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# Aphasia and the presence of language in dreams

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## COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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## Aphasia and the presence of language in dreams

### Abstract

A study was done to ascertain the presence of dreams and the quality of language in dreams in patients with aphasia. 24 aphasic subjects were interviewed using Kagan's (1998) Supported Conversation for Adults with Aphasia (SCA) technique of communication. The main hypothesis investigated was that aphasic patients would experience a better quality of language while dreaming than while awake. Severity being kept constant, aphasia in its acute stage displays greater discrepancy between pre-morbid and morbid language abilities than in its recovering, chronic stage. Therefore, a secondary hypothesis was formulated whereby the difference between language in waking life and language in dreams would be more significant in acute aphasics than in chronic aphasics. Thirdly, it was hypothesized that fluent aphasics would experience less dreaming, if any, since posterior lesions have been found to correlate with cessation or reduction in dreaming. *Language in dreams was found to be significantly better than language in waking life amongst the 63% of subjects who reported dreaming.* Differences in trends between the categories i) *acute* and *chronic* and ii) *fluent* and *non-fluent* aphasics, that is the second and third hypotheses, did not achieve statistical significance.

## Introduction

In his “Interpretation of Dreams”, Freud (1900/1954) argued that verbal expression in dreams was the result of a series of extractions of words or phrases from waking thoughts or conversations, re-arranged and modified in meaning. Language in dreams could therefore be equated to a verbal collage, given a reality of its own, torn from its original contexts. It seems to imply that language in dreams is not generated but remembered. The *dream-work* would thus involve memory of language rather than language production. It is suggested that the content of dreams has its origin in lived experiences. The dream world does not possess the ability to generate ideas, images and conversations independently; dreams are a reflection of waking encounters.

However, we might not ‘recognize’ an element in a dream as having a real, personal source since we are not always aware of all the information present in our knowledge store. Freud (1900/1954) argues that the dream world has a generative ability, only to the extent that it enables the exploration of competence or knowledge that is either underestimated or inhibited by conscious awareness. The above function is not always understood by the conscious mind and is experienced as a fantastical event like the reported ability to speak foreign languages in dreams (Vaschide, 1911 as cited in Freud, 1900/1954).

Hidden or downplayed skills in waking life are thought to emerge as proficient in dreams (Freud, 1900/1954). This greater fluidity of one’s abilities could be extended to language use in some aphasics whereby hesitant, effortful speech in waking life could be experienced as more fluent in dreams. Also, the dreamer is thought to engage in ‘conversations’ without any “acoustic or motor accompaniments” (Freud, 1900/1954, p.420), which are comparable to thoughts in waking life. The sort of inner speech Freud seems to refer to does not require actual auditory or motor processing but an ability to think in words. The psychological implications of aphasia summarized as a disconnection between the *knowing* and the *doing* of language (Teuber, 1964) suggests that aphasics

would retain their ability to experience language in dreams given they retain the inherent *knowledge* of language.

Waking activities are action- oriented whereas dreams are geared towards perception as hypothesized by Freud (1900/1954). The dream process and its underlying mechanisms would hence enable the perception of language. Impaired performance of language is unlikely to affect the perception of language, as supported by the evidence of the presence of language in dreams of aphasics (Solms, 1997). Dreaming amongst aphasics can be paralleled with dreaming in some blind subjects. It has been observed that in cases where blindness occurred after the age of 5 to the age of 7, visual dream imagery persisted, eventually fading with time (Broughton, 1982). It is hypothesized that in the case of dreaming aphasics, language in dreams would be retained as they recover some or all of their language functions. The observation of visual dreams in blind patients and of verbal imagery in aphasic patients seems to imply that dreaming has its sources, at least partly, in the individual's long- term memory store.

## **1. Theoretical framework**

### **1.1. The quality of language in dreams**

Language defined as “conversation, speaking, talking, verbal activity” by Meier (1993) who studied 500 dream reports from REM awakenings, is thought to be present in 2 out of 3 dreams in normal subjects and 4 out of 5 dreams have been observed to include some form of linguistic utterance including self- talk. Snyder (1976) found that 86% to 100% of medium to long dream reports included conversation.

With regards to the semantic and syntactic aspects of language, language in dreams has been observed to be competent. “A main characteristic of dream speech is the general lack of language disturbances” (Meier, 1993, p.66). This claim is further supported by Snyder's finding that 99% of dream dialogue was grammatical (Snyder, 1976). The dreamer is generally a participant of the verbal activity (79.1%) and the main initiator of conversations. Dreams appear to be communicative whereby language occurs mostly

within the context of social interactions between the dreamer and other characters in the dream plot. The other characters are mostly known by the dreamer and include partners, friends, relatives, colleagues and acquaintances. Only 5 to 15% of dream dialogue is reported by dreamers as being absurd by wakeful standards (Heynick, 1985). Meier (1993) reports as little as 3.4% of verbal utterances in dreams as being bizarre, illogical or uncharacteristic of the dreamer.

Furthermore, Freud's theory of dreaming termed the "replay hypothesis" by Heynick (1985), has been challenged by the finding that only 10% of dream dialogue are attributed by the dreamer to speech uttered or heard during wakefulness (Heynick, 1985). From the evidence at hand, it would not be too bold to infer that dreams could involve linguistic generation. Given the significant presence of language in dreams and its involvement in constructing the dream plot, the question arises as to whether individuals such as aphasics, suffering from "language disturbances", dream and if they do whether or not their "language disturbances" contaminate the quality of the "verbal activity" in their dreams.

## **1.2. Aphasia and cessation of dreaming**

### **1.2.1. Anatomical correlates**

Brain structures work in coordination in regulating language. However, language deficits are usually highly localized. Left-hemisphere lesions in the inferior pre-sylvian region and the superior temporo-parietal areas have been identified as the anatomical correlates of most aphasias in right-handed individuals (Epstein, 1984). Dreaming can be described as consisting of visual information supplemented by thoughts, phrases and words that give meaning to the images produced. Words are produced as the dream plot unfolds but are also borrowed from recent and remote waking experiences. The meaning of words and the knowledge of their relationship with other words are thought to be accessed from semantic memory (Tulving, 1972; Epstein, 1984; Cicogna et al, 1986; Cavallero & Cicogna, 1993; Baylor & Cavallero, 2001).

The traditional view that global cessation of dreaming should be a direct consequence of aphasia stems from two beliefs: firstly, that the loss of memory for words or the inability to name objects would hinder the interpretation of visual imagery and hence the creation of an integrated dream scenario (Dorricchi & Violani, 1992); secondly, that cessation of dreaming occurred predominantly with left- hemisphere damage (Anan'ev, 1960; Broughton, 1982, Doricchi & Violani, 1992; Eipstein & Simmons, 1983; Foulkes, 1978; Jakobson, 1973; Moss, 1972; Zinkin, 1959). Cases of loss of dreaming following right- hemisphere damage have been reported, challenging the belief of hemispheric lateralization in cessation of dreaming (Murri, Arena, Siciliano, Mazzotta & Murarorio, 1984; Murri, Massetani, Siciliano, Giovanditti & Arena, 1985; Solms, 1997). In a study done by Solms (1997) on the incidence of non- dreaming, as many as 33% presented with unilateral right- hemisphere damage were reported, 42% being left- hemisphere patients and the remaining 19% resulting from bilateral damage. If aphasia in itself were to be the cause of non- dreaming, then right hemisphere damage in right- handed patients should never result in non- dreaming (Solms, 1997). More importantly, experiments by Buzare and Wainsbourg (1983), Cathala, Laffont, Siksou, Esnault, Gilbert, Minz, Moret-Chalmin, , Murri et al (1984) and Schanfald, Pearlman and Greenberg (1985) demonstrated that aphasics possessed the ability to dream, recall their dreams and to formulate ideas in their dreams, despite their difficulties while awake.

### 1.2.2. Aphasia and the mechanics of visual imagery and its implications for dreaming

Although aphasia per se does not cause cessation of dreaming, damage to the left hemisphere generally does seem to impair image processing or imagery. In an experiment testing the process of imagery in two aphasic patients, one Broca's and one Wernicke's, against a group of normal subjects, Kosslyn, Berndt and Doyle (1985) observed a significantly slower rate of generation of the target picture, difficulty with keeping the image input in memory for a long time and a slower rate of scanning (the ability to rotate an image mentally) on the part of the aphasics, despite their advantage over controls of rehearsing the task beforehand.

Imagery involves describing the component parts of an image and perceiving how they are interconnected, in order to form a coherent whole. Images are best maintained in working memory if verbal strategies are available to preserve the visual patterns within the complete image. In other words the relation of visual parts needs to be rehearsed in order for a scene to be remembered. This rehearsal involves sound language use, whether silent or spoken. Therefore, although some aphasics can accurately piece the parts of a scene together and remember the end product, the construction and storage of images seems to be relatively taxing on all levels of processing. One could infer that this disability could affect dream imagery to a certain extent whereby one would expect dreams of aphasics to be relatively scarce, less vivid and thought-like. This tentative assumption could be used to explain the reduced frequency of dreaming in aphasics as reported by Dorrichi and Violani (1992) and the misleading association of aphasia with non-dreaming.

### 1.2.3. The recall of dreams and its implications for the functions of dreaming

Dream reports rely on the recall of dreams, however, awakening itself involves memory impairment, compounded by time elapsed and confounding post-sleep events, without the aid of proper rehearsal of the dream events by the working memory. The neuropsychology of mental activity during sleep is mostly challenging in terms of the methodological difficulties of testing. The reporting of events in wakefulness requires the encoding of these events. In other words, the meaning and context of events, in relation to already existing knowledge and experience, need to be processed, rehearsed and subsequently stored in long-term memory for future access or retrieval. Sleep makes this consolidation process difficult (Broughton, 1982; Dorrichi & Violani, 1992).

Cohen (1981) has argued that better memory is associated with REM sleep rather than better dreams. He argues that dreams are more likely to be remembered following REM awakenings than when subjects are awakened from non-REM stages of sleep. This does not mean necessarily that dreams are more frequent and vivid during REM sleep; it just shows that better consolidation of the memory of our dreams occurs during this stage of sleep. It is believed that a short-term memory (STM) trace lasts for a few seconds only.

The dream cannot be adequately rehearsed before being transferred to long-term memory, in a form that can easily be retrieved. The probability of a person successfully retrieving this partially or differentially encoded dream is maximal if aroused when its content is still in the STM store, in other words just after REM sleep, a phase of heightened cortical activation. The above described Activation Retrieval Model (Koulack & Goodenough, 1976 as cited in Rosenblatt, Antrobus & Zimler, 1992) implies that remembering dreams is a fragile process that requires either timely awakening or effective cueing especially in the case of memory-impaired stroke patients, which most of our participants qualify as.

