailed analysis of the relevant data would be beyond the scope of this study, this interpretation of the predictability effect must await further research.

A second possible interpretation is that predictability might correlate with interest or emotional involvement. The more predictable the sequence, the lesser the interest or emotional involvement of the speaker, which may, in turn, have an effect on language output. There is arguably a correlation between the level of emotive content and the levels of predictability described in the current study. High predictability sequences depicted familiar, everyday events that follow a clearly defined sequence, e.g., making a cup of tea and taking a book out of the library. Low predictability sequences, however, depicted situations where, by definition, there was an element of surprise. For instance, there is little suggestion at the beginning of sequence three, that the snack laid out for the person reading the paper will be stolen by a black cat. Similarly, when the person carrying the bag enters the room in sequence four, there are a number of events that could feasibly follow. The theft of the bag by a suspicious looking character from outside is by no means typical in such a situation. This departure from the ordinary, from a predictable sequence of events, may affect viewers' emotional involvement with what is happening. If this impacted on the level of attention and focus a person gave to the task, it would most likely be evident in the language they used to describe what they had seen. As was mentioned in section 1.3, there is some evidence in the literature that emotional involvement can have a positive impact on language production. Bottenberg, Lemme and Hedberg (1987), for example, compared various formats and found the highest the measures of output in response to a description of the most emotive scenes - a depiction of the assassination of President Kennedy.

4.3 Study Limitations & Recommendations for Further Research

Using a larger number of participants with aphasia would be necessary to confirm any findings from this study. In addition, including scenes where directional cues are crucial to understanding events may elicit differences between dynamic and static formats not seen in this study. Finally, further analysis of predictability should ensure that the number and types of events are controlled for across levels of predictability.

4.4 Clinical Implications & Conclusion

This study has provided a rare example of language elicited from sequence descriptions across two formats, where the number and type of events were strictly controlled for across those formats.

In finding that there was no overall advantage for video format on describing the events in a viewed sequence, this study suggests that the use of 'clinic – friendly' static formats such as drawings or photographs doesn't necessarily elicit an 'unrealistic' picture of a patient's ability to describe events that they have seen.

That being said, the heterogeneous results in this study support the conclusions of previous literature that a range of formats should be used in the assessment of aphasia.

This study also suggests that clinicians should consider that speakers may limit or increase the type of language they produce, according to how much inference they feel a listener may need in understanding the description of a viewed scene. This may vary from scene to scene and would be dependent on a speaker's psycholinguistic means to adjust production appropriately.

Finally, this study illustrates that the cognitive load and emotional content inherent in a visual description task should be considered by clinicians. The results relating to predictability in this study showed no evidence that lowering the cognitive load of a visual description exercise offsets the advantage that may be provided by the increased emotional involvement and interest in a cognitively more demanding task.

Bibliography

Applebee, A. N. (1978). The child's concept of story: Age two to seventeen. Chicago, IL: University of Chicago Press

Berndt, R.S., Haendiges, A.N., Mitchum, C.C. & Sandson, J (1997a). Verb Retrieval in Aphasia. 1. Characterising single word impairments, Brain and Language 56, 69 - 106.

Berndt, R.S., Haendiges, A.N., Mitchum, C.C. & Sandson, J (1997b). Verb Retrieval in Aphasia. 2. Relationship to Sentence Processing, Brain and Language 56, 107 – 137.

Bottenberg, D.E., Lemme, M.L., Hedberg, N.L., (1987). Effect of content on narrative discourse of aphasic adults. In Brookshire, R.H. (Ed.), Clinical Aphasiology Conference Proceedings, Minnesota: BRK Publishers

Black, M., & Chiat, S. (2000). Putting thoughts into verbs: developmental and acquired impairments. In Semantic Processing: Theory and Practice, Best, W., Bryan, K., Maxim, J. London: Whurr.

Black, M., & Chiat, S. Linguistics for Clinicians: A Practical Introduction. London: Arnold.

Black, M., & Chiat, S. (in press) Interfaces between Cognition, Semantics & Syntax, to appear in Ball, M.J., Perkins, N., Muller, N. & Howard, S. (Eds) Handbook of Clinical Linguistics, Blackwell

Byng, S. & Black, M. (1999). The Reversible Sentence Comprehension test, London: Winslow

Cooper, P.V. (1990). Discourse production and normal aging: Performance on oral description tasks. Journal of Gerontology, 45(5), 210 – 214.

