

PRAGMATICS IN THE RIGHT HEMISPHERE DAMAGED

Kamalish

Register No.M9711

This Dissertation submitted as part fulfilment
for the Final Year M.Sc., (Speech and Hearing),
submitted to the University of Mysore, Mysore.

ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE 570006

MAY 1999

DEDICATED
TO
MY GRANDPARENTS
WHO LAID THE FOUNDATION
FOR WHAT I AM TODAY

ACKNOWLEDGEMENTS

My sincere thanks and gratitude to my guide and teacher Dr. Shyamala, K.C. Reader & Head of the Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore for her invaluable guidance, support and suggestions throughout the study.

I would also like to thank Dr. (Miss) S. Nikam, Director, All India Institute of Speech and Hearing, for granting me permission to conduct this study.

My thanks also go to the staff of J.S.S. Hospital, K.H. Hospital, Kamakshi Hospital, Basappa Memorial Hospital, Mysore for providing me with subjects.

All my subjects, I enjoyed spending sometime with you and thanks for your cooperation and friendliness.

Hia, Sanyu, and Anjana. Thank you for talking, listening, understanding and comforting on for giving me strength with me on happiness. Friendship is a promise spoken only by the heart. A promise we will always share.

Sarmi and Ruchi. I miss you. Will always remember the "moments together".

To all my classmates. I shall always remember having spent with you some of the best years of my life and very happy ones too.

Mummy & Papa. Your watchful eye, unconditional love and constant encouragement made me the person I am today.

Bhaiya - you have always been my inspiration. Thanks for the love and support when I needed it the most.

My sis Sony-my love to you will be there always.

All the Library staff - thank you for the "Treasure Hunts" of literature.

Rajalakshmi Akka - your hardwork and a project job has enabled this dream, come.


The Lord Almighty - with a great faith you I understood that,

"As one of a thousand I may just fail,
But as one, plus God, I am sure to win."

CERTIFICATE

This is to certify that this Dissertation **entitled** :
PRAGMATICS IN THE RIGHT HEMISPHERE DAMAGED is the bonafide
work in part fulfilment for the degree of Master of science
(Speech and Hearing) of the student with Register No.M9711.

Mysore
May. 1999


Dr.(Miss) S.Nikam
Director
All India Institute of
Speech and Hearing
Mysore 570 006.

CERTIFICATE

This is to certify that this Dissertation entitled :
PRAGMATICS IN THE RIGHT HEMISPHERE DAMAGED Has been prepared
under my supervision and guidance.

Mysore
May, 1999

Shyamala K.C.
Dr. Shyamala K.C.
Reader in Sp.Pathology
All India Institute of
Speech and Hearing
Mysore 570 006.

DECLARATION

This Dissertation entitled : *PRAGMATICS IN THE RIGHT HEMISPHERE DAMAGED* is the result of my own study under the guidance of Dr. Shyamala, K.C. Reader in Speech Pathology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other diploma or degree.

Mysore
May, 1999

Reg. No.M9711

TABLE OF CONTENTS

	Page No.
I Introduction	1 - 11
II Review of Literature	12 - 71
III Methodology	72 - 76
IV Results and Discussion	77 - 81
V Summary and Conclusion	82 - 83
VI Bibliography	84 - 101
Appendix	

LIST OF TABLES

	Page No
1. Presumed localization of selected RH impairment.	15
2. Communication deficits associated with RH impairment.	18
3. Fundamental properties of discourse and their relationship to surface structure.	31
4. Some contrasting findings in discourse production after RHD.	33

INTRODUCTION

After hesitating for many centuries between Aristotle and Hippocrates, between the heart and the brain (and thereafter, between the cavities of the brain and its substance), science finally convinced itself that language and other cognitive activities were based in the convolutions of the brain, along with some of the subcortical structures. After the regularity of the brain's convolutions was finally discovered and coupled with the conviction that the different aspects of human activities could be conceived atomistically, the essence of modern neuropsychology was laid down through one of the first of a series of excesses, the phrenological approach. Franz Joseph Gall, his pupils, and his colleagues thus proposed in the early 19th century a notion that still lies at the core of modern conceptions about the neurobiological bases of intellectual activities, namely, that discrete components of the brain are responsible for discrete components of what we now call cognitive functions. But for all those centuries whatever the conceptions proposed, both halves of the brain- or of the heart! -were thought to contribute equally. No distinction was made whatsoever between the relative contributions of the right and the left hemispheres to an individual's cognitive functions.

However, at the same time that phrenological proposals were being popularised in northern France, a clever and observant surgeon in southern France came to some clinical conclusions that would change the way both hemispheres would be regarded. This surgeon was Marc Dax. From 1800 to 1834 he had to treat a series of patients who had lost the ability to speak after suffering brain lesions (some of them from saber blows). In a paper given in Montpellier in 1836, Dax first presented the principle that the brain's hemispheres make asymmetrical contributions to language. Even though Dax's claim was never published in his lifetime, it was the origin of modern conceptions about the brain's asymmetry vis-a-vis language functions. According to Ombredane (1951), it was the discussions around the official recognition of Marc Dax's paper by the Academie de medecine de Paris that forced Broca to take his position. Approximately three weeks after Dax's paper was authenticated in May 1865, Broca popularised the asymmetry concept on June 5, 1865, in an address to the Societe d' anthropologie in Paris.

The essence of Dax's oral and Broca's written contributions is that articulated language is essentially a product of the left hemisphere. Although most of those who refer to this period insist that the privileged role of the

teft hemisphere for language was thus unveiled, it must be realised that it was not the rote but its privileged status those was new; in part, Dax and Broca simply restated the teft hemipshere's long-known contribution to tanguage. The real revolution was that the right hemipshere lost its presumed contribution to tanguage. Thus, the end of the 19th century should be remembered as the period during which the right hemipshere tost its postutated contribution to language whereas the teft hemipshere kept its presumed abiiities. For nearly a century researchers woutd deny the right hemisphere any role in tanguage functions, the few exceptions being some sporadic and ill-received contributions, such as those of Hughlings Jackson (1879).

The right hemisphere btackout in tanguage functions tasted until the mid-20th century. At that point, some other trailblazing clinicians, as clever and observant as Dax had been, suggested that right hemisphere lesions, although usually not the origin of an aphasia proper, nonetheless could cause limitations in right handed patient's communicating abitities. Pioneers such as Mac Donald Critchley (1962), Jon Eisenson (1962) and Ed Weinstein (1964) thus came up with the notion that an acquired right hemisphere lesion could produce communication problems. The terms delineating those problems were clumsy, though, such as

Eisenson's (1962) notion of the "super-ordinary" aspects of language. Nonetheless, the right hemisphere was more and more suspected of having some capacities for some aspects of verbal processing. Thus, a century after this exclusion and only some 30 years ago, the right hemisphere was again recognized as playing a role in language.

It is now well known that an acquired lesion to a nondominant right hemisphere, though not responsible for an aphasia, can be at the root of some impairments in the ability to communicate. Apart from those at the prosodic level, impairments have been reported potentially to involve the prosodic level, the processing of the semantic aspects of words and text level abilities, as well as the adequacy between language and context (Code, 1987; Joanette, Goulet and Hannequin, 1990; Myers, 1984, 1986). Most of the conceptual frameworks needed to describe these problems were not available when the term aphasia was coined, which probably explains why the impairments were not recognized as aphasic.

As we near the dawn of the 21st century the left hemisphere is conceived to be necessary but not sufficient for normal communication ability. Numerous studies and

clinical reports have clearly demonstrated that the integrity of the right hemisphere is also needed. The question now is to identify clearly the components of communication for which the integrity of the right hemisphere is needed.

Now there is general acceptance of the notion that both cerebral hemispheres perform specialized functions. However, as complementary hemispheric specialization (Milner, 1980) gained increasing acceptance, the countervailing notion also gained voice—that the right hemisphere, being nonverbal, would therefore be mentally primitive. While the right hemisphere appears resolutely unburdened by phonological or syntactic structure, it does contain rich lexical networks differing in structural organization from the left hemisphere lexicon (Drews, 1987; Richards and Chiarello, 1997; Zaicfel, 1977). Whether the right hemisphere cues "speaks" remains a question as unsettled as it is important (Code, 1997). Meanwhile, study of right hemisphere abilities continues to expand using various methodologies, including patients with lateralized lesions (Brownell, Pincus, Blum, Rehak and Winner, 19 ; Pell and Baum, 1997), lateralized presentation (Corballis, 1997; Richards and Chiarello, 1997), and lateralised read-out (Sinos, Molfese and Brendon, 1997).

Facial perception has been extensively studied from many points of view, using all the methods mentioned above. Perception of faces, with its qualities of pattern recognition, remoteness from verbal function, and its familiarity dimension became a popular topic (Hecaen and Angetugues, 1962; Benton and Van Allen, 1968; Assal, 1969; Whiteley and Warrington, 1977; Damasio, Damasio and Van Hoesen, 1982; Malone, Morris, Kay and Levin, 1982; Ellis, 1983; DeRenzi, 1986; Regard and Landis, 1988). Visuospatial processing as a speciality of the right hemisphere has developed to include personal topography (Landis, Cummings, Benson and Palmer, 1986), visual organization, scanning (Beumont and Davidoff, 1992), visuoconstruction and mental rotation (Corballis, 1997).

For a long time, whatever abilities were increasingly attributed to the right hemisphere, the left hemisphere was still seen as "leading" the more "active" of the two. In this view, the left hemisphere produces verbal and motor output, subserving, as it does, speech and praxis (Heilman, 1979), whereas the "minor" hemisphere's work was often thought to be relatively passive (excepting a notion of "manipulo-spatial" abilities, Bogen and Gazzaniga, 1965; LeDoux, Wilson and Gazzaniga, 1977). Even that difference is

blurring. Most recent observations in prosodic behavior (Pell and Baum, 1997), action patterns (Richards and Chiarello, 1997), communicative pragmatics (Brownell, Pincus, Blum, Rehak and Winner, 1997) and speech (Code, 1997) clearly attribute to the right hemisphere a more active role.