However, some stroke patients, including aphasics are able report dreaming. This brings us to the issue of the function of dreams. We cannot as yet aspire to answer the question as to why, in light of all the evidence casting dream recall as a near miracle, brain damaged patients with some memory and language impairment, retain the ability to remember their dreams. We can speculate that perhaps human beings *need* to remember at least some of their dreams. According to Michel Jouviet (1972 as cited in La Berge, 1985), dreams serve to test genetically- programmed behaviors without the consequences of overt motor responses. In the case of aphasics, the practice of language in dreams without the consequences of overt dialogue with others, could partly be to provide the individual with a safe platform for expression, protected from judgment, whether his own or others'. The suggestion that dreams allow for the exorcism of certain fears is in line with Freudian theory of the function of dreams. The 'deviant', 'shameful' element for aphasics would be their language disability that is deemed risky or inappropriate when exposed in waking life. The dream work could be thought to resolve their conflict and fulfill their wish by enabling them to generate normal language.

### **1.3. Towards a tentative explanation of non- dreaming**

Non-dreaming has been argued to be more closely connected with visuo-perceptive deficiencies than with language disabilities alone. The disruption of the pathway that translates words into images, a disconnection between "verbal and visual signals", is what is believed to cause cessation of dreaming (Cathala et al, 1983; Jakobson, 1973 in Goodglass & Blumstein; Murri et al, 1984; Pena- Casanova, Rovira, Bermudez &

Tolosa- Sarro, 1985). Pena-Casanova et al (1985) describe a case of non- dreaming in a patient diagnosed with “optic aphasia” or anomia, differentiated from classical forms of aphasia in that the patient had neither receptive nor expressive language difficulties and from visual agnosia. The authors attribute this presentation to a deficit of semantic memory whereby the patient cannot access the words associated to the visual stimulus at hand and term it “visuoverbal disconnection”. They propose that this “visuoverbal disconnection” rather than aphasia per se, is an underlying cause for cessation of dreaming (Pena- Casanova et al, 1985). The literature seems to point to a correlation between non-dreaming and specific lesion sites, namely tempero- occipito-parietal lesions and deep bilateral frontal lesions (Dorrichi & Violani, 1992; Solms, 2000; Kaplan- Solms, 2002). Aphasia seems to be the ‘extraneous’, third variable in the equation and not a cause of non-dreaming. As we will see, all aphasias do not lead to cessation of dreaming and not all aphasias involve the kind of memory impairment referred to above.

In some cases, the quality of the aphasic syndrome might include the malfunctioning of an element essential to the dream process. In other words complex language processing and dream work share some key components, the disruption of which may lead to cessation of dreaming as opposed to any impairment of language. Kaplan-Solms and Solms (2002) emphasize the notion that language is a multimodal operation consisting of a motor, a sensory, an auditory and a kinesthetic component. Cessation of dreaming is more likely to result from a failure in the auditory or visual modality of language than from the motor modality of language. Therefore, fluent aphasics with auditory processing difficulties would be more likely to report non- dreaming than non- fluent aphasics who suffer predominantly from a breakdown in the motor modality of language.

The deduction that the inability to generate language should result in the inability to dream is based on three assumptions: firstly that dreams are reducible to “self speech”; secondly, that the inability to generate language leads to the absence of thought; and thirdly that the mind can be mapped accurately and fixedly on parts of the brain. In the light of evidence regarding the quality of language in dreams, it is clear that language in

dreams involves more than self- talk. Most dream verbalizations involve conversations between the characters of the dream plot (Meier, 1993). Aphasics range in terms of presentation and severity and a lot of aphasics demonstrate a level of comprehension that cannot be reflected by the quality of their verbal output (Jackson, 1915 in Wepman, 1951). The phenomenon of semantic paraphasia is evidence that thought is present in the aphasic subject. The notion that aphasics would retain the ability to generate normal language in dreams (Solms, 1997) indicates that brain states are not equal to mind states; it points to the difference between the concept of a correlate and a tautology.

#### **1.4. Aphasia and the Activation- Synthesis Model (ASM) of dreaming**

The basis of Hobson and McCarley's (1977) *Activation- Synthesis Model (ASM)* of dreaming is the strong correlation observed between REM- sleep and the incidence of dreaming. The theorists initially equated dreaming to REM sleep, proposing that dreaming required a *higher level of cortical activation* which distinguishes REM sleep from other stages of sleep and approximates waking consciousness, in order to be processed. The source of this "higher level of cortical activation" lay in brainstem activation. "... reticular, vestibular and oculomotor neurons in the pontine brain stem" (Hobson & McCarley, 1977, p.1347) are thought to generate endogenous information that are left to be interpreted by the cortex. The information released is random and the cortex simply attempts to extract some meaning from the chaos. The authors use the bizarreness of dreams to illustrate the cortex's attempt to make sense of nonsense. Specific parts of the cortex responsible for different forms of perception interpret different aspects of the information, for instance, the 'language center' of the brain would give a verbal dimension to the dream being produced. A malfunction in any one 'subsystem' of processing would be reflected in the quality of the dream produced. According to the *ASM* dreams of aphasics would be devoid of any verbal imagery. The presence of language in dreams of aphasics challenges this model of dreaming and mental functioning.

#### **1.5. A different perspective on brain functioning and of mechanisms for dreaming**

The *ASM* has been the object of a lot of controversy in light of the massive data collected

by dream researchers on the presence and quality of dreams in terms of REM/NREM differences, content, cortical damage and developmental stages in children.

The model's reliance on a state- dependent theory of dreaming whereby dreams are merely by- products of Rapid Eye Movements sleep induced by the brain stem has seriously been challenged by the evidence of dreams in non- REM sleep (Foulkes, 1978; Solms 1997, Solms, 2000) and of their qualitative similarity with REM dreams when controlled for length of dream reports (Cicogna et al, 1986; Cavallero & Cicogna, 1993; Baylor & Cavallero, 2001). The presence of dreams in non- REM stages of sleep challenges the notion that high levels of cortical arousal during sleep are required for dreaming to take place. As mentioned earlier, better remembering of dreams is what requires high levels of cortical arousal (Cohen, 1981).

Data, in the form of thousands of collected dream reports, reveal that dream sources are unlikely to be random; they can easily be traced by dreamers and are qualified as bizarre or illogical only some of the time (Heynick, 1985; Meier, 1993; Domhoff, 2000). The idiosyncratic nature of the content of dreams, coherent in terms of plot and grammar, consistent with the dreamer's emotional preoccupations and constant along an autobiographical time- line with some dreams being recurrent (suggesting selectivity and motivation in the production of some dreams), implies a more sophisticated and volitional system of dream generation than a purely automatic and physiological one.

The study of the dreams of children by Foulkes (1982; 1999) has revealed that the frequency and complexity of dreams in children correlated with more advanced visuo- spatial skills, a result of cortical development. The *Activation, Input Modulation (AIM)* model of dreaming (Hobson, Pace- Scott & Stickgold, 2000), which is a revised version of the *ASM*, acknowledges a more significant cortical involvement in the dream process. Dream sources or *input* are thought to be shaped, *modulated* by the cortex in a more intentional rather than simply integrative manner. However, this improved version still attributes dreaming to pontine brainstem mechanisms and fails to account for non- dreaming in patients with cortical- lesions as revealed by Solms' s (1997)

neuropsychological investigations of anatomical correlates of cessation of dreaming. Furthermore, loss of dreaming in patients with pontine lesions has not been successfully demonstrated (Feldman, 1971).

A top- to- bottom system of dreaming is proposed by Solms (2000), where information from the forebrain (deep bi- frontal white matter) is projected backwards onto the perceiving posterior brain (occipito- tempero- parietal gray matter). The structures in-between, responsible for motor activities, are inactive during dreaming. The process is reversed in waking life whereby input from the environment is received by the perception centre, sent to the motor centre for the execution of appropriate action. In dreams, the input is mostly internally- generated and needs only to be perceived and not acted upon. The presence of language in the dreams of aphasics is consistent with the idea of alternatively active brain pathways during dreaming in contrast to waking life (Solms, 1997).

## **2. Rationale**

### **2.1. Dreaming and memory**

Dream researchers define memory and its relationship with dreaming as “the knowledge representations reprocessed during dreaming and the ‘sources’ of dream imagery (Baylor & Cavallero, 2001). Research on memory sources of dreams relies on Tulving’s (1972) dichotomous “organization of memory” into episodic versus semantic memory (Baylor & Cavallero, 2001; Cavallero & Cicogna, 1993; Cicogna, Cavallero & Bossinelli, 1986).

Tulving (1972) describes semantic memory as a “mental thesaurus” “necessary for language” (p.386). It refers to the organized knowledge of words, their meaning (hence the notion of *semantic* element of language), their relationships with other words (in other words *grammar* or *syntax*) and ideas. Semantic memory is thought to have the function of transforming information about concepts into language. It constitutes our general knowledge of the world and of others. Episodic memory on the other hand, refers to autobiographical events that have a fixed temporal and spatial context, episodes that draw a continuous timeline of experiences in an individual’s life (Baylor & Cavallero, 2001).

Hence a person's remembrance of personal identity and their sense of continuity relates to episodic memory (Tulving, 1972).

Research has demonstrated, through the method of free- association, that the content of dreams has its sources both in semantic and episodic memory (Baylor & Cavallero, 2001). In other words, different memory sources form the basis of dreams. Besides the memory of recent and remote events, combined with the knowledge of language and rules of the world, dreams also contain self- reflection. "Abstract self- references" are expressed in dreams in terms of the dreamer's knowledge of his or her habits, preferences, wishes and anxieties (Baylor & Cavallero, 2001; Cavallero & Cicogna, 1993; Cicogna et al, 1986). Reports of dreams almost always relate dream scenarios that are meaningful within the context of the dreamer's life and emotional preoccupations, consistent over time and coherent in form. The sources of dreams can be traced quite easily by the dreamer, from his or her own long- term memory. They are rarely exogenous in nature, and when they are they still undergo transformation so that the use or memory of them is a unique interpretation of the input, translated into the individual's "schemic mental language" (Cavallero & Cicogna, 1993).

The reason for studying the dreams of aphasics lies in the reasoning that the language sources of dreams are accessed from the dreamer's semantic and episodic long- term memory and that only the perception and not the performance of language is required for it to acquire reality in dreams. It is hypothesized that the *knowledge* of grammar and of the meaning of words (semantic memory) remains intact although it might be inaccessible in waking life in those aphasics who retain the ability to dream. Secondly, it is hypothesized that recovering chronic aphasics, should report less of a gap between the quality of their waking language and that of their dreams, since their language abilities in waking life would be relatively closer to their pre- morbid language abilities, in contrast to acute aphasics who are at the peak of their language dysfunction.

## 2.2. The etiology of aphasia and its relationships with dreaming

Aphasia can be understood as a clinical term designating the inability or disability to

process or decode the meaning (semantics) or structure (syntax) of language (Benson, 1985; Solms, 1997). The original division between Broca's motor aphasia and Wernicke's sensory aphasia has a localizing function, attempting to map the different types of aphasias on a continuum from the anterior cortex to the posterior regions of the brain, different sites of neurological damage resulting in varied clinical presentations. We propose to approach aphasia from its clinical presentation first and then infer its possible location in each case. Geshwin (1971) proposed that aphasics could be observed as being either *fluent* or *non-fluent*. Patients can thus be categorized by assessing the quality of their speech output.