Dean, M.P. & Black, M. (2005) Event processing and description in people with aphasia, Aphasiology 19 (6), 521-544

Dipper, L., Black, M. & Bryan, K.L. (2005) Thinking for speaking and thinking for listening: the interaction of thought and language in typical and non-fluent comprehension and production. Language and Cognitive Processes, 20 (3), 417-441.

Druks, J. & Masterton, J.(2000). An Object and Action Naming Battery, London: Psychology Press.

Hartsuiker, R.J., & Kolk, H.H.J. (1998). Syntactic facilitation in agrammatic sentence production. Brain and Language, 62 (2), 221-254

Harris Wright, H., Capilouto, G.J., Wagovich, S.A., Cranfill, T.A., & Davis, J.E. (2005). Development and reliability of a quantitative measure of adult's narratives. Aphasiology 19 (3/4/5), 263-273

Harris Wright, H., Capilouto, G.J., Wagovich, S.A. & Cranfill, T.A. (2006). Reliability of main event measurement in the discourse of individuals with aphasia, Aphasiology 20 (2/3/4), 205 – 216

Herberg, N.L. (1986). Narrative analysis: clinical procedures, Topics-in-Language-Disorders. Vol 7(1) 58-69.

Henderson, J. M., & Ferreira, F. (2004). Scene perception for psycholinguists. In J. M. Henderson and F. Ferreira (Eds.), *The interface of language, vision, and action: Eye movements and the visual world.* New York: Psychology Press.

Hughson, S. (2004) Describing scenes under different conditions: a comparative investigation into the effects of spatial and temporal manipulations on event description in people with dysphasia, Unpublished MSc dissertation, University College London.

Hunt, K.W. (1970), Syntactic Maturity in Schoolchildren and Adults, Monographs of the society for research in child development, vol 35, No.1, pp. iii-iv+1-67

Kaplan, E., Goodglass, H., & Weitraub, S. (1983), The Boston Diagnostic Aphasia Exam, Philadelphia: Lea & Febiger

Kertesz, A. (1982) The Western Aphasia Battery. The Psychological Corporation.

Lemme, M.L., Hedberg, N.L. & Bottenberg, D.E. (1984). Cohesion in narratives of aphasic adults. In Brookshire, R.H., Clinical Aphasiology: Conference Proceedings, Minnesota: BRK Publishers.

Levelt, W.J.M. (1989). Speaking: from intention to articulation. Cambridge, MA: MIT Press.

Levelt, W.J.M., Roelofs, A., & Meyer, A.S. (1999). A theory of lexical access in speech production, Behavioural & Brain Sciences (22), 1 – 75.

Liles, B.Z., Coehlo, C.A., Duffy, R.J., & Zalagens, M.R. (1989). Effects of elicitation procedures on the narratives of normal and closed head-injured adults. Journal of Speech and Hearing Disorders 54 (3) 356-366.

Marshall, J. (1993). Thematic Roles Video Test. Unpublished, University College London.

Marshall, J., Black, M. & Byng, S. (1999) Event Perception Test. London: Winslow.

Nicholas, L.E. & Brookshire, R.H. (1993) Quantifying connected speech of adults with aphasia. Journal of Speech and Hearing Research 38 (1) 145 – 153

Potechin. G.C., Nicholas, L.E. & Brookshire, R.H, (1987). Effects of picture stimuli on discourse production by aphasic patients. In Brookshire, R.H. (Ed.), Clinical Aphasiology: Conference Proceedings. Minnesota: BRK Publishers.

Robertson, I.H., Ward, T., Ridgeway, V., & Nimmo-Smith, I. (1994), Test of Everyday Attention, Bury St. Edmunds, Thames Valley Test Company

Shadden, B.B., Burnett, R.B., Eikenbery, B.R. & DiBrezzo, R. (1991). All discourse tasks are not created equal. In Prescott, T. (Ed.), Clinical Aphasiology. Austin: Pro-Ed.

Staveley, R. (2004) Describing scenes under different conditions: a comparative investigation into the effects of spatial and temporal manipulations on event description in people with dysphasia. Unpublished MSc dissertaton, University College London.