Investigators point a specialized role in auditory functions for the right hemisphere, utilizing dichotic listening in normal subjects as well as studies of persons who have suffered brain damage. Relatively better processed by the right hemisphere are complex pitch and timbre (Sidtis, 1980, 1984; Zatorre, 1988), chords (Gordon, 1970), familiar songs (Gordon and Bogen, 1981) and personal voice information (Van Lancker and Canter, 1982). These signals have in common (1) being complex auditory "patterns", in that they are not readily decomposable into elemental units, and (2) containing complex pitch information as salient perceptual cue (Van Lancker and Sidtis, 1992).

In audition research, prosody is the laterality topic of the moment. Claims for affective-prosodic information - intonation in speech signaling emotion states - have been amply staked out in right hemisphere domains (Heilman, Scholes and Watson, 1975; Ross, 1980; Van Lancker, 1980). Further, given a new focus on the right hemisphere as

processor of emotions, it became apparent that normal prosodic performance probably has various psychological explanations - in that prosodic cues involve pitch, auditory patterns, and emotional meanings (Scherer, 1986), as well as multiple cerebral sources.

As mentioned above, by the 1980s, there was considerable evidence that emotional experiencing might have greater representation in the right hemisphere, manifest in several modalities, including lexical, prosodic, facial and gestural processing (Wechsler, 1973; Cicone, Wapner and Gardner, 1980; Bear, 1983; Bryden and Ley, 1983; Ten Houten, Hoppe, Bogen and Walter, 1986; Borod, 1992, 1993; Bowers, Bauer and Heilman, 1993), with as yet unsettled questions about lateralization corresponding with negative and positive emotion (Gianotti, 1972; Sackeim, Greenberg, Weiman, Gur, Hungerbubler and Geschwind, 1982; Davidson and Tomarken, 1989). Possibly, related to lateralized affective disorders (Galín, 1974; Heilman, Watsen and Bowers, 1983; Robinson, Kubas, Starr, Rao and Price, 1984; Cummings, 1985, 1997; Bruder, Quitkin, Stewart, Martin, Voglmaier and Harrison, 1989). In the affective realm, there are reported preference and aesthetic judgements between the hemispheres (Regard and Landis, 1986, 1989).

Another recent observation is the involvement of familiarity processing or personal relevance (Sperry, Zaidel and Zaidel, 1979; Wallace and Canter, 1985; Van Lancker, 1991) in behavioural deficits associated with right hemisphere dysfunction. Such problems are seldom seen in left hemisphere damage. Examples are prosopagnosia (Damasio, 1985) phonagnosia (Van Lancker and Canter, 1982; Van Lancker and Kreiman, 1987), the set of misidentification delusions including Capgras syndrome (Staton, Brumback and Wilson, 1982; Ellis, 1984), and topographical agnosia (Landis et al., 1986).

Currently, perhaps the most richly mined cache of right hemisphere function is the use of language in communicative contexts - the field of pragmatics. Here we refer not to phonemes or grammar, but to the subtler, crucial interstitial knowledge used to connect sentences, infer meanings, follow conversation, appreciate irony, recognize metaphor, and comprehend discourse. Deficits following right hemisphere damage have involved nonliteral language (Winner and Gardner, 1977; Van Lancker and Kempler, 1987; Van Lancker, 1988, 1990), theme and topic maintenance, humor, context relevance and inference (Brownell, Pincus, Blum, Rehak and Winner, 1997; Gardner, Brownell, Wapner and Michelow, 1983; Brownell,

Potter, Bihrlle and Gardner, 1986; Molloy, Brownell and Gardner, 1990). With this approach, studies of right hemisphere function merge with sociolinguistic (Rommetveit, 1974), psychological (Kernan, Mac Winney and Mayhow, 1977), and philosophical (Grice, 1975; Brownell and Martino, 1997).

NEED FOR THE STUDY

The 1980s have been the decade of pragmatics. There has, of course, long been an interest in the function of language as well as the structure of language, but it has been in the last fifteen years or so that we have seen the widespread influence of the area of pragmatics. Studies have indicated that many of the communicative consequences of RHD can be captured under the rubric of pragmatics (Joanette, et al. 1990; Myers, 1986; Tompkins, 1990, 1994).

This is a much needed endeavor, because the right hemisphere damaged patient may have troublesome communicative deficits despite fully intact "language" (phonology, syntax and lexical semantics) function. Besides aiding the patient, identifying these deficits helps family members cope with what otherwise may seem to be uncooperativeness or willfully aversive behavior.

Very few Indian studies have been carried out in this respect.

Thus, this study is warranted to study the communicative impairment with reference to pragmatics present in the RHD population and the trend seen in the Indian patients.

REVIEW OF LITERATURE

Research over the last century has revealed that the two sides of the brain, despite their morphological similarity, differ markedly in function. These differences, moreover, appear more and more fundamental as more data are reported.

The original observation that loss of speech was associated with damage to the left side of the brain (Broca, 1865) led to the hypothesis that the test hemisphere (LH) was "dominant" not only for language but for most other higher functions as well (Giannitrapain, 1967). Of course, research since then, and especially in the last decade, has confirmed the Broca-Dax hypothesis many times over in a variety of ways. Moreover, this research has in recent years addressed itself to more complex questions, namely whether the LH is specialized for the language faculty as a whole, some subpart of language, or for mental abilities used in nonlinguistic cognition as well as language.

Knowledge of the properties of "the other side of the brain" (Bogen, 1969a) has emerged somewhat later, and it is only in relatively recent years, that researchers have appreciated the special role that the right hemisphere (RH) may be playing with respect to language.

During the nineteenth century the idea arose that each cerebral hemisphere controlled different functions. Hughlings Jackson (1865) first drew attention to the contribution of the RH to linguistic performance, suggesting that it might mediate the less propositional, more automatic aspects of language, such as emotional utterances.

Since that time, effort in the area of RHD communication deficits has been devoted largely to an exploration of the signs and symptoms themselves, and much has been learned in the process.

We are now in a position to acknowledge that the two cerebral hemispheres of the brain enjoy a relationship of complementary specialization (Turber, 1974; Milner, 1980).

PATHOPHYSIOLOGY

Damage to neural tissue in the RH arises from the same array of neuropathologies that can result in LHD i.e. cerebrovascular accident, tumor, head trauma, and various other disease processes. Stroke is the leading cause, but relatively focal symptoms can be associated with tumors and

some cases of TBI as well. CVA is distributed fairly equally between the RH and LH of the brain.

Although investigators now make an effort to be more specific in reporting site of lesion in RHDs, much less is known about localization of function in the RH than in the LH. In the past it was customary to attribute non-dominant functions to the RH or "minor" hemisphere without specifying site of function. Finally, the RH is thought to be more diffusely organized than the LH so that the distribution of function is more widespread and less focal than in the LH (Goldberg and Costa, 1981; Semmes, 1968).

Table 1: Summarizes the presumed localization of function of the RH sensory, perceptual, and cognitive deficits that affect communicative ability in RHD patients.

Impairment	Presumed localization in the RH
Left-sided neglect; impairment in directed attention	Reticular activating system, cingulate gyrus, frontal eye fields, and/or dorsolateral parietal cortex (Mesulam, 1981).
Acute confusional states, including delusions and hallucinations	Posterior parietal cortex (Lavine and Finkelstein, 1982; Mesulam, 1985), frontotemporal cortex (Lavine, 1984), Prefrontal cortex (Mesulam, 1985).
Prosopagnosia	Occipito-temporal cortex confined to the RH (De Renzi, 1986; Meadows, 1974; Landis, et al. 1986); bilateral occipito- temporal cortex (Meadows, 1974; Damasio et al. 1985; Damasio, 1985).
Reduplicative paramnesia	Frontal cortex (Benson, et al. 1976) Parietal cortex (Fisher, 1982), Frontoparietal cortex (Ruff and Volpe, 1981)
Topographic disorientation	Occipito-parietal cortex (Meadows, 1974; Ruff and Volpe, 1981).
Impaired prosodic comprehension	Parietal and/or temporoparietal cortex (Heilman et al. 1984; Ross, 1981, 1985)
Impaired prosodic production	Frontal cortex (Ross, 1981, 1985)

Table-1: Presumed Localization of Selected RH Impairment.

Aside from prosodic disturbances, communicative impairments are not included in the table since almost nothing is known about their localization. Based on

hypothesis about left side neglect, one can speculate, however, that like neglect, failure to use and respond to significant contextual cues during communicative events may be differentially affected by anterior and posterior lesions. Frontal areas may contribute to the search for relevant cues while posterior regions may contribute to their recognition as significant.

EPIDEMIOLOGIC OVERVIEW

Although we know little about the epidemiology of RBD per se, perhaps we can extrapolate from existing data about stroke in general. Mlcoch and Metter (1994) summarize relevant epidemiologic data. They note an annual incidence in North America of about one to two people per 1,000 people, each year in the US, stroke leaves more than 250,000 people with permanent disability. At anyone time, about six of every 1,000 people are living with the consequences of stroke.

THE RIGHT HEMISPHERE'S CONTRIBUTION TO COMMUNICATION

RHD patients remind us that language is only one aspect of communication. Despite adequate linguistic skills, they are poor communicators.

Communication impairments associated with RHD has been defined as a breakdown in the "expression and reception of complex, contextually based communicative events resulting from a disturbance of the attentional and perceptual mechanisms underlying nonsymbolic, experiential processing (Myers, 1986). While fundamental language processes are intact, attention to and perception to contextual information is compromised so that the individual's experience of events is altered.

The three main types of communication disorders associated with RHD can be categorized as linguistic, extra linguistic, and non-linguistic. Table 2 represents the communication deficits associated with RH impairment.

Linguistic Deficits : May include mild problems in:
 Confrontation naming
 Word fluency
 Body part naming
 Auditory comprehension of complex material
 Oral sentence reading
 Writing :Grapheme substitutions, omissions.

Nonlinguistic Deficits : May include :
 Left sided neglect
 Directed attention to the left side of space
 Recognition of stimulus significance.
 Maintaining form in and including left sided detail
 in visuo constructive tasks.
 Awareness of midline and kinesthetic sense of body position.
 Anosognosia - recognizing physical limitations and impaired
 body as ones own.
 Denial of illness.

Visuospatial deficits
 Figure ground, figure integration, figure completion tasks.
 Detecting the directionality and orientation of lines.
 Mental rotation.
 Visual recall of form.