“Verbal fluency is the ability to produce flowing, smooth speech without word-finding pauses.” (Devinsky, 1992, p. 92). In the case of *non-fluent aphasics* speech is sparse with as few as one word per response and an average of less than 50 words per minute. It is hesitant, effortful, telegraphic, dysprosodic and is often accompanied by dysarthria. *Non-fluent aphasics* struggle with repetition of complete sentences despite demonstrating relatively preserved comprehension (Benson, 1985; Goodglass & Kaplan, 1983; Saffer, 1998).

*Fluent* aphasics generally speak with normal prosody and articulation; their phrase length is normal (100 to 200 words per minute) and sentences contain appropriate grammar but lack substantive words to make them meaningful to the recipient, hence the terms ‘empty speech’ or ‘word salad’ to describe *fluent* aphasic speech. Comprehension is generally poor (Benson, 1985; Goodglass & Kaplan, 1983; Temlett, 1998).

Motor deficits are an important factor in distinguishing between *fluent* and *non-fluent* aphasics. It is estimated that *non-fluent* aphasics have hemiparesis in 80% of the cases and often present with ideomotor apraxia (Benson, 1985; Saffer, 1998). *Fluent* aphasics on the other hand, tend to suffer from loss of sensation, which brings us back to the original motor/sensory divide in the classical categorization of aphasia. The *non-fluent*, motor type of aphasia would be localized anterior to the Rolandic fissure (central sulcus) while the *fluent*, sensory type of aphasia would be the result of posterior lesions. The

distinction between *fluent* and *non-fluent* aphasia is crucial to our study as cessation of dreaming has been found to correlate with posterior damage (Dorrichi & Violani, 1992). It is tentatively hypothesized that non-dreaming would be more prevalent amongst fluent aphasics with posterior lesions.

In Broca's aphasia, it is mostly the motor component of language that is impaired, the rest being relatively spared. It would seem that the ego does not rely on this motor aspect in order to function; verbal thinking, inner speech or internal verbalizations still occur despite a breakdown in the output channel of language. Some Broca's aphasics have reported dreams whereby they were represented as their undamaged, pre-morbid selves with motor handicap neither of the limbs nor of language (Solms, 1997; Kaplan-Solms & Solms, 2002). On the other hand, aphasic syndromes of the "acoustico-mnemonic" type (Luria, 1947 as cited in Kaplan-Solms & Solms, 2002) appear to be accompanied by cessation of dreaming. This kind of aphasia is fluent and characterized by the inability to hold audio-verbal material in memory. The subject here is unable to find words to describe thoughts, so that it feels like an inability to think altogether.

From a psychological point of view, there appears to be a relationship between the ability to dream and the preservation of the image of the undamaged self in memory, which motivates our comparison of acute with chronic and fluent with non-fluent aphasics with regards to their differential connectedness with an unbroken self.

### **3. Method**

#### **3.1. Sample**

Twenty-four aphasic patients (13 in the acute stage and 11 in the chronic stage) were drawn from four speech therapy private practices and three hospitals namely, the Conradie Care Centre, Booth Memorial Private Hospital and Groote Schuur Hospital.

It has been argued that spontaneous recovery levels off within the second year after neurological brain damage and is replaced with more compensatory coping mechanisms as a result of new learning, in other words when memory functions are

relatively recovered (Lezak, 1995). Hence, the cut-off period used to categorize the stage of aphasia was of two years with subjects suffering from aphasia for less than two years being classified as *acute* and those with aphasia for two years or more were classified as *chronic*. Subjects were selected according to the following criteria:

- a) The ability to give informed consent, indicating a reasonable level of awareness and autonomy.
- b) The diagnosis of aphasic syndrome made by each subject's speech therapist was verified by neuropsychological assessment following Goodglass and Kaplan's Boston Diagnostic Aphasia Examination (BDAE) guidelines and using components of other test batteries as well. For instance, subjects were tested for comprehension using the Token test (Boller & Vignolo, 1966; De Renzi & Vignolo, 1962) and the Cookie Theft picture test (Goodglass & Kaplan, 1983); they were asked to write their names and short sentences to test for aphasic symptoms which generally extend to various modalities of expression such as writing and reading.

The main objective of the neuropsychological assessment was to identify truly aphasic subjects able to give reliable accounts of their experiences. This objective potentially led to more non-fluent aphasic cases, with relatively milder comprehension difficulties than their fluent counterparts, to be included in the sample.

In terms of the *type of aphasia* they suffered from, subjects were classified as fluent or non-fluent aphasics. As mentioned in the rationale section (Etiology of aphasia) of the literature review, the fluent and non-fluent dichotomy encompasses most aphasias and provides a point of consensus amongst the various ways of classifying aphasia. Its usefulness in research and its validity in categorizing patients have been confirmed by various studies (Benson, 1967; Kerschaneiner & Hartje, 1972; Wagenaar, Snow & Prins, 1975). Secondly, verbal fluency as a component of aphasic syndrome relates directly to the experience of language which is the focus of the present study.

### **3.2. Instruments**

A *semi-structured interview*, based on a questionnaire developed by Mark Solms (1997) evaluating the quality of dreams in patients (N= 361) since the onset of their neurological illness, was conducted. The questionnaire and consequently the interview procedure used a neuropsychological approach to obtain a qualitative and clinical perspective on the dream experience as affected (or not) by illness, in this case aphasia. The interview schedule was adjusted to focus on some of the variables assessed by the questionnaire, such as: quality of sleep, presence of dreams, frequency of dreams, the effect of medication on sleep and dreams, presence of language in dreams and the ability to distinguish between dreams and real experiences. The questions were required to be repetitive to ensure consistency in terms of the patients' understanding of the subject matter. Language was defined by the ability to produce speech, to communicate using gestures, to write, to point to relevant objects, to respond to yes and no questions and to comprehend verbal commands and requests from one's social environment, in other words the ability to exchange thoughts and intentions with other people.

The objectives of the interview were summarized in the form of a six- question questionnaire (see Appendix A) enabling subjects to rate their language numerically on a 5- point Likert scale, according to the criteria discussed during the interview. The questionnaire had two subsections: Awake and Dream which were scored separately. The section AWAKE referred to the subject's language ability in waking life while section DREAM referred to their language ability in dreams. The questionnaire made use of pictographs, line scaling and numbers to ensure response consistency. Each element was shown to the subject in isolation so as to limit the input the aphasic person has to work with; great caution was taken not to overload subjects with symbols and conflicting, confusing material that could detract attention from the focus of the investigation.

The interview exercise and the summary questionnaire were designed taking specific disabilities that often accompany aphasia into account. Note that only those deficits

that were judged to have direct effects on communication between the interviewer and the aphasic interviewee were considered. The disorders mostly encountered with the effective sample were:

- i) *Number blindness (alexia for numbers)* or the “inability to recognize numbers presented visually” (Wepman, 1951, p. 187) was countered by verbalizing the number while pointing to it on the scale, providing a spoken and written verbal equivalent to the number, in the form of a short phrase. For example, score 1 of the Likert scale was associated to “very difficult” output of language and score 5 was equivalent to “very easy” production of language. Furthermore, pictographs were used to supplement the content with an emotional equivalent. A happy face was placed next to the phrase and number indicating total ease with language and a sad face was placed next to score 1 which indicated the most serious level of handicap, as experienced by the subject.
- ii) In cases of *alexia*, the questionnaire was administered verbally.
- iii) *Word deafness (audio- verbal comprehension difficulty)* or the difficulty in understanding spoken language (Wepman, 1951), was the most challenging of all the aphasic disorders from a methodological point of view. To ensure the validity of the investigation at hand, it was crucial that each subject could accurately *receive* the meaning of each request. Hence only those aphasics, who demonstrated the ability to appropriately and consistently respond to the interviewer’s probes on the history of their aphasia during the preliminary interview, were included in the study. The interviewer uttered short sentences or single words while pointing to a relevant picture or body part; used gestures like the thumbs up to confirm understanding, facial expressions relating to anger, sadness and satisfaction were used; ‘yes’ and ‘no’ questions were utilized to limit the complexity of the questions and because often ‘yes’ and ‘no’ have been observed to be amongst the few words preserved by the aphasic subject in very severe and/or acute cases (Critchley, 1970).

- iv) Questions were followed by their negatives to ensure consistency and to counter *perseveration* (Lezak, 1995). The same questions were phrased differently and were asked at different moments during the interview; questions on the subject's daily experiences and relationships were employed as distracters to avoid response set.
- v) *Motor aphasia* or the inability to say what one desires compounded by the difficulty in directing one's thinking (Wepman 1951), is the epitome of the disconnection between the knowing and the doing of language, mentioned in the introduction section of this paper. Again 'yes' and 'no' questions were employed since they did not require the subject to articulate many words but more importantly they did not pressure him or her to find the 'right' words. 'Yes' and 'no' were printed out and the subject was required to point to the relevant response. Written words were shown to subjects without alexia to which they were required to nod in approval or shake their head depending on whether the word was relevant to their experience. In cases where vocabulary was quite inaccessible, the subjects were asked to supplement their 'yes' responses with a thumbs up and by pointing to the relevant facsimile to ensure comprehension and that what was being uttered was in fact the output desired by the subject. An interesting observation with non- fluent aphasics was that often the subject would show reluctance to partake in the interview and would limit responses to one word. The interviewer found that engaging with such subjects on their personal interests, their daily challenges and their loved ones tended to 'bring them out' and lead to greater participation. See *Appendix A* for a sample of an interview.

### **3.3. Procedure**

Each patient was first approached by their speech therapist and was briefed as to the topic of the study, without the disclosure of the hypothesis.

The researcher was then informed of their case history in order to direct the approach in communication.

Written consent was obtained from subjects. They were assured confidentiality and the possibility to withdraw from the exercise at any given point. The aphasia- friendly consent form also served to explain the aim and nature of the study to the subjects, ensuring full comprehension of the study's objectives and requirements (*see Appendix A*). The entire process of obtaining informed consent was audio- taped and verbal confirmation of consent was recorded to validate the written document.

A detailed history was taken from each subject where they were required to describe their ailment and provide the history of the onset of their aphasia, their feelings about their deficit, their perception of the severity of their language disorder and how it was affecting their relationships with other people and their daily activities. The aim of the history- taking also had the function of generating spontaneous speech, the quality of which would enable the assessment of fluency, in terms of which the subject was essentially classified. This was done in retrospect by replaying the recorded interview. The raters counted the number of words uttered per minute (Non- fluent <50 words/minute and fluent = 100- 200 words/minute) and assessed the quality of output generated, in reference to grammar, paraphrasias, word finding difficulty and circumlocution (Benson, 1985).

Subjects were then interviewed about their experiences of dreaming in terms of frequency, of emotional quality (pleasant or unpleasant), characters present in their dreams, subject matter of the dream and lastly, thoughts and conversations within the dream. They were asked to relate the last dream they could remember while accounting for the key elements mentioned above.

Different tools of Supported Conversation with Adult aphasics (SCA) (Kagan, 1998) were used in accordance with each subject's prominent area of language difficulty as explained in the previous section. Individual compensatory techniques already negotiated within the context of speech therapy, were used by the researcher in an attempt to tailor the interview to the subject's abilities and hence to maximize on

effective communication. The researcher was aided in this task by the speech therapist and family members.