Stein, N., & Glenn, C. (1979). An analysis of story comprehension in elementary school children. In R. O. Freedle (Ed.). Advances in discourse processing (Vol. 2). Norwood, NJ: Ablex.

Slobin, D. (1996), From "thought and language" to "thinking for speaking". In J.J. Gumperz & S.C. Levinson (eds.), Rthinking Linguistic Relativity (pp. 70-96). Cambridge University Press.

Swinburn, Howard and Baker, (2004) Comprehensive Aphasia Test. Hove: Psychology Press.

Van Dijk, T.A., & Kintsch, W. (1983). Strategies of discourse comprehension. New York: Academic Press

Yorkston, G. & Miller, L. (1988). An analysis of connected speech samples of aphasic and normal speakers. Journal of Speech and Hearing Disorders, 45, 27-36.

Appendix 1: Qualitative Analysis: Marking Criteria

General guidelines for scoring: Participants yielded one point for each event. These scores were then converted into a percentage score – derived by dividing the number of points scored by the number of events. Semantically related substitutions were accepted in cases where they fulfilled the criteria detailed below.

1. Is the event identified correctly? If incorrect, or not described then the participant scores zero.

2. Substitutions:

Verbs: Verbs that did not match the controls, but did not represent semantic deviation from the control descriptions were accepted. For example, part of JH's response to photo format in sequence three scene one is: "fellah was landing something on the table". Relative to the control description: "a man's putting something on the table", this is acceptable and scores a point, as the core meaning of the event is not changed by JH's description. However, JH's response to the video format for sequence one scene 4: "She's sending the milk coffee" is not accepted relative to the control description: "she's adding milk to/putting milk in the coffee", as the verb send implies that milk leaves the proximity of the person who 'sent' it. This concept of distance involves a substantial semantic difference to the description given by the controls and is therefore not accepted.

Nouns/Objects: Semantically related objects are accepted if the substitution is not present in the scene being described[8]. The criterion is less strict than those for verbs, which are crucial to conveying the event. Generic references to objects such as it/them/the thing/stuff are accepted.

3. Syntactically disordered descriptions are accepted unless the participant orders thematic roles in a way which presents a semantically different description of the event relative to controls.

[8] Use of an object present in the scene might represent inappropriate foregrounding of something not essential to event description. It would not, therefore be possible, to rule out difficulties at a conceptual level.

4. Predictions are not accepted. As with the criteria for quantitative analysis, references to what a participant thinks is going to happen next, or overarching descriptions of the sequence as a whole (before all scenes have been shown and described) score zero.

5. Descriptions of an individual scene which differ from controls, but provide a semantically feasible alternative, will not be accepted if the represent a contradiction to events that have occurred in previous scene. For example, several of the participants with aphasia state that the girl in sequence two is re-newing a library book when in the first two scenes she is seen looking at, and selecting the book from the library shelf.

6. No points will be scored if a marginal event is foregrounded by a participant. For example, AOD responds to the photo of scene four in sequence two as: "She , holding the book, on the book...she went through into the place, in the outside", compared to the control description which foregrounds the girl's exit: "She's leaving the library (with the book)".[9]

7. Summary of the whole sequence not accepted as overarching description for each scene (as with quantitative measures)

[9] Although a participant may subsequently refer to the main event, no points will be given as highlighting a element of the scene that the controls do not could be seen as misinterpreting the importance of the main event.

Appendix 2: Full Transcripts (including Discounted elements) of Participants with aphasia

For each sequence, bullet points from top to bottom correspond to scenes 1-4. 'Overall' denotes the overarching event description
DS denotes discounted summary

RD: session 1

Sequence 1 (Video a):

- Jar, and tub, and feed in the jar
- In two, um, make, in cop, um coffee, two, um, two um (gestures holding spoon, tipping something out x 2) and that's all
- And, she pour (does pouring motion as if holding kettle)
- Milk (prompt) Um, she (pouring motion)

Overall: She, going to make herself coffee, milk.