Impaired contextual processing and impaired visual
 associations
 Prosopagnosia
 Reduplicative paramnesia - geographic disorientation.
 Topological disorientation.

Extra linguistic Deficits : May include problems in :
 Distinguishing between significant and irrelevant contextual
 cues .
 Integrating pictured and verbal story elements into a theme.
 Interpreting implicit or intended meaning.
 Grasping the figurative meaning of metaphor and idiomatic
 expression.
 Over-personalization of external events.
 Organizing information into an appropriate hierarchy.
 Topic maintenance.
 Demonstrating sensitivity to the communicative situation.
 Impulsivity of response.
 Recognizing the emotional valence of ongoing events.
 Interpreting and producing affective facial expression.
 Interpreting and producing the prosodic features of
 verbal messages.

Table 2: Communication Deficits Associated with RH-
 Impairment.

When they exist, pure linguistic deficits are usually mild and by themselves, represent the least of the patients communication problems. The patient may suffer or appear to suffer from word finding problems and mild comprehension difficulty.

The heart of the person's communication disorder is in the nonlinguistic area where specific attentional and perceptual deficits interfere with the recognition of salient cues, the integration of those cues into a meaningful pattern, and the ability to adequately interpret implied or implicit meaning. The deficits manifest themselves in the extralinguistic aspects of communication.

Deficits in the extralinguistic category are usually the behaviours that first alert the observer to the person's communicative impairment. Essentially these deficits reflect a failure to adequately interpret cues and organize information in an efficient manner.

NONLINGUISTIC DEFICITS

The extralinguistic impairments stem from deficits in specific types of attentional and perceptual processing with the RH appears to mediate. Behaviours associated with these nonlinguistic deficits are described below:

ATTENTION DISORDERS

Attention is a collection of operations that forms an important mental resource allowing us to manage this information barrage, and to process and act on that which is relevant to our goals.

The integrity of the RH is considered particularly critical for developing and maintaining an alert state over time (Posner and Peterson, 1990; Whitehead, 1991) also referred to as sustained attention. This vigilance function is important for processing high priority stimuli. It appears to depend in part on a cluster of right frontal and parietal regions (Pardo, Fox and Reichler, 1991). Patients with RHD in those areas have evidenced reduced galvanic response and heart rate response to warning signals (Heilman et al., 1985; Yokoyama, Jennings, Ackles, Hood and Bollez, 1987). Also frontal lesion (in either hemisphere) interfere with sustained performance of monotonous tasks (Wilkins, Shallice and McCarthy, 1987), unless the subject can purposefully compensate with higher level of autonomic activity.

Sustained attention deficits may manifest in difficulties with extended listening, maintaining eye contact, and staying on topic or task. Some research has

also linked depression, in part, to a disruption of RH arousal and vigilance mechanisms (Liotti and Tucker, 1992).

RHDs can often generate compensatory effort to improve their performance in the short-term, but no one, brain damaged or not, can sustain compensatory effort for extended periods of time.

It is common in daily life to perform two or more tasks concurrently and to alternate or divide attention between them. The ability to divide attention is a problem for patients with prefrontal lesions in either hemisphere. The ability to divide attention is also relevant for performing "high load" single tasks, such as comprehending discourse units that are grammatically complex, or that require backtracking and re-evaluation (juggling many simultaneous acts of processing and storage). To name a few, the comprehender must execute syntactic, semantic and lexical processes to represent initial propositions; hold those propositions temporarily while others are encoded and interpreted; relate them to information retrieved from context and world knowledge, inhibit information that was automatically activated, but not relevant to the unfolding interpretation, resolve ambiguities such as those entailed by polysemous words, in explicit reference, nonliteral expressions, syntactic garden paths, erroneous assumptions,

or other inconsistencies, and draw inferences or other conclusions about the integrated textual interpretation. Indeed RHDs often complain about keeping track of lengthy conversations, complicated movies, or novels with many characters and complex plots (Tompkins, 1994).

To summarize briefly, the more attentional resources and the greater attentional control required for a particular activity, the more poorly RHDs will perform. But, becoming familiar and practiced with new tasks or mental operations allows people to attend to fewer aspects of them, freeing up some of their limited capacity.

VISUAL AND AUDITORY PERCEPTUAL AND RELATED FUNCTIONS

Even without significant sensory loss, RHDs may experience a variety of impaired visual functions, including visuoperceptual, visuospatial and visuomotor deficits. One may influence the other.

Disorders of Visual Function (Kolb and Wishaw, 1990)

Visuoperceptual

- Poor discrimination of complex stimuli that differ in subtle ways.
- Poor recognition of objects or other stimuli, such as faces (prosopagnosia)

- impaired colour recognition.
- impaired separation of figure and ground.
- Poor integration of stimulus constituents, and of relationships among objects/pictured elements.

Visuospatial

- Difficulty localizing points in space with fixed forward gaze.
- Difficulties judging direction, distance, length, depth.
- Topographical disorientation.

Visuomotor

- Deficits in movements directed by visual stimuli.
- impaired scanning.
- Constructional impairment.

Visuat-Attentional

- Visual neglect.

Evans, Heggs, Antoun and Hodges (1995) reported a 6 year old female presenting with progressive prosopagnosi associated with selective hypo-perfusion and atroph respectively (as revealed by SPECT and MRI), of the anteric part of the right temporal lobe.

False recognition of unfamiliar faces was investigated, by Rapesak, Polster, Glisky and Comer (1996), in patients with focal RHD in order to define the neuropsychological and anatomical correlates of the recognition impairment and examine its relationship to prosopagnosia. Processing deficits in subjects with both false recognition and prosopagnosia were associated with posterior right hemisphere lesion sites and included severe face perception impairment and partial damage to face recognition units (FRUS). Prosopagnosia without false recognition was seen following near complete destruction of FRUS, but this type of dissociation could also occur when FRUS become disconnected. The opposite dissociation, false recognition without prosopagnosia, was observed following right prefrontal damage. They proposed that false recognition in frontal patients results from the breakdown of strategic decision making and monitoring functions critical for determining whether a face is indeed that of a familiar person or whether there is merely a resemblance to a known individual. False recognition, following prefrontal damage may also be related to confabulation, in which case familiarity or even specific identity are erroneously attributed to facial stimuli without the activation of an underlying memory representation.

RHD can result in impaired performance on a variety of facial tasks that include the perceptual discrimination and

delayed recognition of unfamiliar faces (Warrington and James, 1967; Milner, 1968; DeRenzi, Faglioni and Spinnler, 1968; Benton, 1980), the estimation of age (DeRenzi, Bonacini and Faglioni, 1989), and the interpretation of facial expressions (DeKosky et al. 1980; Bowers et al. 1985).

Anatomical and neurological correlates of visuospatial neglect were studied in 53 patients with a CT-documented right hemisphere stroke by Samuelsson, Jensen, Ekholm, Naver and Blomstrand (1997). Evidence of neglect at the acute stage of stroke was strongly related to large lesions involving the middle temporal gyrus and/or the temporo-parietal paraventricular white matter. Comparing those patients, who recovered from neglect and those who did not, it was suggested that a simultaneous damage to the ventrothalamic system for regulation of arousal and to the neural systems mediating visual spacing, is likely to be followed by persisting neglect symptoms.

Visual agnosia is also commonly seen in the RHDs. Out of the two types of visual agnosias - apperceptive and associative, apperceptive visual agnosia is more common in RHDs wherein the analysis of perceptual properties and dimensions of known objects is affected (McCarthy and Warrington, 1990).

Disorders of Auditory Function (Kolb and Whishaw, 1990)

Audioperceptual

- Impaired perception of music (eg. loudness, harmonic structure, tonal harmony).
- Impaired discrimination of affective and linguistic prosody.

Audiospatial

- Impaired sound localization, shifting auditory signals towards the right side.
- Auditory neglect : Rare. Analogue of visual neglect, where patients ignore auditory stimuli from the side contralateral to the lesion, has been equivocally reported (Beaten and McCarthy, 1993). This may be partly due to the anatomy of the auditory systems. Both hemispheres receive input from both ears.

Auditory Agnosias

- Amusias : Inability to discriminate tones in a scale; impaired melody recall or recognition, disorders of rhythm and tempo. Rare; usually associated with right temporal lesion.
- Agnosia for sounds : Inability to identify the meaning of nonverbal sounds, such as a bird singing. Often associated with amusia and word deafness. Probably due to bilateral temporal damage.

ANOSOGNOSIA

- Refers to lack of knowledge of disease. Generally, anosognosia is worse and more persistent after large strokes. Also, worse the hemiplegia, the greater the denial (Hier, Mandlock and Caplan, 1983).

The patients may overestimate their capacity for independent living and resist supervision or intervention.

ORIENTATION

The RHDs may be disoriented to place and time, perhaps related to perceptual deficits. Some may be disoriented to the passage of time as well. RHD can affect orientation to other people, causing difficulty recognizing even familiar faces.

MEMORY

Just and Carpenter (1995) and Tompkins (1994) reported 25 RHDs to be more limited than control subjects on a measure of working memory capacity that requires simultaneous processing and storage of spoken information. Additionally, capacity as indexed by this task, was related to individual RHDs abilities to resolve textual inconsistencies and to revise initial references in other tasks with relatively high information processing load.

Working memory limitations of this sort may also be the root of the RHDs complaint of difficulty keeping up with fast-moving conversations and complicated story plots.

INTEGRATION

Integration deficits were included in the list of visuoperceptual disorders. But there are broader characterizations of difficulties with integrating or synthesizing information into a whole.

Generally, RHDs have trouble evaluating individual parts in the context of an organizational framework or appreciating the relationship of discrete elements to an overall structure. Integration deficits have been described in the linguistic domain as well as the visuo-perceptual domain.

Molloy, Browne II and Gardner (1990) conclude that the fundamental discourse comprehension impairment after RHD is a difficulty combining old and new information.

Myers (1986) suggests that RHDs may have trouble with any task that requires them to detect key elements, see relationships among them, combine them into an overall structure, and draw relevant conclusions.

RHDs integration deficits typically have been ascribed to problems taking in and using contextual cues, but perception integration requires attention to features of the stimuli themselves as well as contextual information.