The SCA (Kagan, 1998) technique of communication comprises a set of skills and resources which aim at customizing conversation in a way that makes sense to the individual aphasic person. The technique uses pictographs relating to personal experiences and activities of daily living. It was also used as a guideline to the design of the questionnaire and of the consent form.

The short questionnaire was administered after the interview session.

Some participants were interviewed more than once, at weekly intervals to ensure consistency in their responses.

### **3.4. Data recording and capturing**

*Stage of aphasia:* patients diagnosed as suffering from aphasia for less than twenty-four months were classified as “acute aphasics” and patients with aphasia for twenty-four months or more were classified as “chronic aphasics”.

*Type of aphasia:* The “percentage of perfect agreement approach” (Domhoff, 2003) was used to obtain good inter-rater reliability in categorizing patients in terms of *type of aphasia*. Two blind raters, together with the researcher, assessed the patients for fluency. The three raters listened to each recorded interview separately and made their clinical judgment according to the criteria proposed by the Boston Diagnostic Aphasia Examination or BDAE (Goodglass & Kaplan, 1983). The percentage of perfect agreement is calculated by taking the total number of agreements across all raters and dividing it by the total number of agreements plus the total number of disagreements, in other words the grand total and multiplying the figure by 100. Raters in this particular study agreed on 19 cases out of 24 which results in a 79.2 % agreement. The 5 cases that did not generate perfect agreement were deliberated and consensus was reached before the final classification.

*Report of dreaming:* Participants were asked if they dreamt or not; if not a) they were asked if they dreamt before their stroke and were required to relate their last remembered dream and to locate it in time, if yes b) i) how often they dreamt within the period of a week, ii) whether they dreamt more frequently or less since their stroke, iii) whether or not they could speak in their dreams, remember conversations within a particular dream and relate the thoughts they experienced during the dream and finally iv) whether they could express themselves normally in dreams, finding the right words, speaking fluently with their thoughts flowing clearly, in other words whether or not their aphasia disappeared in their dreams. A percentage of perfect agreement (Domhoff, 2003) was calculated for the reliability of the subjects' understanding of the key concepts (dreaming and language in dreams) and of their subsequent accounts. Raters agreed that the accounts were valid in 95.8% (23 out of 24) of cases. The one subject whose account cast doubt on his understanding of the subject matter was re-interviewed after a period of two months. He was more responsive and used more words to communicate his thoughts. The second interview was judged valid.

The presence of non-aphasic language in dreams was assessed through the subjects' account of their last dream or most recent memorable dream. They were probed with questions such as "who else was in your dream?", "how did you feel?", "what did you say to him?", "did you talk to him?", "what did he say?", "so you shouted out to him?", "you heard him apologize for dying?", "difficult to speak for you (interviewer using slow, widely articulated speech with hand over mouth)" ... waiting for confirmation ... "but you told him not to leave, you were sad, you missed him?...waiting for confirmation ... to which the subject responded "yes, yes ... I told.. to wait for ... I.. me". "Right now you can't find words, was it difficult speaking to him?" to which the subject responded "no, no, I was young ... he was at my school you know ... he told me 'don't cry, I'll take you with me'" after which, the subject broke into tears. Subject W, a non-fluent chronic aphasic (25 months) with considerably effortful and somewhat telegraphic speech, had been widowed 3 years prior to her stroke.

*Evaluation of language:* Participants were then required to allocate a score between 1 to 5, 1 being very poor and 5 being very good to 1) their output of language, 2) their ability to understand language in its spoken form, as related to them by others and 3) their strategies to convey thoughts and intentions verbally, in writing, by pointing or by using gestures: i) while awake and ii) in their dreams. Sections i) and ii) were scored separately with the maximum score amounting to 15 and the minimum possible score being 3.

### **3.5. Data analysis**

A) *The presence of dreams:* The proportion of dreaming subjects versus the proportion of non- dreaming subjects was contrasted diagrammatically using a pie chart. The distribution of non- dreaming aphasics within the sample was compared to a normal distribution of non- dreaming neuropathological patients in general (extracted from Solms, 1997).

B) The interaction between the *stage of aphasia* (acute versus chronic) and dreaming and the interaction between the *type of aphasia* (fluent versus non-fluent) and dreaming were analyzed using a classical 2 x 2 Chi-square framework, applying Yates Correction to the analysis. Due to the small sample size multivariate techniques could not be applied meaningfully and thus clinical description was relied on to supplement the formal statistical analyses. However, the choice to work with a small sample was maintained in order to generate more in- depth data, rich with case- specific experiences of the malfunction of language. Recurrent themes raised by subjects and particular trends identified in both the experience of dreaming and non- dreaming were reported to supplement the formal statistical analyses.

C) *Quality of language* was measured by comparing the means of the two categories i) 'Language Awake' and ii) 'Language in Dreams'. The difference between means was analyzed using a t-test. The discrepancy between Language Awake and Language in Dreams was then controlled for a) *stage of aphasia* (acute and chronic) and for b) *type of aphasia* (fluent and non-fluent), using t-tests.

### **3.6. Ethical Considerations**

The research was conducted with ethical oversight by the Department of Psychology Ethics Committee and the Groote Schuur Ethics Committee. In cases where patients were still hospitalized or were residing in retirement homes, approval was granted by the respective institutions (Conradie Care Centre, Booth Memorial hospital, Highlands's old age home and Monte Rosa old age home) on submission of a formal application letter. Participation was voluntary. Informed written consent or verbal, tape-recorded consent was obtained from participants prior to questionnaire administration, with spouses or/and speech therapists as witnesses. A translator was present in cases of bilingual but primarily Afrikaans speaking participants to ensure more accurate representations of their verbal accounts. All information was treated as strictly confidential.

## **4. Results**

### **4.1. The presence of dreams (N=24)**

Of the 24 aphasic subjects, 15 reported dreaming, 7 reported having stopped dreaming since their stroke and 2 state that they are unsure as to whether they dream or not but cannot recall their dreams. It was necessary to confirm that aphasia per se did not cause cessation of dreaming, that some aphasics did in fact retain the ability to dream and recall their dreams. As is illustrated below in figure 4.1.1, 63% of the aphasic subjects reported dreaming as opposed to 29% who reported non- dreaming and 8% who were unsure. Figure 4.1.2 represents non- dreaming amongst control subjects, patients with no neurological damage. 1 (3%) of 29 subjects reported non- dreaming (figures extracted from Solms, 1997). Figure 4.1.3 compares the incidence of non- dreaming between patients with unilateral left hemisphere lesions (52%) and patients with unilateral right hemisphere lesions (48%) (figures extracted from Solms, 1997).

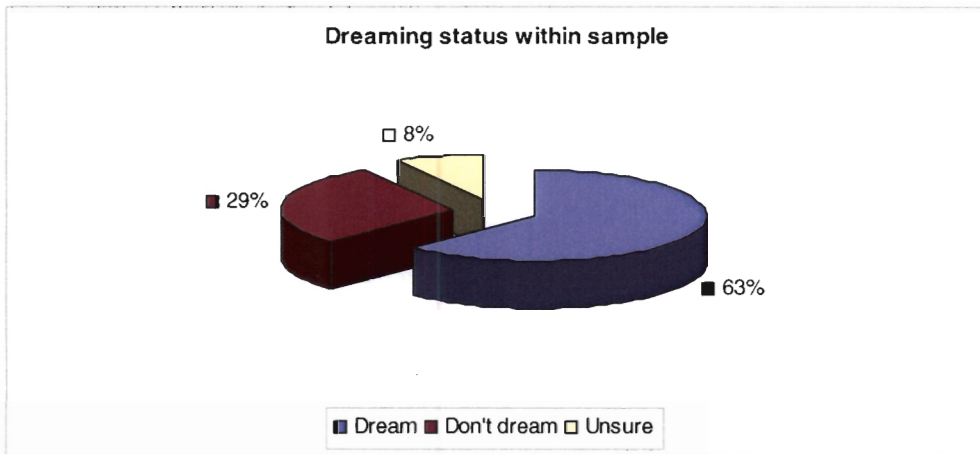


Fig 4.1.1: Dreaming status within the sample

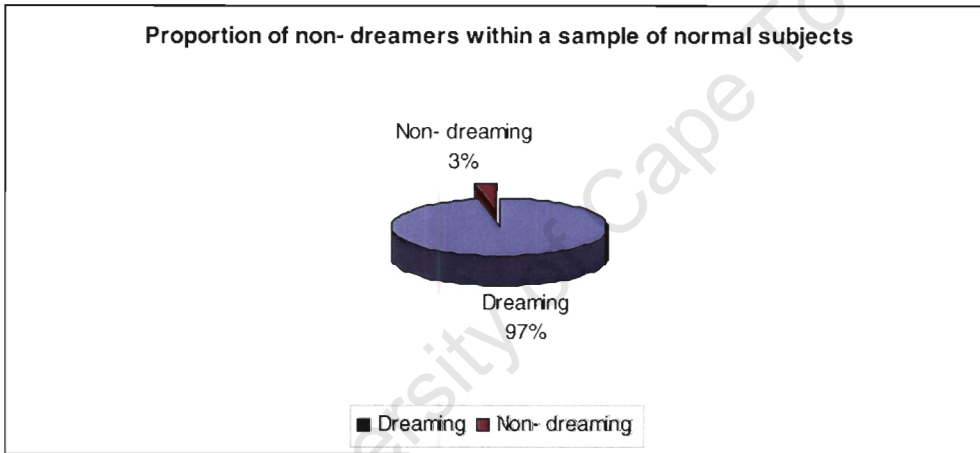


Fig 4.1.2: Proportion of non-dreamers within a sample of normal subjects

Subjects	Phase	Aphasia type	Dreaming	Change	Language Awake (A)	Language Dreaming (D)	Language D and Language A
A	Acute	Non-fluent	yes	Yes	5	15	10
B	Acute	Non-fluent	yes	None	7	N/A	N/A
C	Acute	Non-fluent	yes	yes	8	8	0
D	Acute	Fluent	No	yes	8	N/A	N/A
E	Acute	Non-fluent	No	yes	7	N/A	N/A
F	Acute	Fluent	unsure	unsure	10	N/A	N/A
G	Acute	Non-fluent	yes	yes	5	N/A	N/A
H	Acute	Fluent	yes	None	14	15	1
I	Acute	Non-fluent	No	yes	10	N/A	N/A
J	Acute	Non-fluent	yes	None	15	15	0
K	Acute	Non-fluent	yes	yes	13	15	2
L	Acute	Fluent	yes	None	9	9	0
M	Acute	Non-fluent	yes	yes	3	15	12
N	Chronic	Non-fluent	yes	None	12	14	2
O	Chronic	Non-fluent	No	yes	9	N/A	N/A
P	Chronic	Non-fluent	yes	None	4	15	11
Q	Chronic	Fluent	No	yes	8	N/A	N/A
*R	Chronic	Non-fluent	No	yes	10	N/A	N/A
S	Chronic	Non-fluent	yes	None	11	N/A	N/A
T	Chronic	Non-fluent	unsure	unsure	10	N/A	N/A
U	Chronic	Non-fluent	yes	None	13	15	2
V	Chronic	Non-fluent	No	yes	11	N/A	N/A
W	Chronic	Non-fluent	yes	None	14	14	0
X	Chronic	Non-fluent	yes	None	14	14	0

Fig 4.1.3: Description of subjects in the study

The above table provides with a description of the aphasic subjects (referred to as letters of the alphabet) in terms of the stage of their aphasia, the type of their aphasia in terms of

fluency, their dreaming status referred to as 'yes' for dreamers and 'no' for non-dreamers, their personal ratings of their experience of language in i) waking life (language A) and ii) dreams. Note that experience of language in this context refers to the subject's perception of their ability to comprehend and produce language. The final column gives a numerical value to the difference between language in waking life and language in dreams.