Sequence 2 (photo a)

- She, looking, out **(at)** the book, um, the book shake (take)
- and the, library, sss um, I , um (stamping gesture) // ....four weeks and he's gets (Waves arm away from self)
- he' s outing library and out the book

Overall: She going to library and she book I want and the library samped (gestures stamping) and (waves finger away from something)
Prompt:
She's going to the library and go out

Sequence 3 (video a)

- reading the paper and two, plate two san-which-is
- cat, the cat was sniffing, smelfing to, to um, cat, smiffing (points to nose)
- he, he looking at the plate and the two san-which-is is gone
- tat can eat the one and

Overall: cat (inaudible) plate and one eat the san-which

Sequence 4 (photo a)

- Going to the shopping
- Came in to the room, open the bag
- And, he going to seal the bag
- And, "hey weigh-er is the bag

Overall: The girl wod, um, where is the bag

Session 2

Sequence 4 (Video b)

- You, um, came in the room and um, I don't know, came in the room
- The b, bag and place it the table (gesture showing motion)
- The girl wods the um bag and (mimes person looking left and right) is she leave //...(inaudible).... Gone.../..gets into the room, wot and pick (gestures picking bag up)[10]
- You "whe, how the bag gone"

Overall: The girl run and the man no more the bag

Sequence 3 (photo b)

- He look the sun, the paper, read paper and look, um (prompt) sitting on the couch, you 8 words, 2 utterances, 2 verb phrases, 2 verb tokens, 2 verb types, 0 irrelevant words, 0 embedded sentences, PUCVP 1:1)
- Girl reading the paper // cat two, two slices of bread 9 words, 2 utterances, 1 verb phrases, 1 verb tokens, 0 verb types, 0 irrelevant words, 0 embedded sentences, PUCVP 2:1)
- The dod (SE Cat) // the girl look at the tray and empty 10 words, 2 utterances, 1 verb phrases, 1 verb tokens, 1 verb types, 0 irrelevant words, 0 embedded sentences, PUCVP 2:1)
- And cah, de dog, n the cat eat the last one 6 words, 1 utterance, 1 verb phrases, 1 verb tokens, 1 verb types, 0 irrelevant words, 0 embedded sentences, PUCVP 2:1)

Overall: The girl, the bread and the cat, the girl can't see and the cat eat the one

Sequence 2 (video b)

- The girl comes the library, that's all (prompt) Watch, wots the books
- The lie, no, and the big book and the (motions hand towards self) I want the book
- The hanks the on the book, the woman she (motions stamp) samps and the girl thank you very much, leave
- Go out the liboo door and (waves hand away from self)

Overall: The girl gets the book and the woman samps it and the girl goes out

Sequence 1 (photo b)

- Girl, the keteal, til of water
- Coffee (prompt) the girl gets two cup puts and two, no one coffee
- The girl pours coffee
- Milk (prompt) the girl's milk (pouring motion)

DS: The girl (inaudible) cap, gorl, um, the girl was and cup o tea (drawing pictures) and milk (Prompt)

Overall: She going to give cup of tea for her

[10] (Wods → wants, wot → watch)

AOD

Session 1

Sequence 1 (photo b)

- The girl, not the same girl I don't think, she took the water out of the normal place where you get it, into the thing that you use the ice, make the ice, not the ice you thicko, water, and made it hot, like we have
- The girl has just put into the water or something, in the bottom of her little bag, no not bag, she's um, you know, you use on the water and you hold it and that's called cup. // Now, she was either pushing them in or pulling out. I suppose it looked more as if she had turn it turned it round and then was pulling it out (prompt) possibly the tea, thing that holds them. Normally she'd have left it with a mess all over it. But I'm not sure, it could've been something else that she pushed in
- She's now putting the water int, into the tup, no, the word I was just about to say 't', pen, short, cup, cup, in the cup, and the water went in poured over her and as it moved in it was brown
- She then put milk on it

DS: She got the milk, the hot milk, they got the milk to make it hot, put the um, to make a tea, tea, little bag in there. She put milk on that

(prompt)

Overall: Doing something to make it hot, it's a tea, to offer a tea, to make a tea, to use towards tea

Sequence 4 (video b)

- You came into a place holding a whole, new, I'm not sure what it was actually, and he had a red jacket, not a jacket, a bag
- She put, he put his red bag onto the tree, not tree. The word that I'm looking for is this one (taps on table top) t t t table
- Little girl, a woman, under his black jacket, as if to be something to steal between her red um bag, looked, // she looked around and was about to take it
- Um, you then, you came into, he saw the place but the bag has gone,