Klonoff et al. (1990) has described integration deficits in daily living under the rubric of "seeing the big picture". Families of 3 RHDs reported that the patients fastened onto small details of a discussion, without appreciating a wider perspective or another point of view.

PLANNING, ORGANIZATION, REASONING AND PROBLEM SOLVING

RHDs potential difficulties with some component processes of planning, organizing, reasoning, and problem solving are :

- appreciating and generating alternatives
- perceiving relevant properties and characteristics
- focussing and sustaining attention.
- various aspects of integrating information and inferencing.

(Ashcraft, 1989; Lezak, 1983; McCarthy and Warrington, 1990; Ylvisaker and Szekeres, 1994).

These difficulties are associated with lesions in prefrontal regions of the brain, though subcortical damage can create difficulties as well.

Some studies proferred : Daily planning and organization tasks that may prove difficult for RHDs include record keeping activities; following sequential procedures; keeping

checklist; organizing date books; schedules and notebooks; and keeping track of personal belongings (Klonoff et al, 1998). They also have severe problems with time management.

OTHER BEHAVIOURAL PROBLEMS

Other behavioural deficits that may follow RHD :

- Impulsivity and disinhibition
- Distractibility
- Response delay
- Poor error recognition
- Slower rate of learning
- Difficulty switching sets
- Apparent lack of motivation
- Depression
- General discrepancy between "knowing" and "doing".

Overall, the cognitive and behavioural problems exhibited by RHDs can interfere with judgement and social skills, family relationships, functional living activities, and the potential to return to productive work (Klonoff, et al. 1990).

TEXT LEVEL ABILITIES : DISCOURSE AND CONVERSATION

Discourse processing calls on complex interactions of knowledge and mental operations that underlie daily life interactions. Table 1 - describes some general properties characterizing successful discourse (Patry and Nespoulous, 1990).

Remote from Surface Structure

Unity	Discourse is perceived as a whole, not as a simple concatenation of sentences.
Appropriateness	Formality, content, expression take into account the situation and the addressee's knowledge.
Intentionality	Message, or purpose, is clear.
Topicality	Topic is also clear.
Informativeness	A reasonable amount of information is included.

Surface Structure Elements

Cohesion	Reflects continuity established through word-level semantic relations. Cohesion occurs when the interpretation of a word or phrase in a discourse unit depends on that of another in the same discourse unit. Cohesive devices are explicit linking elements like pronouns, determiners, and other lexical or syntactic forms that coreference information across phrases and sentences (Armstrong, 1991).
----------	--

Intermediate with Respect to Surface Structure

Coherence	Reflects continuity over an entire discourse unit. Coherence is concerned with semantic relations (e.g. those involved in logical sequences and cause/effect relations) and pragmatic factors (e.g. new information should not contradict already given information, and should be relevant to what has come before). It can be overt (established directly from propositions in the text) or covert (linkages via inference and world knowledge); and local (reflecting relationships among individual propositions) or global (reflecting propositions' relation to an organizing principle or discourse theme).
-----------	--

Table 3: Fundamental properties of discourse and their relationship to surface structure.

Discourse Production and RHD

Interest in discourse production is growing rapidly, but the evidence is hard to interpret because no two investigators have used similar discourse models, sampling contexts and dependent measures and few subjects. Table-4 presents some of the contrasts among those that have been observed in the spoken discourse samples of RHD adults.

Diminished information content (propositions, t-units, episodes) versus propositional content and accuracy similar to comparable non-brain-damaged adult speakers.

Fewer words than normal (paucity) versus same number of words versus more words or more words per turn (verbosity).

Wandering from the point versus topic maintenance skills similar to those of control speakers.

Poor error monitoring in discourse versus as many successful repairs as control speakers.

Productions based on scripts, which are common scenarios like ordering a meal in a restaurant, that include tangential associations versus those that terminate prematurely.

Difficulty telling an integrated story versus producing a fully integrated story that is unrelated to the stimulus situation.

Impaired organization on story recall versus impaired memory for story schema.

Loss of connecting line (coherence errors) in narrative productions versus comparable proportions of propositions that are central to, supportive of, or distracting from the main story line.

Higher proportions of literal concepts reflecting a tendency to itemize, rather than interpret, in picture descriptions versus no differences from age peers in proportions of literal and inferential concepts produced.

Excessive detail and over personalization versus "unnecessary" detail and personal comments similar in extent to those produced by normally aging speakers.

Table-4: Some contrasting findings in discourse production after RHD

Baggs and Swindell (1993): Bloom, Ferrand and Paternosto (1993); Cherney and Canter (1993); Hillis Trupe and Hillis (1985); Joannette and Goulet (1990); Kennedy et al. (1994);

Joanette and Goulet (1990) report a comprehensive analysis of narrative discourse produced by 36 RHDs and 20 normals; elicited with a novel picture sequence called "The Cowboy Story".

They analyzed formal (lexical, syntactic) aspects of the sample, content (story structure and informativeness) and elements of cohesion and coherence contributing both to form and content.

Results are summarized as:

FORMAL ASPECTS

- * Percent nouns, verbs, adjectives
- * verb/noun, adjective/noun ratios

+ COHESION AND COHERENCE

Cohesive errors, or errors in semantic relations between segments of narratives (eg. undetermined pronouns, inadequate lexical reiteration).

Non-progression errors : Segments do not contribute new information.

Contradiction errors : New information contradicts something previously given.

Relation errors : New information is used without being related to that specified or implied meaning.

STORY SCHEMA AND INFORMATIVENESS

- * Total number of propositions in the referential portion of the narrative (excluding modalized comments that reflect subjects' comments about the task and their performance).
- * Total core propositions (relatively invariant propositions given by at least 20% of either group).
- * Total simple propositions (proposition having no argument overlap with other propositions) and complex propositions (those with arguments overlapping with another proposition).

* RHD samples have fewer.

+ RHD samples more likely contain errors in 2/more of the areas combined, (attributable to about 1/2 of the RHDs).

Another study by Frederikson and Stemoun (1993); revealed a particular difficulty constructing new conceptual representation of texts that contained information. The study is to be replicated for confirmation.

Davis, Pirozzi and Coon (1997) compared a group with RHD to neurologically intact controls regarding the referential cohesion and logical coherence of narrative production. A somewhat varied sample of six stories was obtained with tasks of cartoon-elicited story-telling and auditory oral retelling. They found deficits in the patient group with respect to referential cohesion, logical coherence, and accuracy of narration, but the occurrence of deficits depended on the condition in which narration was produced and, to some extent, on the particular story used in each condition.

Tompkins et al. (1993) analyzed connected speech samples elicited from a relatively large group of RHDs who were not selected on the basis of severity or neurobehavioural status. They studied 52 stroke patients (26 RHDs, 26 LHDs) and 26 controls. The stimuli to elicit speech sample was the

"cookie theft" picture. The responses were scored for literal and interpretative context units. Results revealed that some of the disordered behaviour ascribed to RHDs such as high proportions of literal concepts, over personalization, and excessive detail, did not distinguish RHDs from LHDs or normals.

Kennedy, Strand, Burton and Peterson (1994) studied first encounter conversations of RHD adults; with the purpose of comparing the dyadic interaction in turns between RHD and non-brain damaged (NBD). Simple conversation samples of 12 RHD and 11 NBD were analyzed. Results showed that RHDs took significantly more turns than NBD groups. They suggested that RHDs turn taking was inversely proportional to the number of words per turn and total number of turns in conversation. They used simpler topic skills of maintaining and reintroducing the topic. Also their dyadic conversation was less.

Uryase, Duffy and Liles (1991) analyzed and described narrative discourse in RHD adults, compared to neurologically normal and LHD aphasic adults; in terms of cohesion and story grammar 22 RHD, 20 neurologically normal and 12 LHD participated in the study. They found that only significantly smaller proportion of incomplete - tie cohesive markers than the LHD differentiated the two groups (which

could be partially explained by their brevity and missing context).

Discourse Comprehension and RHD

Brownell (1988) notes that RHDs appear to understand less in discourse than one might predict on the basis of their intact sentence-level linguistic comprehension.

Indeed the RH appears to contribute more to discourse comprehension than to single word processing (Phelps, Mazziotta and Huang, 1982).

The discourse comprehension problem that some RHDs exhibit appear to reflect a difficulty in synthesizing their knowledge with a specific discourse context. For ex. They may have trouble selecting a punchline that coheres with the rest of joke, even though their choice appropriately captures an element of surprise. Or they may have problems choosing pictured representations for metaphors that they can define. RHDs may also have difficulty answering questions about the more abstract or inferential aspects of narrative passages, such as those about relationships among events or characters. The extent of difficulty has been associated with education level, extent of premorbid brain atrophy and neglect (Benowitz, Moya and Levind, 1990).

Purdy, Belanger and Liles (1992) studied RHDs ability to use information within the text as well as extra linguistic information to draw inferences. They studied two groups - Group-1 consisted of 15 adults with RHD due to stroke and Group-2 had 15 normal adults. Results showed that the RHDs used more of general world knowledge in drawing appropriate situation specific inferences. Amongst explicit and inferential questions, explicit questions were easier for both RHD and normal subjects. However, RHDs overall performance was significantly poorer than normals.

Myers and Brookshire (1994) investigated the effects of visual and inferential complexity on the picture description of 24 RHD and 30 NBD adults by manipulating the visual and inferential complexity of pictured stimuli within the same task. They found that visual complexity has little effect on subject's descriptions of complex pictured words. On the other hand, inferential complexity consistently affected performance. The RHDs tended to generate fewer major concepts in all conditions than the NBD group, which suggests that RHDs are less able than NBDs to interpret and describe pictures (significantly impaired inferential accuracy and neglect scores). Therefore had more problem in context than isolated pictures, therefore show a central inference deficit (suggested by Myers, 1991).

Another study by Schmitzer, Strauss and DeMarco (1997) examined the influence of context on the interpretation of denotative and connotative meanings of homographs in RHD and NBD adults. Subjects were required to choose the meaning of homographs in linguistically unbiased ambiguous sentences and in denotatively and connotatively semantically biased narrative contexts. The NBD groups was significantly more accurate than the RHD, on the sentence and connotative narrative contexts. However, there was no significant difference between groups for the denotative narrative context. There were no significant differences between tasks contexts for the NBD group. The RHDs were significantly more accurate on the denotative narrative than the sentence context but displayed no significant difference in performance on the connotative narrative vs. sentence contexts. The findings suggested that RHD may result in a reduced ability to process connotative components of word meaning, that does not appear to be aided by the presence of additional semantically supportive linguistic information.