N/A refers to those participants who could not rate their experience of language in dreams either because i) they did not dream or could not remember their dreams or because ii) they could not remember conversations within the dream context and were unable to relate thoughts associated to the dream. They managed to describe their last recalled dream as a collage of visual images only. It is important to note that these particular subjects (B, G and S) showing an inability to reflect on language in dreams, were also characterized as relatively more severe in terms of their aphasias.

As reflected by the data, all the non-dreaming subjects attributed their non-dreaming to their stroke. The subjects classified as 'unsure' (2) were unable to account for their non-dreaming and in fact did not report non-dreaming as such, but rather an inability to recall dreams and a lack of interest to reflect on dreaming altogether. An interesting finding was that they both reported "not being bothered by dreams", being "deep sleepers" and believing that they had "never dreamt much" during their lifetime. They did not discount the possibility of dreaming but could not bring any dream experience to mind.

Subject R was able to give detailed accounts of two dreams he experienced in the very early stage of his aphasia (2 weeks), while he was still hospitalized. The subject attributes his loss of dreaming to "never being much of a dreamer" and to being "a deep sleeper" but the evidence, in the form of last dreams remembered coinciding with the onset of his stroke (8 years) suggests that subject R's loss of dreaming is likely to be a result of his stroke.

#### **4.2. Comparing dreaming in acute and chronic aphasics:**

Of the 15 'dreamers', 60% are *acute* aphasics and 40% are *chronic* aphasics. The 'non-dreamers' are evenly represented by the two groups, that is 50% *acute* and 50% *chronic*.

	Dream	Don't dream	Totals
Acute aphasics	9	3	12
Percent of total	40.909%	13.636%	
Chronic aphasics	6	4	10
Percent of total	27.273%	18.182%	
Totals	15	7	22
Percent of total	68.182%	31.818%	

Table 4.2

The hypothesis that fewer chronic, recovered aphasics should report non- dreaming, is not supported by the data ( $\chi^2 (1) = 0.57$ ,  $p = 0.452$  and a Yates corrected Chi-square value of 0.09,  $p = 0.7699$ ). We are inclined to think that the non- conclusive results in this case are a consequence of the small sample size

#### 4.3. Comparing dreaming in fluent and non-fluent aphasics:

	Dream	Don't dream	Totals
Fluent aphasics	2	2	4
Percent of total	9.091%	9.091%	
Non- fluent aphasics	13	5	18
Percent of total	59.091%	22.727%	
Totals	15	7	22
Percent of total	68.182%	31.818%	

Table 4.3

The data does not support the hypothesis that *type of aphasia*, defined as *fluent* or *non-fluent*, affects non- dreaming ( $\chi^2 (1) = 0.74$ ,  $p = 0.3881$  and a Yates corrected Chi-square value of 0.07,  $p = 0.7874$ ). This lack of effect is most likely the result of small sample size and the considerable discrepancy in numbers within each category

#### 4.4.1. Comparing subjective ratings of language by aphasics, while awake and dreaming:

The data revealed a significant difference between the quality of language in dreams and the quality of language while awake, with a t-value of -2.31 ( $df = 22$ ,  $p = 0.03$ ) at a 95% significance level. *These results suggest that aphasics experienced a better quality of*

*language in their dreams.* Of the 15 dreaming aphasics, 3 were excluded from the current analysis because they could only relate purely visual dreams that did not contain verbal communication or thought that they could recall. Language in dreams scored higher with a mean of 13.67, (sd= 3.36) compared to a mean of 9.58 (sd= 2.46) for language while awake for all 12 dreamers. The histogram below shows the marked difference between the two means.

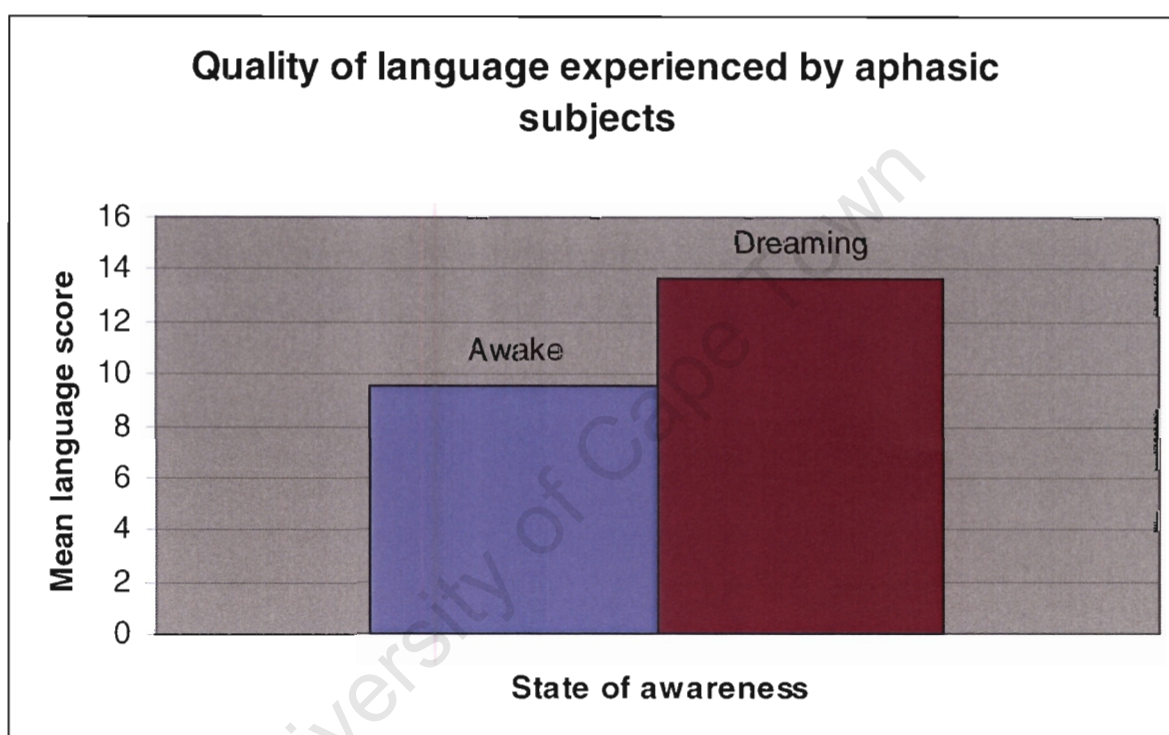


Fig 4.4.1: The quality of language in aphasic subjects while a) Awake and b) Dreaming

Graphs 4.4.1.2 and 4.4.1.3 reflect the individual, self-rated scores of language proficiency of the aphasic subjects while awake and while dreaming, respectively. Language proficiency while awake is evenly distributed ranging from a minimum of 3 to a maximum of 15. On the other hand, as is clearly shown by figure 4.4.3, language proficiency in dreams tends to converge to a higher score, with a straight line easily drawn between scores 14 and 15. From the graph, two outliers can be identified, marked as subjects 2 and 6 in the graph or as subjects C and O, whose scores dilute the true gap between the quality of language Awake and of language Dreaming. Subject C was interviewed in the very acute phase of her aphasia (2 weeks) at which point she

presumably had insufficient experience of being aphasic to differentiate her waking and sleeping experiences thereof.

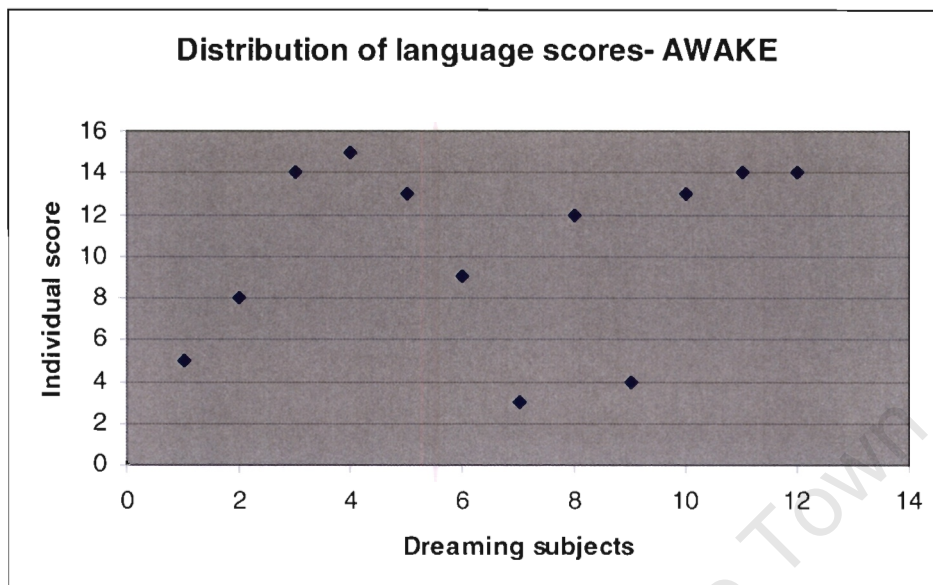


Fig 4.4.1.2: Distribution of language scores- AWAKE

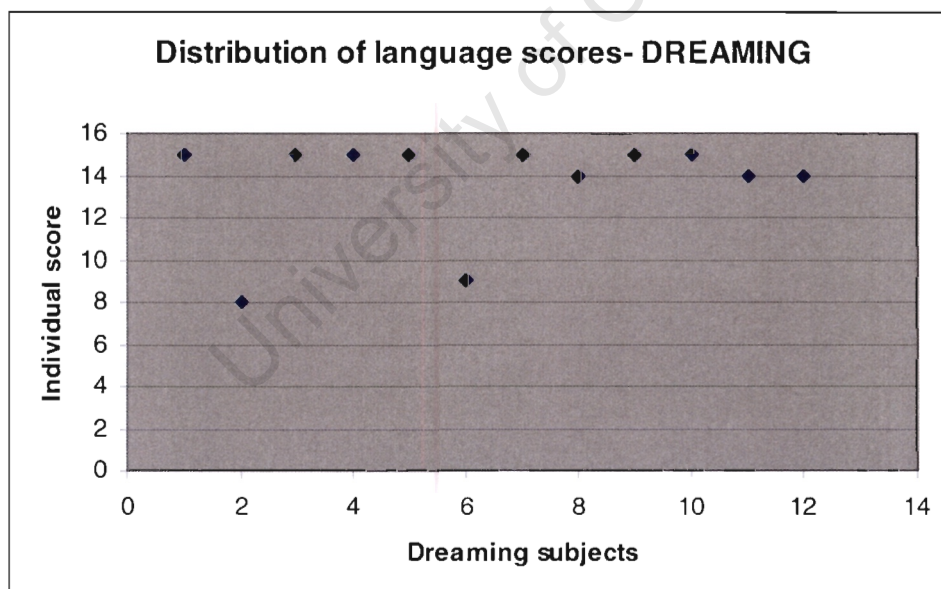


Fig 4.4.1.3: Distribution of language scores- DREAMING

The experience of non-aphasic, more fluid language in dreams is illustrated through subjects' accounts of their dreams such as that of subject W, related in part 3.5 of the

method section, whereby W dreamt of her late husband visiting her from heaven, comforting her and telling her that he would not abandon her. The subject recalls telling him about her sadness, loneliness, frustration and her intention to commit suicide. This sort of elaborate account, also shared by subjects H, M, N and X, is evidence in support of some forms of waking life handicaps not permeating the persons' dream worlds. There seems to be a sense of pre- morbid self that is preserved in memory and accessed in dreams.