Overall: You took the bag in, put into the pad, pad, table, the girl came in ready to catch it and you saw it and it was lost and he couldn't see it

Sequence 3 (video b)

- A woman is reading a newspaper, not a newspaper another one like that, // you, I believe, I think so, gently put down um on the bottom, on, on to the small table, and I think they had two um, um, very simple things which are part of the stuff over there (indicates), and they are called, I don't very often use it, (prompt) It was brown, it had a black jacket at the bottom and those.... could have been something like a bread or something, put something on it
- The girl didn't do anything any more. The cat came up and the cat was quite interesting to smell it and was hoping to get to eat it but that's it, didn't actually pinch it// there is a red jacket, red thing on the top of it
- She picks, was about to pick herself up, it shows that the thing in the bottom was a, not newspaper, but like um, the things you have in school (open and closes hands), oh dear

(indicates diary) pen, pen, pencils, actually writing on it, but they moved (prompt) She was starting to pick it up and moved up but the two things were not there, they'd gone and the cat wasn't there aswell.../// so it could well have been the cat ran out of the way and that's why you get a whooooooom (hand gesture suggesting movement of air)

- He started, he was eating it at the bottom, and he was eating the, eating the um, piece of bread

DS: Someone came in to have two of those two things, to into the, to put them on top of the table,. The girl did nothing about it, was reading a book, and the cat came to see what it is and then the girl was about to move herself further and the paper whoooooosed) and the cat has been eating some of the stuff (prompt)

Overall: Cat ate the stuff that she wanted to // as he put the meal that the girl could do nothing except go towards it

Sequence 2 (photo b)

- Do nothing, standing up seemed to be sleeping, in library, watching (prompt) Well to be honest she looked to be half sleeping, she wasn't even looking where it is
- Right she's now finded, she found what she got which is a... book, black at the top, red at the beginning and yellow bits in the middle, // and she was pulling and getting out, puutt, pull, pulling out
- The girl was going towards to get those, that, the books, the books and the girl on the other side was knocked on the things, on the bang (Stamping gesture) on the..of er, stops, the, the time, not the time, the days it's going to be g-out // and there was a girl that was a bit further on
- She's holding something which is white and getting out into another place.

Overall: The girl was apparently looking trying to what she could find. // She found, she went to the girl on the library and then she left

Session 2

Sequence 1 (video a)

- She's pulling the water into the kettle, it came to me slightly more difficult than last time,
- She's just put his coffee into the bag, not bag, the um, the um pen, tep, tung, bag. It is coffee and it wasn't before, something like a bag
- The person who put the thing into (motions holding large object and tipping) the something like a bag, little bag, probably. But you couldn't see it when you looked down now when I thought most of the things was like a girl, but it wasn't a girl
- Putting the milk onto the box, green on it

DS: Um, put some water into the bag, the bag was put it into the.....she's put the that thing (motions kettle) into, on something, now the next one she was looking to have the coffee and then she's putting milk in

(prompt)

Overall: She's putting to get something to speak, to use to, something to (does drinking gesture)

Sequence 2 (video a)

- Different girl, she was looking for it She pulled it in, not allowed to say it's the same book as last time
- She really simple to, that's to (Stamp gesture), saw what it is and went to (showed stamping gesture) // you stick it on and words, sentences, grammar (*description of stamp – words sentences grammar may be semantic error for day month year*) // , no. the girl was actually showing the thing *(probably describing the girl showing her library card. Not related to main event)* girl showing library card
- She moved from the left moved right, holding the bag, not the bag, beg, not the beg, book, on the book, (prompt) she went through into the place, in the outside (points towards the door) and went through

Overall: She's looking for a one it is, find a one, left the girl there and out,. moved on

Sequence 3 (photo a)

- The girl came along, to sit down...she sit there // He was reading // The girl was passed the stuff to eat on a platter // Little short table
- It's the girl, the fellow who's sitting there // and the cat, who jumped up to see those little thing //. Man with the newspaper was there, // and it's red, something like a red
- He was not aware of and he came along looked up in his paper and looked where he could find a little place where she put the two things
- Now sitting there and quite nicely eating the stuff and a red top on what he is sitting on, red brown, red, red

Overall: The cat is trying to eat the stuff

Sequence 4 (photo a)