Other discourse comprehension problems have been attributed to a deficit in altering initial assumptions. RHDs even have difficulty at the single sentence level with tasks that require a shift in their initial assignment of syntactic roles for textual items (Schneiderman and Saddy, 1988).

RHDs appear to have particular difficulty in discrepant situations when portions of the context point to competing interpretations. Ex. Situations involving literally false statements where several possible meanings may be reconciled with other contextual cues. RHDs show less ability to use context effectively (eg. Knowledge of characters relationship) to predict what a speaker intends (eg. was the statement meant as a lie, a teasing comment, or a hurtful remark?) (Kaplan et al. 1990).

Frederikson and Stemmer (1993) found a problem with reconceptualizing original interpretations to reconcile seeming discrepancies (like to differentiate between a relevant and a dream). They also suggest that an abundance of inferences linked to explicit propositions, and an over use of narrative frame structure, may contribute to perceptions of tangentiality in RHDs.

Bloise and Tompkins (1992) found no group differences between RHDs and NBDs performance on questions pertaining to revised linguistic or attitudinal inferences.

DeVruse, Neri, Rubichi and Salvioli (1996) examined the issue of RH participation in sentential syntax processing. A modified version of the Insertion Task of Schneiderman and Saddy (1988) was administered to 8 RHDs, 8 LHDs and 28

normals. 28 word/syntagm insertions required role reassignment of a lexical item in the stimulus sentence (shift); 25 insertions implied only semantic reinterpretation of the sentence (Nonshift). The RHDs performed significantly worse only on the shift items. However, there was no differences between normals and RHD nonshift scores, or between the LHD and normal shift scores. Again, the RHDs scored lower than both the normals and LHDs on the Insertion Task as a whole. The findings suggest that the RH may be crucial for parallel activation processes underlying resolution of grammatical ambiguity.

Normally, an enhancement mechanism heighten the activation of information associated with a contextually relevant interpretation, and a suppression mechanism dampens activation of information that is less appropriate or relevant to the situation or discourse content. Given that RHDs comprehension problems tend to surface in incongruent conditions, with materials that require revision for successful comprehension, or in which multiple sources of information must be considered and reconciled, it is useful to investigate the efficiency of RHDs suppression and enhancement mechanisms (Tompkins, 1993).

Tompkins et al. (1997) studied 19 RHDs and 15 controls who listened to sentences that ended in lexical ambiguities.

structure to interpret story events. The patient also generated plausible inferences that could reconcile the two sets of events in the story, as well (eg. that the woman was having a nightmare, at a later time, about being in a airplane crash), but did not tie them to the reconceptualization suggested in the story.

RHDs are sometimes able to infer from, and profit from, contextual information (eg. semantic or emotional contexts, explicit themes, internal discourse consistency or redundancy), particularly in conditions that limit demands of attentional or working memory resources. And, they can draw some inference revisions when attentional demands are reduced (Tompkins, 1990, 1991; Tompkins, et al. 1992, 1994).

Conversational Behaviour

One preliminary effort examining spontaneous conversations with familiar partners (Prutting and Kirchner, 19987) found the majority of the 30 pragmatic skills investigated to be appropriately used by a group of 10 RHDs. About 1/2 of the RHDs were judged inappropriate in eye gaze, prosodic pattern and variation, turn-taking contingency, turn-taking adjacency, and quantity/conciseness. Parameters such as topic selection, topic introduction, topic change, other turn taking variables, and cohesion were noted to be deficient for 2 of the 10 subjects.

The sentence verbs biased ambiguity interpretation. Probe words, representing unbiased meanings of the ambiguities, were presented for rapid judgements of their fit with the sentences. In rejecting probe words, both groups showed interference from unbiased meanings of the ambiguities at a short (175 ms) probe interval. Only RHDs demonstrated interference 1000 ms after sentence offset, indicating that they suppressed contextually inappropriate meanings less effectively than controls.

Despite their deficits, RHDs do exhibit some strengths in discourse comprehension :

- They understand main ideas in narrative paragraphs better than details (Brookshire and Nicholas, 1984).
- They comprehend explicit information, especially when it is salient or important better than implied meaning (Brookshire and Nicholas, 1984).
- They benefit when provided with thematic information at the beginning of a narrative paragraph (Hough, 1990).
- They also demonstrate knowledge of the essential elements of common scripts (Roman, Brownell, Potter, Seibold and Gardner, 1987) and of metaphoric and idiomatic meanings (Tompkins et al. 1992).

Frederikson and Stemmer's (1993) patient drew micro-proposition inferences, in fact paraphrasing more of the literal content than the control subject; showed evidence of using narrative frame structure in inferred propositions that indicated temporal, causal and conditional links (but staying closer to the text than the control subject, who generated more summarization); and demonstrated some use of a goal

structure to interpret story events. The patient also generated plausible inferences that could reconcile the two sets of events in the story, as we II (eg. that the woman was having a nightmare, at a later time, about being in a airplane crash), but did not tie them to the reconceptualization suggested in the story.

RHDs are sometimes able to infer from, and profit from, contextual information (eg. semantic or emotional contexts, explicit themes, internal discourse consistency or redundancy), particularly in conditions that limit demands of attentional or working memory resources. And, they can draw some inference revisions when attentional demands are reduced (Tompkins, 1990, 1991; Tompkins, et al. 1992, 1994).

Conversational Behaviour

One preliminary effort examining spontaneous conversations with familiar partners (Prutting and Kirchner, 19987) found the majority of the 30 pragmatic skills investigated to be appropriately used by a group of 10 RHDs. About 1/2 of the RHDs were judged inappropriate in eye gaze, prosodic pattern and variation, turn-taking contingency, turn-taking adjacency, and quantity/conciseness. Parameters such as topic selection, topic introduction, topic change, other turn taking variables, and cohesion were noted to be deficient for 2 of the 10 subjects.

In first-encounter conversational dyads consisting of RHDs and SLPs, Kennedy and colleagues (Kennedy and Perez, 1993; Kennedy et al. 1994) also noted poor eye contact for RHDs. RHDs took more turns and used more words per turn in their conversations than did controls. But a variety of topic skill parameters including introductions, maintenance, expansions, shades, reintroductions, and terminations did not distinguish the two groups. Those in the patient group, on average, were more likely to talk about themselves than to ask questions of their clinician partners. They also found that RHDs initiated conversational topics after clinicians had made termination moves, suggesting that the patients were not aware that the conversation should be ending.

Mackenzie, Begg, Brady and Lees (1997) studied 91 middle aged subjects (64 NBD and 17 RH stroke) who were assessed on a series of verbal comprehension and spoken discourse tasks. Comparison of the stroke subjects with the appropriate educational contrasts showed the stroke group to be weaker in several aspects of spoken language comprehension, particularly metaphor and inference. In picture description the NBD groups used more words, spoke for longer and produced more information. In conversation, limited facial expression and eye contact and monotonous intonational pattern were characteristics of the stroke subjects, but other discourse

parameters - such as verbosity and topic maintenance did not distinguish these RBDs and NBDs.

RHDs were observed to use fewer figurative expressions than NBDs. However, the relative frequency of various types of figurative terms did not distinguish the groups (Apel, et al. 1992). There was no difference in percentage of terms containing requests for information responses to questions, arguments, interruptions, self-initiated comments, direct quotations, narrative comments, elaboration, self-elaborations or taboo words (Blender, et al. 1993).

AUDITORY LANGUAGE COMPREHENSION

Adamovich and Brooks (1981) reported that RHDs performed less well than control subjects on most of the auditory comprehension tests of the BDAE (Goodglass and Kaplan, 1983), and on portions of the Revised Token Test (RTT) (McNeil and Prescott, 1978).

McNeil, Odell and Campbell (1982) observed some similarities between RHDs and aphasic subjects in the nature of moment to moment changes in auditory processing.

evidence that lexical semantic knowledge is largely intact following RHD, and the apparent lexical deficits result from failure to use lexical knowledge flexibly, suggesting that RHD language disorders may stem from broader cognitive failures.

Jogermani and Pierce (1995) investigated the nature of semantic attribute knowledge in subjects with LHD and RHD and with NBD. The relationship between attribute knowledge and both auditory comprehension level and naming skills was also studied. Subjects completed a sorting task involving high, mid and low frequency of occurrence nouns and high (HI) and low importance (LI) attributes. Subjects also named pictures of the stimulus nouns. While the identification of HI attributes remained intact, LHDS and RHDS exhibited equivalent reductions in identification of LI attributes across frequency levels. In contrast, the LHDS were significantly more impaired on comprehension and naming measures than were the RHDS.

Kiefer et al. (1998) found that ERPs at inferior fronto-parietal sites for directly related words showed ERP priming effects over both hemispheres. However, indirectly related words only elicited ERP priming effects over the RH. The results support the hypothesis that the RH semantic system is involved in processing of remote semantic information.

WORD-RETRIEVAL DIFFICULTIES

RHDs often have word retrieval problems :

Hough, DeMarco, Bedsole, Fox and Pabst (1993) report that 60% of the RHDs exhibited word-finding difficulties. Their difficulties are typically fewer in number and less obvious than those of aphasics. The majority of errors can be coded as semantic confusions, and, as is the case of NBDs, most of these are coordinate errors (eg. "cat' for "dog').

RHDs also tend to make more visually based errors than aphasics (eg. "extension cord' for snake). Some visual-semantic errors can be attributed to problems of scale in the correct semantic field (eg. "big top' for camping tent). It has been suggested that RHDs with temporo-parietal damage are most likely to have visual misnaming errors due to perceptual impairments of object recognition (Tompkins, 1994).

The evidence of lexical semantic deficits following RHD was assessed using word (or verbal) fluency tests by Varley (1995). Two groups of subjects (NBD and RHD) were indistinguishable in their performances on convergent lexical tasks. Subjects completed verbal fluency tasks by 5 semantic criteria. The BD subjects produced significantly fewer lexical retrieval strategies. The results are interpreted as

evidence that lexical semantic knowledge is largely intact following RHD, and the apparent lexical deficits result from failure to use lexical knowledge flexibly, suggesting that RHD language disorders may stem from broader cognitive failures.