#### 4.4.2 Comparing language in dreams between acute and chronic aphasics:

Language in dreams was reported to be better than language in waking life for acute aphasics by an average of 6.00 as compared to a much lower average of 2.00 for chronic aphasics. This difference in mean was however not statistically significant with a t value of 1.00 ( $p = 0.42$ ), at a 95% significance level.

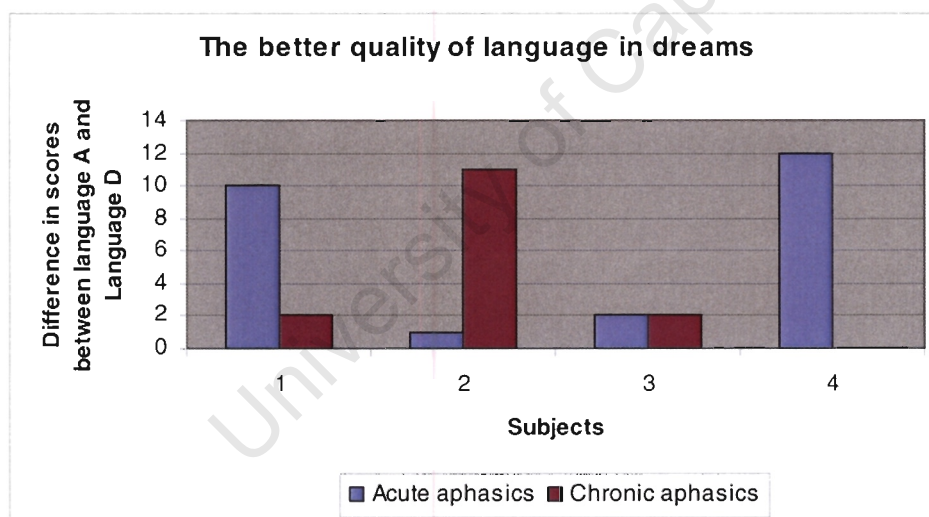


Fig 4.4.2: The better quality of language in dreams between acute and chronic aphasics

#### 4.4.3. Comparing language in dreams between fluent and non-fluent aphasics:

Non-fluent aphasics scored a higher mean of 3.90 for the difference between language in dreams and language in waking life, compared to fluent aphasics who scored a mean of 0.5. This difference in mean was however not statistically significant with a t value of -0.92 ( $p = 0.38$ ), at a 95% significance level.

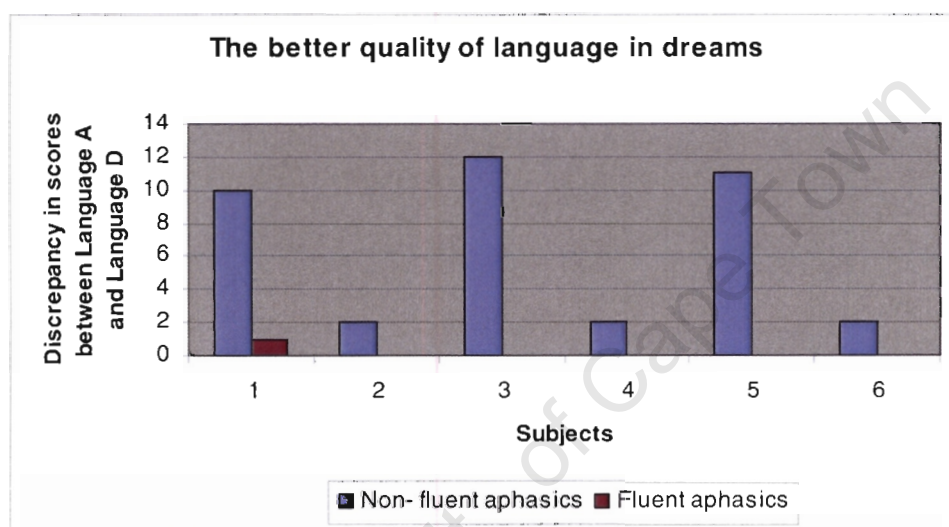


Fig 4.4.3: The better quality of language in dreams between fluent and non- fluent aphasics

## **5. Discussion**

### **5.1. The presence of dreams**

The proportion of non-dreamers is greater amongst aphasic subjects (29%) than amongst non-neurological subjects (3%- figure extracted from Solms, 1997). The relatively higher incidence of non-dreamers amongst aphasics relates to the point made by Kosslyn et al (1985) on the relatively poor ability of aphasics in integrating and remembering visual imagery in general. Non-dreaming by these subjects coincided with the onset of their stroke (4 non-fluent and 2 fluent aphasics); they were equally distributed across acute (3) and chronic (3) categories.

However, *the hypothesis that some aphasics do dream and are capable of remembering their dreams (Buzare and Wainsbourg, 1983; Cathala et al, 1983; Murri et al, 1984; Schanfeld, Pearlman & Greenberg, 1985; Solms, 1997) is supported directly by this study whereby 63% of the sample reported dreaming.*

### **5.2. The quality of language in dreams**

The foundation of this study is the hypothesis that language should be free of aphasic features in the dreams of aphasics. *The study demonstrates that language in dreams is experienced as much better than in waking consciousness, at a statistically significant level.* Subjects reported more or less normal quality of language in their dreams; they confirmed not experiencing their waking handicaps whilst dreaming of themselves. This is consistent with the testimony of certain aphasics that they dreamt of themselves as “whole again” (Kaplan- Solms & Solms, 2002). One of the subjects of the study, a chronic aphasic left with a hemi-paresis of the right leg and arm, testified having had a dream where his lover and he were on a cruise-liner, standing on the deck watching the sunset and he was walking and talking “like before”. In the sample, the mean subjective score for language was 9.58 while awake as opposed to 13.7 while dreaming, where 3 is the minimum and 15 is the maximum possible score. The subjects’ ability to understand what was meant by language in dreams was particularly emphasized. It is

important to reiterate that whenever the raters had doubts about a subject's ability to grasp the intended meaning of a question, that subject was re-interviewed as was the case for subject K. It would therefore be safe to say (given the high rate of reliability) that the three subjects who could not comment on the quality of their language in dreams simply had no recall of any form of verbalization being part of their dreams, either because they did not occur or were inconsequential to the point of not being remembered. What dreams are remembered and what elements of the dreams are specifically remembered are dependent on their relevance to the dreamer at any particular point (Foulkes, 1978).

The ability of aphasics to experience 'non-aphasic' language in dreams confirms that language in dreams is at least remembered. It seems to suggest that normal conversations or fragments of normal verbal exchanges experienced by the aphasic subject, prior to their stroke, would have been stored as episodic memory (Tulving, 1972). These language sources would have then been still available to be retrieved and re-constructed during dreaming after their stroke. It could also be that the *knowledge* of language is still intact and is retrieved from semantic memory, allowing the dreaming brain to generate normal language, fluent and grammatically correct. Whether language in dreams is remembered (Freud, 1900/1954) or generated (Heynick, 1985), the *presence* and *quality* of language in the dreams of aphasics proves that dreams have their sources in long-term memory (Baylor & Cavallero, 2001; Cavallero & Cicogna, 1993; Cicogna et al, 1986).

The memory sources of dreams, together with the quality of language in dreams, suggest a theory of dreaming involving higher executive, cortical involvement enabling meaningful retrieval and organization of endogenous information, salient to the dreamer's emotional preoccupations, as opposed to a bottom to top activation-synthesis model of dreaming firing random information to the cortex (Domhoff, 2000).

The fact that a function that fails during waking life succeeds in dreaming, is further evidence against a theory of the brain and of the mind that postulates brain to mind isomorphism in dreams (Hobson & McCarley, 1977). From the evidence at hand, one cannot predict that the structures responsible for the normal functioning of language in waking life enables the perception of language in dreams.

The sensory- motor cortex responsible for the production of language while awake is inactive during dreaming and yet dreamers experience language in dreams as being real. It would appear that other structures active during dreaming convert memory traces or thoughts into language similarly to how visual images are processed internally (Solms, 1997; Solms, 2000).

### **5.3 The difference between *acute* and *chronic* aphasics**

Despite the seemingly big difference in mean gap between *Language Awake* and *Language Dreaming* between acute (mean score= 6.00) and chronic aphasics (mean score= 2.00), the hypothesis that acute aphasics should experience greater difference in language in dreams by virtue of the salience of their language deficits was not confirmed. One observation made was that chronic aphasics tended to rate their waking language abilities rather harshly. Their high expectations caused them to under- represent their waking achievements and thus over- emphasizing the gap between “Language Awake” and “Language Dreaming”. Although many of them had almost fully recovered their language functions, they would judge their language relative to their pre- morbid abilities and not as a contrast to their acute stage difficulties.

### **5.4 The difference between *fluent* and *non-fluent* aphasics**

Evidence of the presence of dreams in *non- fluent* aphasics supports the notion that dreaming is not affected by deficits in the motor component of language. On the other hand, the study could not confirm the hypothesis that audio- verbal disturbances or spatial disturbances caused by left –parietal lesions, characteristic of *fluent* aphasia would correlate with non- dreaming (Kaplan- Solms & Solms, 2002). Graph 4.4.2, however, clearly illustrates a discrepancy between *fluent* and *non- fluent* aphasics in terms of the quality of language in dreams with only one *fluent* aphasic reporting better language in dreams.

### **5.5 General discussion:**

The findings of the study converge to the point that aphasia does not cause cessation of dreaming but other deficiencies do. Aphasia is merely at times, a syndrome that overlaps with other syndromes that lead to non- dreaming (Kaplan- Solms & Solms, 2002). The initial belief that aphasia should necessarily result in cessation of dreaming (Anan'ev, 1960; Broughton, 1982, Doricchi & Violani, 1992; Eipstein & Simmons, 1983; Foulkes, 1978; Jakobson, 1973; Moss, 1972; Zinkin, 1959) might have been compounded by the fact that aphasics, notwithstanding their challenges in comprehending a command and in responding adequately, also seem to suffer from poor recall that extends to dreaming.