- A girl had a red jacket and she was just to take It in with her bag
- She put the bag onto it's table (7 words, 1 utterance, 1 Verb phrase, 1 verb token, + 1 verb type, 0 irrelevant words, 0 embedded sentences, PUCVP 1:1)
- A fellow, a man tried, could see the bag, and he had his black top on, catching it, presumably stealing it
- Girl came in and couldn't see the whatitsname so worries, stealing it is aware that it's gone

Overall: Girl bringing in a bag, somebody stole it from her and she lost it and she realised someone else had stolen it

JH

Session 1

Sequence 2 (photo a)

- Toa, bread, it's s, t, o, r, bread, (writes word) library looking at, listen, (wf strategy)story (semantic error), story
- Taking a bu, boo, taking a story, taking a story
- Now the library, renew, 3 months, 3, three weeks (prompt) she's in the library to renew story
- Going home, going out //... taking it outside the library

Overall: Renewing the library

Sequence 4 (video a)

- Open the door, open the door d, o, o, r, door, (prompt) just walking in, walkin in, justv left in hum, just got up from maybe the library or somewhere near, taking home,// going home
- Taking home in the table, putting on the table the books, (gestures rucksack straps)... takin' it here and putting it on the table
- Someone is ta st stealing the, the the er bus (motions rucksack straps) table (semantic error), the table and she's taking
- Now she's, well it's gone, looking on the table and it's gone

DS: She's just walked in the door, sess the table she can't realise what's happed, it's gone walk out of room, man came up and stole the tab, table, then she comes back indoors and realise it's taken (prompt)

Overall: Took a table and stolen // can't realise what's happened

Sequence 1 (photo a)

- Haven't got clue, woman, bright clothes, whatever it was, I can't see
- Tape cup 'o tea (motions drinking from cup) or tea. Water, put it in, get it burned
- Pouring in a cup 'o tea, cup o' water, pouring it
- Sugar...sugar, milk (prompt) pouring milk into the coffee

Overall: Making a cup of tea...making a cup of coffee

Sequence 3 (video a)

- Looking, buying a newspaper, getting a newspaper, // got a friend but I was looking down I didn't take any notice,// another person there, another man there// (prompt) bit in the table, in the table but I don't know what it was
- C T cat is there and it's, looks like a CD, TV (prompt) the cat was jumping on the table
- Cat, stopped it, he stopped what he was reading and dropped the table down, the table down
- The cat was eating something, toast, teeth, cheeth, table

Overall: Man looking at the newspaper and someone's gone there and put onto the CD onto the table, butter, plate (writes 'plate' to confim) (prompt) // the cat then got onto the table and jumped on the, car carpet from the table som. // Stopped the newspaper to see what was happening with the cat, and then the cat jumped down on it and starting eating it, table, butter (Prompted but Unable to provide more concise overarching description.).

Session 2

Sequence 3 (photo b)

- Someone was, a girl was sitting down and a fellah was dropping two the seats and I can't see what it was but it was a person and they were landing something on the table
- The person, the girl was sitting down, and a cat jumped on the table. I still don't know what it actually is, but it's square, and I remember a little bit on myself and // it was sweets or something
- She's, The girl is looking at the table what ad happened, what the cat had done, not the cat cos he wasn't there anymore, // it was something, it was small, been stopped, no, not stopped, it was square and something had been taken off of it
- Cat was on the floor then and the table, b, u, t bikit, it's a bic, bic, a biccie, and that's what it was eating on the floor

DS: The girl was reading the paper and the man, er no, the girl, the girl was started, number one, with a girl looking at the paper, and a man was putting the table, kiki, begins b not table, a biccie, a biccie, and the cat, the girl was sitting there. It started off with the girl and the man then the next one is the table, and he C A T cat, the cat, jumped onto the cable, the table. He had been on the table bic, biccie and he'd knocked onto the table where he was eating it

(prompt)

Overall: The cat was a wrongun, the cat, had been er um,

Sequence 4 (photo b)

- Been home, man had gone with his coat, with his, working he was jump, jump, jump // gone home, fetching home
- He's laying it on the table
- Now the girl's walked in and she took the table
- Gone, realised what had happened, someone had taken it, the girl had taken the table

Overall: Someone had been and they'd taken some, stealing

Sequence 1 (video b)