Jogermani and Pierce (1995) investigated the nature of semantic attribute knowledge in subjects with LHD and RHD and with NBD. The relationship between attribute knowledge and both auditory comprehension level and naming skills was also studied. Subjects completed a sorting task involving high, mid and low frequency of occurrence nouns and high (HI) and low importance (LI) attributes. Subjects also named pictures of the stimulus nouns. While the identification of HI attributes remained intact, LHDs and RHDs exhibited equivalent reductions in identification of LI attributes across frequency levels. In contrast, the LHDs were significantly more impaired on comprehension and naming measures than were the RHDs.

Kiefer et al. (1998) found that ERPs at inferior fronto-parietal sites for directly related words showed ERP priming effects over both hemispheres. However, indirectly related words only elicited ERP priming effects over the RH. The results support the hypothesis that the RH semantic system is involved in processing of remote semantic information.

RHDs have been found to have particular difficulty naming categories, or collective nouns (Myers and Brookshire, 1995). They may identify the individual elements in a composite picture (eg. one depicting a hammer, screwdriver, and pliers), rather than assigning the category name ("tools"). They may also have more difficulty naming objects associated with their illness (eg. wheelchair), especially when they have hemispatial neglect or anosognosia.

READING AND WRITING DEFICITS

Reading Difficulties

These are ascribed to impairments in various mechanisms that co-operate in encoding and processing visuospatial information, such as premotor programming of ocular scanning, spatial distribution of attention, and construction of abstract visuospatial representations. "Lower level deficits" may include difficulties scanning across a line; tracking back to the left to find the beginning of each line, or coordinating the process of looking from the top of the page to the bottom for an answer choice and then backup again (Tompkins, 1994).

One of the most frequently investigated types of RHD reading impairments associated with attentional or

representational mechanisms is neglect dyslexia (Friedman, Ween and Albert, 1993). This syndrome is classically defined by four symptoms:

1. ignoring the left page of a book.
2. omitting the first words of a line
3. altering the initial letters of single words.
4. "visual" errors in which the word is misread but the incorrect elements do not lateralize.

Left neglect dyslexia is observed in some patients with right parietal lesions. It is sensitive to orientation of words in space, so the effect diminishes when words are written vertically. The most common errors are better substitutions that preserve overall word length; but some deletion errors occur (Kinsbourne and Warrington, 1962; Shallice and Warrington, 1977; Baxter and Warrington, 1983; Barbut and Gazzaniga, 1987; Caplan, 1987; Ellis, et al. 1987; Behrmann, et al. 1990).

Schwartz, Ojemann and Dodrill (1997) characterized the reading errors made by 64 right-handed adults with complex partial seizures after RH injection of sodium amobarbital. A variety of reading errors occurred, most of which fell under the syndrome of "neglect dyslexia" including deletions and substitutions of whole words on the left side of a line of

text as well as within - word neglect errors. It could be caused by an interaction between a peripheral processing deficit and more centrally located conceptual knowledge of linguistic structure. Other errors could be attributed to a general decrease in attentional mechanism. Neglect errors at the level of the sentence occurred in the absence of neglect errors at the level of the word although the converse was not true. Therefore the later causes the former. A double dissociation existed between single word neglect dyslexia errors and "visual" errors, indicating separate processing mechanisms.

Koul and Llyod (1998) compared the differences in performance on recognition of graphic symbols across time by individuals with aphasia, individuals with RHD, and neurologically normal adults. The results indicated that individuals with aphasia and normals do not differ significantly in recognition of graphic symbols. However, individuals with RHD recognized fewer symbols compared to individuals with aphasia and normals, suggesting that they have difficulty in associative learning of graphic symbols.

RHDs may have difficulty comprehending abstract meanings or complex written material. These problems may be linguistically based.

Writing Difficulties

They are most commonly exhibit spatial agraphias.

Ardila and Rosselli (1993) found that motor deficits predominated in RHDs with frontal damage (eg. iterations of features and letters), and spatial deficits were most apparent in RHDs with posterior damage (eg. inappropriate distribution in space, such as superimposition of words or elements, and misgrouping of elements within and between words). Patients with concomitant neglect may also exhibit a tendency to leave larger margins on the left side of the page, which increase as succeeding lines are written or to crowd their output on to the right side of the space provided.

Benson observes that spatial agraphia remains unproven (characterized by an excessive number of separations between letters and groups of letters).

Hashimoto, Tanaka and Yoshida (1998) found that a strongly right handed Japanese man showed an unusual writing disorder associated with Broca-type aphasia after suffering a RH infarction. Writing produced a fluent output in contrast to his non-fluent speech. The patient's agraphia disproportionality affected the writing of kana (Japanese

syllabograms) leaving relatively intact the writing of Kanji (Japanese ideograms). His kana agraphia consisting of substitutions, intrusions, transpositions, and deletions, became apparent as the number of syllables in target word increased. It was seen that most of the substitutions were phonologically dissimilar. More errors occurred near the end than at the beginning of a word. The kana agraphia in association with fluent writing output resulted in kana jargonagraphia. This indicated a selective damage to the hypothesized kana graphemic buffer and by disinhibition of the motor engrams of writing behavior, both of which resulted from RHD.

Data from split-brain patients, patients with extensive LHD and patients who have undergone left hemispherectomy was used to examine the RH capability of written language production by Weekes (1995). The data show the isolated RH of split-brain patients is capable of written language even if spoken word production is absent. The RH can also develop a capacity to write and spell after damage to the LH. Further, the type of spelling skill displayed the RH is constrained to a lexico-semantic strategy.

Other impairments may also contribute to writing deficits. For eg. if attention wanders, patients may have a problem returning to the place where their writing left off.

Difficulty organizing thoughts or formulating propositions may be reflected in ambiguous or seen on sentences.

Prevalence of spatial agraphia as reported by Ardila and Rosselli (1993) in RHDs with retro-rolandic lesions is 40-73% and upto 50% of frontally damaged.

In another report by Homer, Lathrop, Fish and Dawson (1987), the presence, severity, and pattern of agraphia in narrative writing samples did not reliably differentiate RHDs from either aphasics or those with mild dementing conditions.

DYSARTHRIA

Kent and Rosenbek's (1982) acoustic analysis of RHD's speech patterns indicated essentially normal word and phrase duration with a flattened prosodic contour. These are many similarities between RHD and parkinson's disease and hypokinetic dysarthria. Both groups showed a general pattern of decreased acoustic contrast, including limited Fo and intensity variation, continuous voicing, weakly formed consonants and reduced acoustic energy in the mid-to-high frequency range.

PRAGMATICS DOMAIN

Pragmatics involves the relation between language behavior and the contexts in which it is used and interpreted. Some of them include :

- Prosody
- Emotional interpretation and response.
- Speech act use and interpretation.
- Figurative and implied meanings
- Sensitivity to situation and listener needs.
- Humor appreciation
- Other forms of inference

(Joanette et al. 1990).

Pragmatic deficits associated with damage to the RH are interrelated with the deficiencies in affective-prosodic and linguistic cognitive processing (Myers, 1986). Clinical observation of the conversational abilities of RHD patients shows that these individuals are unable to appreciate the context and tone of a conversation or the presupposition entailed. Their discourse often focuses on insignificant or tangential details and includes inappropriate humor or comments giving their language an excessive and rambling nature.

Myers (1986) suggested that the reason why RHD patients are unable to use contextual cues results from their difficulty in evaluating the significance of sensory input, in associating it with prior knowledge and integrating multiple features of experience into a meaningful pattern or context. Further, she suggested that the inability of these patients to use contextual cues occurring in conjunction with an essentially intact linguistic system is the reason why patients with RHD tract to literal rather than metaphorical, humorous or idiomatic speech forms and why they confabulate, miss the point and include tangential details in their conversation. Myers (1986) has suggested that it is these two deficits (i.e. the tendency to interpret words and events on a literal, superficial basis and the failure to establish adequate organizational framework) that constitute the two major pragmatic deficits in patients with RHD.

The observation that LHD aphasic patients communicate better than they talk (Holland, 1977) and RHD patients perhaps talk better than they communicate has led to the hypothesis that RH is responsible for simultaneously organizing and integrating different elements of conversation while the LH is critical for literal language (phonology, syntax and low level semantics (Foldi, Cicone, Garner, 1983).

Shields (1991) noted that following RH lesions, adults' speech can become copious and inappropriate, with abnormal prosody, and they may be unable to comprehend metaphor or humor. Their symptoms resemble those of children with semantic-pragmatic language disorder, who use fluent, grammatically complex language, but with poor sensitivity to the communicative situation. The hyperlexia found in some of these children reflects an underlying cognitive problem in integrating semantic information with knowledge of the world. Both groups of patients fail to comprehend inferential meaning or to make use of paralinguistic features. It was hypothesized that the disorders of communication and cognition found in semantic pragmatic language disorder could be linked to RHD and confirmation by research was indicated.

PROSODY

Includes elements of speech melody rate, stress, juncture and duration. Prosodic influences cut across linguistic levels, providing cues to consonant voicing, syntactic clause boundaries, utterance form, semantic stress and novelty, and utterance intent.

Some RHDs have monotonous or 'flat' speech (House, Rowe and Standen, 1987). RHDs produce less stress on individual words in sentences, and less emphatic stress. so that their production have a monotone quality.

Colsher, Cooper and Graff-Radford (1987) found that time post-onset was related to perceived dysprosody, which suggests that early apparent dysarthrias, may diminish (monotone may be due to the dysarthria associated with RHD).

Some RHDs are hypermelodic. Acoustic evidences show they have abnormally high mean F_0 , together with high pitch variability (Colsher et al. 1987).

In general, whether linguistic or emotional prosody, the evidence on prosodic problems after RHD is mixed. Therefore, these deficits are not particular to RHDs.

Difficulties with interpreting linguistic prosody is due to impairment of prosodic decoding (Joanette, et al. 1990). RHDs respond less consistently to emotional tone or intonationally implied meanings in interaction with others. This is due to difficulty in discriminating between filtered, nonemotional speech patterns (Tompkins and Flowers, 1985).