Across the various subjects interviewed in this study, 5 gave a detailed account of a vivid dream while the remaining 10 knew they were dreaming, could report the general theme of the dream or people present in their dream but were unable to give a *detailed* account of the dream scenario. Besides the varying expressive difficulties of the aphasic subjects, the poverty of dream accounts could be linked to the relatively poorer visual imagery of aphasics as contrasted to that of a normal population (Kosslyn et al, 1985).

Cicogna et al (1986) describe dream analysis as establishing the relationship between the “output and input, that is the dream report (the conventionally accepted output) on the one hand, and the material in memory on the other” (p.209). If “input” were based mostly on current *self* and abilities, the dreams of aphasics (the “output”) would not be representative of the “input”. The fact that aphasics report experiencing better language in dreams than while awake supports the proposition that dreams have their sources in our long- term memory store. It would appear that aphasia as such does not contaminate the aphasic’s *knowledge* of language and possibly that self- image is preserved in its pre-morbid state in memory.

Dreaming and aphasia treated as states of being, emphasize the disconnection between knowing and doing (Teuber, 1964) in a strikingly similar manner. The claim of these aphasics that their aphasia disappears in their dreams can be justified by the fact that dreams necessitate only the knowing of language (Kaplan- Solms & Solms, 2002).

The doing of actions is suppressed in dreams but not the knowledge of these actions, which the dreamer seems to experience and be affected by quite vividly (Freud, 1900/1954; Solms, 1997). Like the ability for humans to fly in dreams, to drive when they do not know how to, to be in two countries within the space of a few minutes, to have sexual intercourse with individuals they would never dare to approach in waking life, to speak a foreign language fluently and experience 'normal' language in the case of aphasics all signify greater competence provided to the dreamer by the dreaming brain, allowing him or her to overcome individual barriers and fears imposed by waking circumstances. Perhaps, like Freud (1900/1954) suggested, dreams have a survival function that expresses itself through the exploration and fulfillment of desires, within the safety of the internal world of sleep, protected from external consequences. The dreamer does not have to face the notion of improbability or impossibility in dreams as physical action is not required for the experience to be authentic. Thoughts can thus be transformed into words and believed to be articulated and heard, without any actual sound being processed.

## **6. Limitations**

### **Statistical analysis and the issue of power**

Hypothesis testing involves making a decision while having the ability to predict the probability of error in making that decision (Howell, 2002). In comparing *fluent* to *non-fluent* and *acute* and *chronic* aphasic categories, the analysis did not allow us to reject the null hypothesis, in other words to reject the fact that there is no difference between categories. There is a possibility that we accepted defeat while our proposed, alternative hypothesis might have been true (Type II error). The ability to reject the null hypothesis when it is false is referred to as the power of the analysis. Power is related to sample size where the bigger the sample the greater the power to prove that *fluent* and *non-fluent* and *acute* and *chronic* aphasics differ in their experience of dreaming and of their quality of speech in dreams. A sample size of 24 is considered small and would not provide with a lot of power. In the current study we have reported no effect or no differences between the categories as suggested by the data. A bigger sample would have allowed us to be

confident of not making a type II error as we would have had more power to prove our hypothesis had it been true. “All qualitative differences are ultimately quantitative differences” (Antrobus, 2000, p.907) given sufficient resources.

### **Differential diagnosis**

A major challenge was finding subjects who fit the criteria stipulated in part 3.1 of the method section, in other words patients who were truly aphasic, willing and able to participate in the study. Two subjects had to be excluded from the sample as they failed to demonstrate an adequate level of comprehension of the subject matter and one subject was excluded from the study on the basis of not presenting with true aphasic symptoms. His writing was grammatical and semantically sound and he used it to communicate quite easily, he appeared to be mostly dysarthric. His comprehension seemed unimpaired as he responded adequately to commands. Practitioners from different fields have different diagnostic tools which serve their different focuses. Inconsistencies can arise from relying on diagnosis based on different sets of criteria. In order to counter this, raters with a neuropsychological background provided independent assessment of aphasia type. Patients were classified using a uniform set of criteria (see section 1.1.4. etiology of aphasia). They were classified as *fluent* or *non-fluent* which was adequate for the comparative analysis of the quality of language in dreams of aphasics who suffer mostly from language production and those who suffer from more integrative aspects of language. For future research, more insight could emerge from investigating the quality of language in dreams in relation to specific aphasic syndromes, especially since the literature points to the relationship between the processes involved in anomia and cessation of dreaming (Pena- Casanova et al, 1985). Subjects ought to be formally tested for naming to seek out the nature and extent of a correlation between the lack of access for words and loss of dreaming.

### **History of aphasia in chronic subjects**

Often, the medical or hospital records were available in fragments for some patients making it difficult to adequately assess for type of aphasia in the case of subjects who have almost fully recovered. Attempts were made to obtain a full history from the

participant, supplemented by collateral history from their spouse or children. Perhaps, the next step would be to conduct a longitudinal study where subjects are identified and assessed in their acute stage and followed through their recovery. It would be interesting to measure each participant's progress in terms of the experience of dreaming and of language in dreams, as their language functions stabilize. This approach would counter the problem of untraceable or fragmented history of deficit and would account for individual differences in interpreting dream experiences.

### **Dream diary**

One problem often mentioned in dream research is the burden of reliance on the participant's memory of the dream event (Foulkes, 1978). As discussed in section 1.2.3 on the recall of dreams and its implications for the functions of dreaming, people often fail to remember all their dreams or remember only aspects of their dream which depends on what is relevant to the individual reporting the dream, especially since consolidation of memory during sleep in general is not as efficient as in the waking state. Our aphasic sample is disadvantaged as they suffer from memory difficulties, a factor that would further interfere with the already fragile process of remembering dreams. In order to optimize recall of dreams, it would perhaps be beneficial to set up a dream diary system where subjects are assisted in the task of recording the frequency of dreams, the dream scenario and the presence of language in dreams providing examples whenever possible, either verbally or in writing. The same questionnaire used in the current study can be administered to the subjects on a weekly basis, over an extended period of two years.

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***Appendix A:***

1. Excerpt of interview
2. Consent form
3. Short questionnaire

University of Cape Town

***Appendix A:***

1. Excerpt of interview
2. Consent form
3. Short questionnaire

University of Cape Town

Interview excerpt

Subject Q was a chronic aphasic of the *fluent* type, aged 72 at the time of the interview. She had suffered from a left CVA 25 months prior to the interview.

R: How is your speech?

B: Not very good

R: Not very good?

B: Not very good

R: Would you say **bad** or **average**?

B: No, bad

R: Can you **understand** me... when I **speak**?

B: Not always

R: Not always?

B: Not always, no

R: Would you say you understand me... **ok**?

B: yes!

R: or is it difficult?

B: No, I can understand you...but not much

R: It's not 100%?

B: Yes (nods)

R: Now, can others understand you?

B: sometimes

R: can you understand them better than they understand you?

B: No, they are *easier* to understand if when I say to them

R: Do you dream?

B: I don't know

R: **Before** you had your **stroke**, and **before** you came here, do you remember dreaming?

B: yes I can but...uh...uh...no...I don't know what, I don't say now...but it's *bbbig*!

(Gesturing)

R: you mean you used to dream a lot? (Gesturing with arms to indicate large quantity, imitating her gesture)

B: yes!

R: **before** your stroke?

B: yes!

R: and now...

B: I don't remember.

R: you don't remember?

B: No

R: what is the last dream you remember?

B: ...I can't...no...I can't really say...

R: Have you had **nightmares**?

B: Yes I would, sometimes, *oderwise bbbig*... wonderful dreams

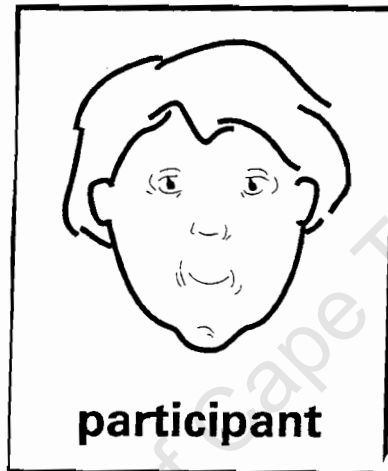
R: Ah, so sometimes you had nightmares but otherwise big, wonderful dreams?

B: Yes (laughter)

R: And that was when you were sleeping?

B: yes  
R: tell me about those nightmares  
B: I don't know why... what it about  
R: you don't remember what it was about?  
B: no  
R: were you speaking?  
B: No  
R: were you screaming in your dream?  
B: yes!  
R: was this after your stroke?  
B: yes, before  
R: oh **before**?  
B: hmmm!  
R: **before** you were ill?  
B: yes  
R: and **after** you were sick?  
B: I don't know, I really don't know  
R: Did you have a dream last night?  
B: don't know  
R: and last week?  
B: don't know, I really don't know. I, I can't say if I have or not. So it might be that it's something *gid* or it might be something bad but I don't know  
R: Might have been a good dream or a nightmare?  
B: yes, but I don't know.  
R: you don't remember?  
B: No!