- Kettle, by a tap
- Looks like it was a coffee, tea, bit in, it was pouring co cu, kettle, begins C, not T, coffee the tap was next to it (prompt) just dropping , table table (makes spooning gesture), brown and that when it makes you pour hot water in it and it makes coffee, coffee
- Pouring the kill, kettle kettle of hot water in coffee and then pouring it
- She's sending the milk er coffee

Overall: Pouring, paying a cup of coffee, drinking a cup of coffee

Sequence 2 (video b)

- Girl's staying in the library, looking at table, looking at table, not table, S T, begins S, look at, listen to a story, story, not story, that's what it was, a library and that's what she's looking to find what sort of table. Er, trying to think it begins C.
- Still searching, trying to see which one she liked and that's when in library (prompt) took it, took inside, took it off to look at

- In the library, fellah's getting the library and re re renew it renew for three weeks going into the library, and leaving

Overall: Join, looking the, getting the library to change a book

RT

Session 1

Sequence 3 (photo b)

- fourteen, fifteen, sitting down table, reading. Stand up, bird, 50/50 to in outside it's in the night, so seven or eight o'clock (prompt) A man man, sitting down the youngest, the eldest standing up, sitting down and stationery, to do with reading
- Oh I see, reading, Ah, a woman actually but it's very close, every day the news, well not the news to do with reading, around the world to do with and it's a woman actually, (prompt) sitting down, reading and a man stand up, no somewhere over to one side
- On their own this time in the winter and dark and sitting down, reading, reading but the news, not the news in the sense that
- Um, on the floor, a that size (put's hand low to the floor) to do with an animal, an animal is (Draws picture of animal with four legs and tail) not to do with that one there very old (points to dog) in and out during the night, and to do with eating, // not sort of on a plate but to do with, off white, it'snot to do with a round, it's um outside, to do with eating in the fridge/ (verbal directions) left hand side, at the top, next across (directs researcher to location of the cheese)

Overall: Well, now, the last one is a different in the sense that small and different entirely to do with a woman, sitiing down, to do with that one there (points to picture of newspaper).// So that one there, (points to cat), different entirely but at

Sequence 1 (photo b)

- In the night, in the kitchen, in the, in the kitchen right , to do with that one there (draws picture of sink) to do with that one there (points to kettle) and hot, to start with on, and up to, tea, or coffee (prompt) and to do with, a woman, in the kitchen
- A woman, to do with now off, and it's warm, very hot, in a bowl, with milk or something else (prompt) in the night to do with milk or (draws picture of spoon and something coming off it into a cup) and different sort, down the bottom of a market, 40 or 50 different sorts, mild or very strong
- That one there (points to kettle) in, in, just the same a woman, thirty, at night and after that drinking it
- Oh, yes, but um milk, to do with drinking it not yet (prompt) the last is to do with that one there (points to picture of cup) and with milk

Overall: Hot, in the evening, very hot, and drinking it

Sequence 4 (video b)

- Right, in the evening, dark outside outside to inside and you, ac (gestures bag on shoulder) very heavy, so in a minute, on the chair, but not at the moment
- At the table, standing up and off um the table (Motions removal of bag from shoulder)
- Woman, (looking?) left and right a woman and then (Gestures snatching motion) and away
- To do with, and it's gone

Overall: a man, on the table, about two minutes ago, a woman and it's missing now

Sequence 2 (video b)

- twenty to thirty, in the table, now, books, but very large so one two three four five six (gestrures shelves), down to the floor reading, reading, but different sort and I can't say yes or no to that one, but um,// university
- Out, to do with, yes and know, to do with out, now is it good, or bad
- And that's alright (prompt) to do with for two or three weeks, out to her home, in the entrance to do with for two weeks on a computer to do with // for any reason it's lost, on the computer
- To do with closed, no um, it's a woman, but it's finished.// Very large but it's finished apart from one so away at home

Overall: A university, a book and it's good, so out, you know in the entrance for two weeks and then it's outside, at home, and away, with a book (22 words, 1 utterance, 1 Verb phrase, 1 verb token, + 0 verb type, 0 irrelevant words, 0 embedded sentences, PUCVP 1:1)

Session 2

Sequence 2 (photo a)