A more purely perceptual component may underlie or contribute to both linguistic and emotional prosodic impairments.

RHDs have more difficulty processing intonational, or F_0 aspects of prosodic signals, than temporal or durational components (Robin, Travel and Damasio, 1990).

The perception and production of linguistic and affective prosody at the word, phrase, and sentence levels were examined to delineate the nature of a prosodic deficit evident in a 20 years old female with a history of seizures in the non-dominant frontal lobe by Dykstra, Gandour and Stark (1995). Acoustic-perceptual analysis of conversational and elicited speech revealed that both perception and production of affective and linguistic prosody were impaired. Acoustic analysis further indicated that timing and intensity were impaired, whereas F_0 was relatively spared. Her prosodic profile indicated that disruption of F_0 in longer and more complex prosodic units was secondary to an underlying timing deficits.

Gandour et al. (1995) studied the production of speech prosody in emotional contexts in Thai patients with unilateral RHD. 12 RHDs and 12 normals read target sentences embedded in paragraphs that cued either a happy, sad or neutral effect. Perceptual evaluations of their productions revealed a severe deficit in RHDs. Acoustic analysis indicated that long-term measures of F_0 , timing and energy at the sentence level were aberrant in RHDs.

Ross and Thompson (1997) explored the mechanisms underlying affective prosodic deficits following LHD and RHD by testing the ability of subjects to repeat and comprehend

affective prosody under progressively reduced verbal-articulatory conditions. The results demonstrate that reducing verbal-articulatory conditions robustly improves the performance of LHDs but not RHDs, a finding that supports the supposition that effective prosody is strongly lateralized to the RH. Based on functional anatomic correlations for spontaneous affective prosody and affective prosodic repetition, deep white matter lesions located below the supplementary motor area that disrupt inter-hemispheric connections coursing the mid-rostral corpus callosum may contribute to affective-prosodic deficits that are both additive and independent of any aphasic deficits.

Blonder et al. (1995) examined spontaneous prosody in audiotapes of interviews with a 77 year old right-handed woman recorded 6 months before and 6 weeks after she suffered a stroke affecting the right fronto-temporo-parietal regions and the right basal ganglia. They compared beginning, peak and ending F_0 in breath groups, the timings of these F_0 changes, rate of speech, pause duration, and breath-group duration. They found that post-stroke, the patient had a more restricted F_0 contour, no changes in the timing of peak F_0 , an increased rate of speech, less variability in pause duration, and no changes in breath-group duration.

Hemispheric lateralization in processing linguistic and non-linguistic intonation contours during sentence processing was examined by Perkins et al. (1996) in four experiments using subjects with unilateral LHD or RHD. When subjects were asked to identify intonation contours as questions or statements in semantically neutral sentences, the LHDs demonstrated a significantly poorer performance than the control groups. No significant differences were found between RHDs and controls. When subjects were asked to identify syntactically ambiguous sentences through the perception of intonation cues located at syntactic boundaries the same patterns of results emerged. In discriminating between the aforementioned segmentally identical sentences, no significant differences were found between groups. However, when the segmental information was degraded and subjects were asked to discriminate between isolated prosodic structures, the RHD group demonstrated a significantly poorer performance than the control group. No significant differences were found between LHD and control groups. This inverse pattern suggested a LH dominance in processing intonation contours that have a linguistic function. When the linguistic significance was reduced, the RH was dominant.

Emotional and Nonverbal Communication

A great deal of evidence suggests that emotional behaviour is mediated primarily by RH (Tucker and Frederick, 1989).

But the evidence is conflicting as to whether the RH is more important for processing negative emotions and LH for positive emotions or vice-versa.

Within RH, frontal lesions tend to result in emotional disinhibition. For ex. patients with frontal impairments may tell pointless stories with liberal profanity, even when others take exception. Patients with more posterior RHD may minimise and rationalise their deficits and have difficulty assigning meaning to emotional stimuli.

RHDs have problems to link a relatively intact appreciation of emotional material with decisions about situations and context. For eg. Patients may do well inferring the affect conveyed by sentences describing emotional situations (Tompkins and Flowers, 1985), but may falter when required to match their emotional inferences with specific pictures or settings (Cicone, Wapner and Gardner, 1980). Some RHDs have problems appreciating the visuospatial and acoustic/prosodic stimuli in which emotional messages are

embedded, potentially leading to emotional misinterpretation (Blonder, Bowers and Heilman, 1991). Some exhibit emotional interpretation deficits across modalities, including pictures, body language, facial and vocal expression, and complex non-redundant discourse units (Zoccolotti, Scabini and Violani, 1982).

In Schmitt, Hartje and Willmess's (1997) study 27 patients with RHD, 25 patients with LHD and 26 normals were investigated for unimodal and simultaneous multi modal recognition of emotional attitude. AM subjects were shown 330 videotaped items of 4 seconds duration, each of which was to be judged in terms of facial expression, emotional prosody and the emotional meaning of the underlying spoken sentence. The results suggested; (a) RH superiority for recognition of emotions conveyed by facial and prosodic information (b) a RH dominance for recognition of fear and (c) no significant enhancement of RH superiority under multimodal presentation of emotional stimuli .

RHDs show reduced non-verbal animation and co-verbal behaviours relative to NBDs (Blonder, Burns, Bowers, Moore and Heilman, 1993; Golper, Gordon, Rau, 1984). Again there are exceptions. Either extreme has potential implications for interpersonal interactions. RHDs also are deficient in adhering to rules of social discourse involving eye contact,

facial expression, spontaneous use of gesture, vocal inflection and turn-taking.

Speech Acts

Often, a speaker's intentions differs from the literal meaning of his/her utterance. For ex. "Pass the salt" requires an action to be done.

The "real" meaning conveyed by an utterance is known as speech acts. Other speech acts include asserting, directing, questioning, and warning.

Some RHDs have difficulty interpreting indirect requests, exhibiting a tendency to take them literally; such as a patient may respond "yes" to the question about the salt. Others are sensitive to the fact that such forms often solicit actions, but they appear to have difficulty judging the appropriateness of action responses in particular situations. For eg. for a question "Can you play tennis", they imagine a person playing tennis and think that it is a perfectly fine response (Hirst, LeDoux and Stein, 1984). Difficulty in such conditions is in judging the plausibility of the depiction, rather than a problem interpreting the contextual appropriateness of the response (Joanette, 1990).

Bara, Tirassa, Zettin (1997) verified all the predicted trends of difficulty; in particular, difficulty increases from direct/indirect speech acts to irony, from irony to deceptions, and from deceptions to failure recovery. They found that in sharp contrast with previous literature, there is no difference between the subjects' comprehension of direct and indirect speech acts.

It is not clear whether the RHDs difficulty lies in interpreting the requests themselves, interpreting the contexts, or relating the two at some level (Joanette, et al. 1990). Stemmer, Giroux and Joanette (1994) studied the production and evaluation of request sequences (not comprehension), suggest that the last possibility may be the case in some conditions. They examined RHDs production and metalinguistic judgements of requests that varied from quite direct requests (eg. "Turn down the radio) to quite indirect "hints" (eg. "I am having trouble concentrating").

RHDs problem, centred primarily around the application of nonconventionally indirect requests, or "hints". In such requests, the mental representation of the stimulus context is not necessarily compatible with that derived for the request itself (whose interpretation is not linked by any strong convention to a particular pragmatic form or function (Stemmer, et al. 1994).

Lemieux, Goulet and Joannette (1993) reported that RHDs had no difficulty interpreting indirect speech acts in more natural communicative situations. Evidence from other studies of nonliteral processing has raised similar cautions against over generalizing from poor performance on metacognitive tasks after RHD (Tompkins. 1990; Tompkins et al. 1992).

Figurative and Other Implied Meanings

Some RHDs also take idiomatic, metaphoric, connotative, or sarcastic expressions more literally than they are intended. Nonliteral interpretation problems often emerge when the assessment method requires metacognitive abilities such as comparing literal and metaphoric word attributes to judge similarity of meaning; associating intact appreciation of figurative expressions such as "a loud tie" with specific, task-imposed contexts; or explaining nonliteral forms such as proverbs. For instance, a dissociation has been observed between RHDs access to idiomatic expressions presented in sentence contexts, and their relative difficulty defining and explaining the same forms (Tompkins et al. 1992).

Kaplan, Brownell, Jacobs and Gardner (1990) assessed the ability to interpret conversational utterances in a group of 12 male patients within RHD and 12 NBD, aged matched male

control subjects. Subjects listened to short vignettes which described both the actor's performance on a task. Each vignette concluded with the speaker's utterance was literally true; in the other half, the utterance was literally false and invited a non-literal interpretation. Results showed no appreciable differences in the performance of control subjects and RHD patients when interpreting literally true utterances. In contrast, the two groups differed reliably when interpreting the pragmatic intent of nonliteral utterances. Control subjects used information about both the actor's performance and the speaker actor, relationship. They are better with nonliteral expressions (comprehension) that they have produced (Apel, Van Dyke and Fedorak, 1992).

Sensitivity to Listener Needs and Situation

Presupposition, and theory of mind, are two concepts associated with sensitivity to listener needs. Presupposition involves the process of forming assumptions about what a listener believes and knows and, as such, requires taking the perspective of one's communication partner. Someone's "Theory of mind" reflects his/her presuppositions.

As the RH has been seen to be responsible for the interpretation of the pragmatic aspects of communication, RHD and LHD adult patients in Siegal, Carrington and Radel's (1996) study were compared on their ability to correctly draw inferences in false belief tasks. The RHD but not the LHD patients were found to have difficulties similar to those of young children in understanding the controversial implications of test questions. Removal of the need to infer the questioner's meaning enabled both RHD and LHD subjects to make correct false belief predictions.

Important for referential and lexical markers to conversational management devices, as speakers attempt to make their contributions appropriate to their partners.

RHDs have difficulty in this area. They may delve into a topic without informing the listener, they may use in explicit referential devices, and they may attempt few conversational repairs. Also they have problems with presupposition and theory of mind. Kaplan, Brownell, Jacobs and Gardner (1990) studied conversational irony. A situation in which an actor's poor performance is followed by a positive comment from another character (friend). RHDs were less likely than controls to use the relationship information to decide whether the speaker was telling the truth, joking, sarcastic, mistaken, or lying on purpose. The authors

interpreted this finding as a difficulty in attributing knowledge of friend's intentions to the actor. This task has a metacognitive component that may make it hard for RHDs to perform.