**INFORMED CONSENT**  
For  
**RESEARCH**



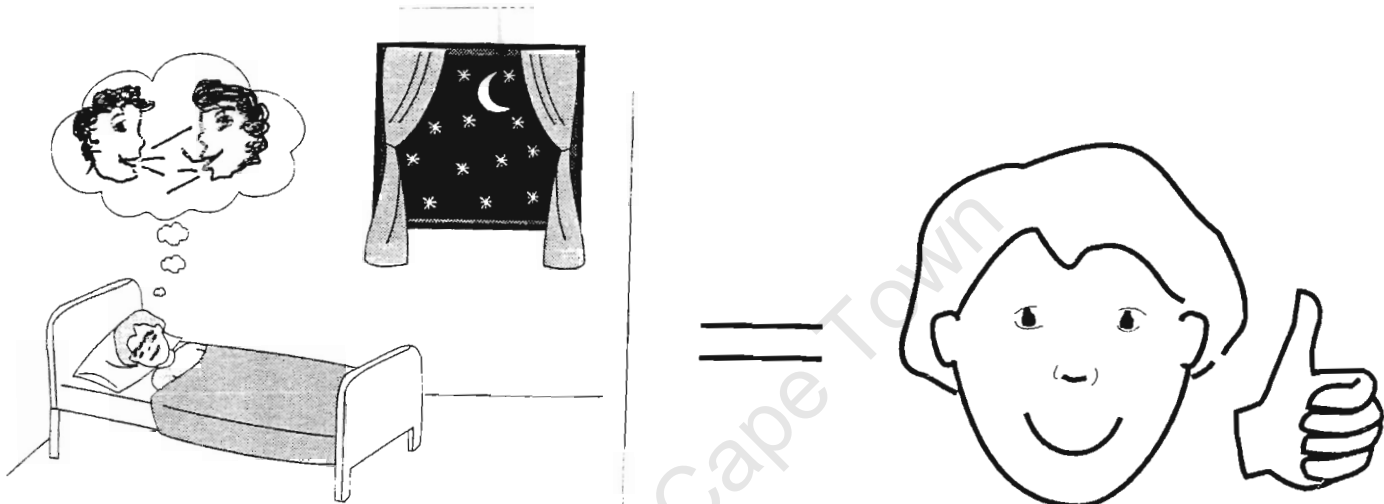
**Participant:**

**Investigator:** Ridwana Timol, M.A  
University of Cape Town (UCT)

**Project Title:** Aphasia and the quality of  
language in dreams

# ABOUT DREAMS

We want to know if



**DO YOU DREAM?**



**YES**

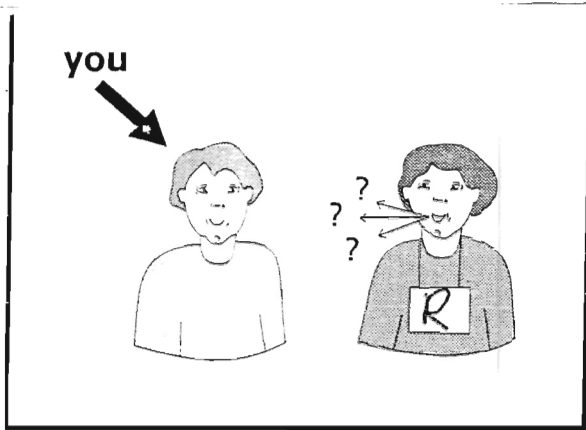


**NO**

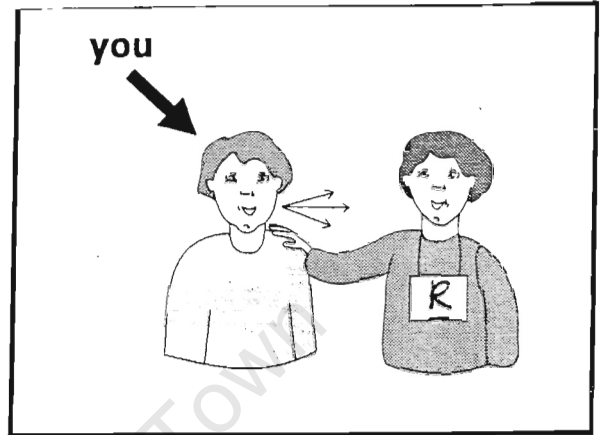


**DO YOU SPEAK IN YOUR DREAMS?**

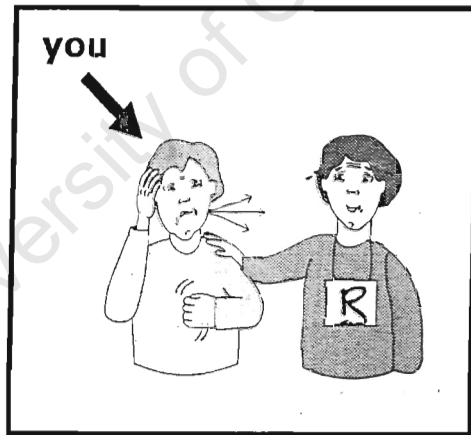
# INTERVIEW



The Researcher will **talk** to **you** and **ask** you questions.



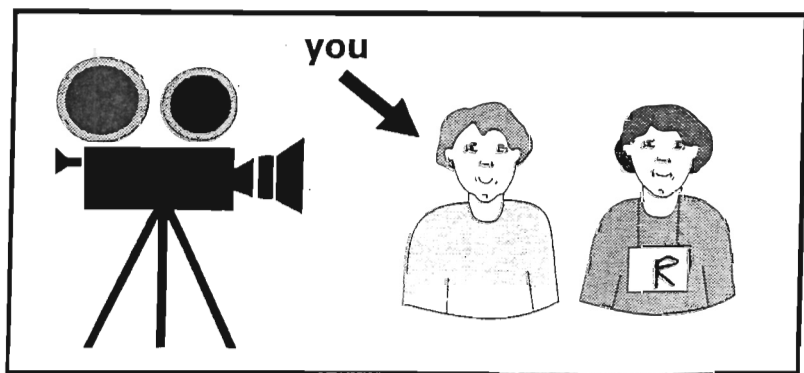
The Researcher will try to **help** you to **answer**.



The Researcher will **try hard** but the interviews may be **frustrating**.

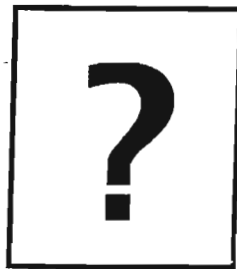
## Videotape

We want to videotape the interview



IT WILL HELP PEOPLE UNDERSTAND THAT  
YOU KNOW MORE THAN YOU CAN SAY

what

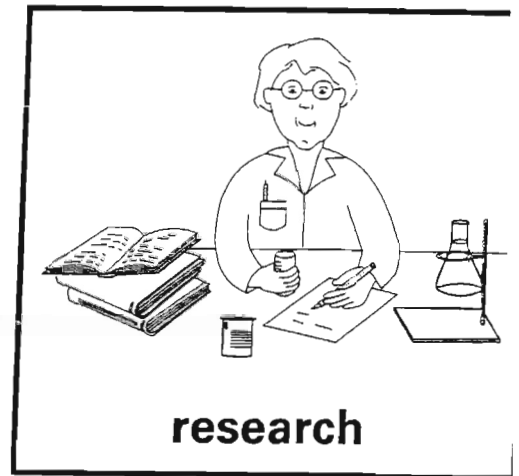


can you expect?

### Potential Benefits:

✓ This **will help** research!

✗ This is **not** speech  
or language therapy.



Will this **help** research?

**YES**

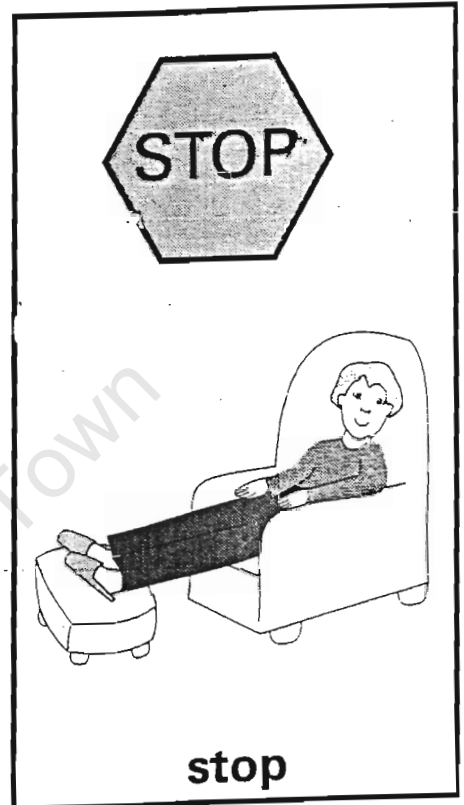
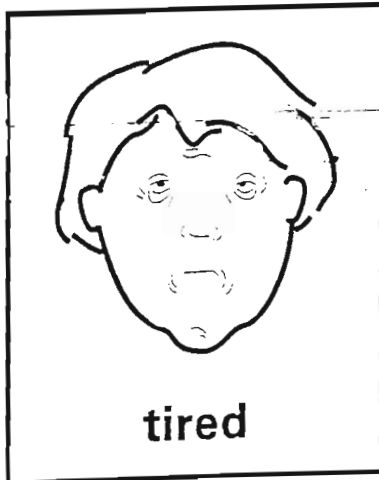


Will this **help you** to talk  
better?

**NO**

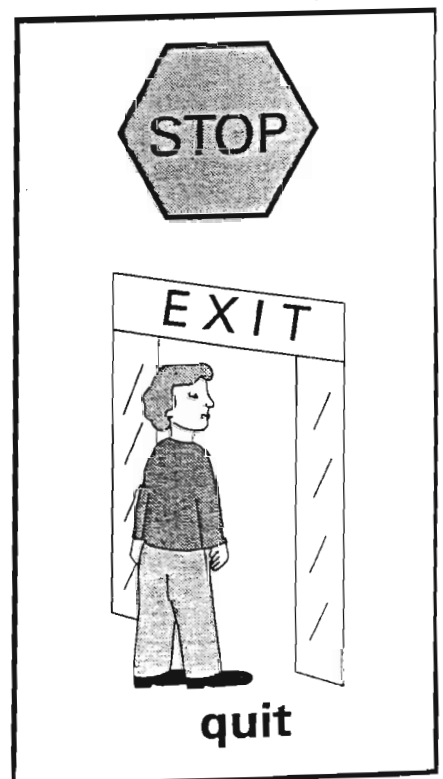


If you get **tired** we will **stop** and **start** again on another day.



### Right to Withdraw:

- ✓ You **can stop** at any time.
- ✓ It is **your choice**.
- ✓ It is **ok** to quit.



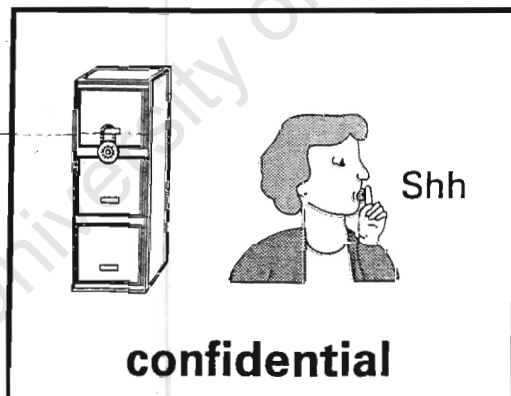
## Potential Risks:

**X** There is **NO** danger  
in participating in this study.



no danger

**✓** Everything is **confidential**.



Will this harm you?

**NO**

# Project Consent:

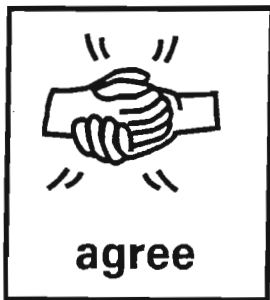
The information presented on the previous pages has been **explained** to me.

**YES**



\_\_\_\_\_

I **agree** to participate in this research project.



**YES**



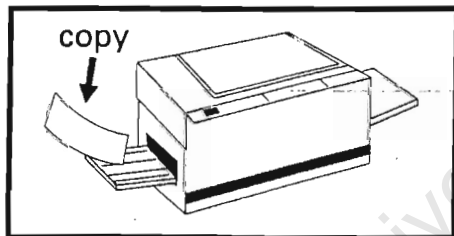
**NO**



\_\_\_\_\_

\_\_\_\_\_

I have been given a **copy** of this form.



**YES**



**NO**



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Date

# AWAKE

How is your speech when you are AWAKE?

Very difficult

Easy

1

2

3

4

5



Can you understand others when they speak?

Not really

Very well

1

2

3

4

5



Can others understand when you speak?

Not really

Very well

1

2

3

4

5



Do you dream?

NO

YES

# DREAM

How is your speech when you are DREAMING?

Very difficult

Easy

1 ..... 2 ..... 3 ..... 4 ..... 5



In your dreams, can you understand others when they speak?

Not really

Very well

1 ..... 2 ..... 3 ..... 4 ..... 5



In your dreams, can others understand when you speak?

Not really

Very well

1 ..... 2 ..... 3 ..... 4 ..... 5