- In a um, university //, to do with um, reading, um, very large, um, to do with, um, in the brain, to do with, since I had a stroke, um, that's alright is it, and a woman…// .a woman
- It's to do with, that's alright, and that's fine, so out, so in the entrance and um out
- So, after that do do with two to three weeks, you know, out.
- and all the way out

Overall: On loan, er, to do with in the brain, to do with one, two weeks or three weeks

Sequence 1 (video a)

- In the evening, in the kitchen, to do with, to do with, um, er that one over there look (points to area where kettle and sink and cups are) that one there (indicates direction) (prompt) Yes, cos, and then in the (points to sink and mimes holding a kettle)
- Um, yeah, to do with the one, side, over there, (indicates kettle in background) to with beside it, a cup and one…..two (accompanied with gesture of holding spoon and tipping contents)
- Yeah, pour….no so it's hot and pouring, in a cup
- And milk, milk in a cup, hot (5 words, 1 utterance, 0 Verb phrase, 0 verb token, + 0 verb type, 0 irrelevant words, 0 embedded sentences, PUCVP 1:0)

DS: Um, in the evening, in the kitchen, um, hot, um, now first though, (indicated holding kettle) them over there (indicates area where kettle and sink are), just a bit, to with um, empty so bit upwards (raises hands), you know, and then alight until very warm right, and after that, one, two (gestures spoon holding and tipping) one there and another one two (seems to indicate two mugs)
(prompt)

Overall: Is to do with grey, in the evening, it's to do with, very warm (6 words, 1 utterance, 0 Verb phrase, 0 verb token, + 0 verb type, 4 irrelevant words, 8 embedded sentences, PUCVP 1:0)

Sequence 4 (photo a)

- In, in the evening, um, in the living room, at night....er, a woman
- To do with, er, inside, in the evening right, but to do with work, um, listening, listening, // and on the side here the er, the time right (*there is a clock on the side*)and it's different,// it's not sort of home it's to do with work (prompt) It's very heavy right, on the table, and in due course, um, open
- Straight away, a woman, in the entrance, like that (motions grabbing bag handles) and away
- A woman, and it's gone, it's missing

DS: In the entrance right, is now missing from, in two minutes ago, and it's in the, in the um.....mumbling...west end right, in the afternoon for two hours right, to do with speech, and it's the same here into town, speech right, together, eight in a group together, and that's the same, except this time, away for two minutes, and when away, in and gone

(prompt)

Overall: Um, well it's to do with the case (motions holding case) and straight away (Snatching motion using left hand) and away, aswell, there's a man

Sequence 3 (video a)

- Oh, I See. Um, sitting down, a man in the evening, and on the table, and in the middle, very small, and one, two// ...sitting down, reading a paper
- Yes, a paper and a, um, one two three four, it's different to over there (points to dog in house), different sort, not that one, different sort, to do with, up the, up high, (points to the roof) and next door, over the.../// but black and, on the table right and in two minutes after that, eating
- It's gone has'nt it, it's gone already to do with eating
- On the floor, and er, two er half a minute, 'pichouo'(query inclusion), in

DS: Well, on high or low, in the kitchen, because up is easy you know, so for any reason in, out of sight, otherwise, mmmmmmm, right...very black different sort to that one (indicates dog)

(prompt)

Overall: In the evening, watching the paper, a woman, and the woman // in and out, and er, you know, it's gone,it's missing cos, you know, already, on the floor.....black

Appendix 3: Scripted Instructions read to all participants

Thank you for agreeing to help me with this experiment. I've taken some photos and made some short video clips that I'd like to show you. I'm trying to find out whether events are easier to describe if you see them in photos or on video.

I'm going to show you four scenes. Each scene has four parts. After you have seen each part of the scene, I will ask you to describe what happened. When you have seen every part of the scene I will ask you to describe what happened overall.

After you've seen two scenes, we'll have a break and I'll ask you to complete a short task. This task may provide us with additional information for the experiment but it's not as important as your responses to the photos and video clips. Please remember that this is not a test. There's no right or wrong answer. Let's do a practice run so you get the idea. You can ask me questions at any time during the practice but after that I'll be unable to answer any questions until the experiment is complete.

Ok, now you're going to look at a practice sequence. After you've seen each photo/video clip, the screen will go blank. When the screen goes blank I'd like you to describe what happened. When you've completed your description the next photo/video clip will be shown and I'll ask you again to describe what happened. Are you ready to begin?