An impaired sensitivity to listener's needs and situations may be manifested more generally in social disinhibition and other social/interactional problems (Klonoff, Sheperd, O'Brien, Chiapello and Hodak, 1990).

Humor

Deficits in appreciating humor in RHDs are potentially multifaceted. They are linked to impairments in interpreting situational, facial and prosodic cues that signal the emotional content of a message, and/or difficulty integrating content across parts of a narrative.

Some patients appear to detect, but have difficulty resolving, the incongruity or contradiction that is frequently necessary for a story to be perceived as humorous, although they do recognize surprise as an essential element of humor (Bihrlle, Brownell and Gardner, 1988).

RHDs humor production is crude or otherwise disinhibited, and inappropriate to the situation.

Gardner et al. (1983) evaluated RHDs understanding of humor by asking them to quantify their appreciation of the humorous nature of a story on a scale from 0 to 5. In them, 1/2 of the stories were humorous and other 1/2 humorless. The latter were constructed from the former by replacing the punchline with a congruent proposition. They found that the RHDs were able to distinguish these two types of stories, truly suggesting that they were capable of understanding the humorous nature of stories.

In a second experiment, Gardner et al. (1983) compared the evaluations given by the same subjects for four different types of humor; puns, tricks, puzzles and foils. In the RHDs, the evaluation scores were lowest for the foils and highest for the forms. In fact, the RHDs tended to give higher evaluation scores than the normals, regardless of whether the item were funny. This finding could reflect a global effect of the task itself on the choices made by these patients.

Both Gardner et al. (1983) and Birlle et al. (1986) view these results as indicative of the preservation of a certain sensitivity of the RHDs to the formal aspects of humor.

Laavanya (1996) studied the comprehension of humour in the brain damaged. She found significant differences between

METHODOLOGY

AIM : The aim of the present study was to study impairment in pragmatic use of language in the Right Hemisphere Damaged.

SUBJECTS : Five adults (above 18 years) with a right hemisphere damage were taken as the subjects of this study.

CRITERIA : The criteria for the subject selection were :

- 1) Right hemisphere damaged
- 2) Age above 18 years
- 3) Education at least uptill primary level.

TOOLS : The tool used in the present study was:

THE PRAGMATIC PROTOCOL

The pragmatic protocol, developed by Prutting (1982) was designed to provide an overall communicative index for school-age children, adolescents, and adults. The protocol consists of 30 pragmatic aspects of language. These parameters were extrapolated from the developmental; child language literature as well as the adult literature. It adheres to Levison's (1983) treatise that the range of

the brain damaged and normal controls but not between LHDs, and RHDs on the task of complex cartoons. The poor performance of RHD's compared to normal were attributed to a combination of visuoperceptive and cognitive impairments and the poor performance of LHD to a difficulty in processing humour based on higher level cognitive strategies.

However, in the test which had cartoons with captions revealed a significant difference between the brain damaged and normal controls. She suggested that such tests could tap the RHDs impairment in associating a linguistic information (caption) with an absurd picture.

Inferences

Inferencing is gleaning information that is not explicitly provided.

Although RHD subjects make few errors sorting pictures of objects, they may have more difficulty sorting pictures according to an implicit theme or gist, particularly when the pictures contain multiple contextual cues that lead to thematic interpretations (Myers, Linebaugh and Mackisack-Morin, 1985). Similarly, some patients are poor at inferring motives and morals from story contexts (Wapner, Hamby and Gardner, 1981).

Some types of inferences may be more difficult than others as well. For example, some RHD adults may do better answering inference questions that rely on general world knowledge than those that require integration of information provided in a text; some may have more difficulty drawing inferences about spatial relationships than about nonspatial descriptions. RHD adults tend to be fairly good at drawing initial inferences from linguistic material, but may have more difficulty revising them if a reinterpretation becomes necessary (Brownell, Potter, Bihrlé and Gardner, 1986; Tompkins and Mateer, 1985).

Kaplan et al. (1990) reported that inferences about affectively consistent information (eg. a person in a pleasant situation hears a positive comment and interprets it as "telling the truth") maybe less impaired than those about affectively inconsistent or discrepant situations (eg. someone in a negative situation hears the same positive comment, which may be intended ironically, or as an attempt to make someone feel better).

In general, RHD patients appear to have more difficulties with inferencing when the context supports or suggests alternative interpretations.

pragmatic aspects exists on a continuum and includes both context dependent aspects of language structure (eg. cohesion) as well as aspects that rely on principles of language usage that are relatively independent of language structure (eg. physical proximity, eye gaze).

The protocol used in this study along with the definitions of each parameter and examples are presented in the Appendix 1.

PROCEDURE :

The pragmatic protocol was completed after observing individuals engaged in spontaneous, unstructured conversation with a communicative partner (family members/experimenter). The experimenter observed a 15 minute of conversation on I ine for aspects that rely on principles of langauge usage that are relatively independent of language structure i.e. non-verbal aspect (eg. body posture, eye gaze etc). The conversation was audio taped to assess the verbal and paral inguistic aspects of language. After the experimenter observed the interaction, the protocol was completed.

RESPONSE MODE : Response were elicited in verbal mode.

DATA RECORDING : The data collected was represented under the following format -

Name	Age/Sex			
Date	Communicative partners:			
	Relationship.			
Communicative Act	Appro- prieate	Inappro- prieate	No oppor- tunity to observe	Comments

VERBAL ASPECTS

A. SPEECH ACTS

1. Speech act pair analysis
2. Variety of speech acts

B. TOPIC

3. Selecti on
- 4 .Introd ucti on
5. Maintenance
6. Change

C. TURN TAKING

7. Initiation
8. Response
9. Repair/Revision
10. Pause time
11. Interruption/overlap
12. Feedback to speakers
13. Adjacency
14. Contingency
15. Quantity Conciseness

D. LEXICAL SELECTION/USE ACROSS SPEECH ACTS

16. Specificity/accuracy
17. Cohesion

E. STYLISTIC VARIATIONS

18. The varying of communicative style

PARALINGUISTIC ASPECTS

F. INTELLIGIBILITY AND PROSODICS

- 19. Intel I igibi I i ty
- 20. Vocal intensity
- 21 . Vocal qua l i ty
- 22. Prosody
- 23. Fluency

NONVERBAL ASPECTS**G. KINESICS AND PROXEMICS**

- 24. Physical proximity
- 25. Physical contacts
- 26. Body posture
- 27. Foot/leg and hand/arm movb.
- 28. Gestures
- 29. Facial expression
- 30. Eye gaze

SCORING

Each pragmatic aspect of **language on the protocols** judged as appropriate, inappropriate, or not observed.

The following guidelines were used.

Appropriate : Parameters are marked appropriate if they are judged to facilitate the communicative interaction or are neutral .

Inappropriate : Parameters are marked inappropriate if they are judged to detract from the communicative exchange and penal ize the individual.

No opportunity to observe : If the evaluator does not have information to judge the behaviour as appropriate or inappropriate, the clinician marks this column. Aspects marked in this column are reassessed during additional samples of conversational interaction until the evaluator is able to judge them as either appropriate or inappropriate.

A two point yes/no judgement was used.

The results are presented and discussed in the next chapter.

NAME: Mr. V
 COMMUNICATIVE SETTING OBSERVED AT HOME

Communicative act	Appropriate	Inappropriate	No opportunity to observe
<i>Verbal aspects</i>			
A. Speech acts			
1. Speech act pair analysis	✓		
2. Variety of speech acts	✓		
B. Topic			
3. Selection	✓		
4. Introduction	✓		
5. Maintenance		✓	
6. Change		✓	
C. Turn taking			
7. Initiation	✓		
8. Response	✓		
9. Repair/revision	✓		
10. Pause time	✓		
11. Interruption/overlap	✓		
12. Feedback to speakers		✓	
13. Adjacency		✓	
14. Contingency		✓	
15. Quantity/conciseness		✓	
D. Lexical selection/use across speech acts			
16. Specificity/accuracy	✓		
17. Cohesion		✓	
E. Stylistic variations			
18. The varying of communicative style	✓		
<i>Paralinguistic aspects</i>			
F. Intelligibility and prosodies			
19. Intelligibility	✓		
20. Vocal intensity	✓		
21. Vocal quality	✓		
22. Prosody		✓	
23. Fluency	✓		
<i>Nonverbal aspects</i>			
G. Kinesics and proxemics			
24. Physical proximity	✓		
25. Physical contacts	✓		
26. Body posture		✓	
27. Foot/leg and hand/arm movements	✓		
28. Gestures	✓		
29. Facial expression			
30. Eye gaze			

FIG 1: DEFICITS WITH REFERENCE TO PRAGMATICS IN CASE I

RESULTS AND DISCUSSION

The main aim of the study was to delineate the pragmatic deficits in the right hemisphere damaged patients. For the purpose, patients were evaluated on the "Pragmatic Protocol" (Prutting and Kirchner, 1987). Figures 1, 2, 3, 4 and 5 demonstrate the deficits with reference to pragmatics in their discourse observed in cases I, II, III, IV and V respectively.

Figure 6 summarises the pragmatic parameters marked inappropriate for the subjects. The results show that ;

- i) 3/5 had difficulty in topic introduction
- ii) 2/5 had difficulty in topic topic maintenance
- iii) 2/5 had difficulty in topic change
- iv) 4/5 had difficulty in turn taking initiation
- v) 1/5 had difficulty in turn taking pause time
- vi) 3/5 had difficulty in turn taking feedback to speaker
- vii) 5/5 had difficulty in turn taking adjacency, contingency and quantity/conciseness
- viii) 3/5 had difficulty in cohesion
- ix) 1/5 had difficulty in vocal intensity
- x) 5/5 had difficulty in prosody
- xi) 1/5 had difficulty in physical proximity

NAME: Mr. R
 COMMUNICATIVE SETTING OBSERVED AT HOME

Communicative act	Appropriate	Inappropriate	No opportunity to observe
<i>Verbal aspects</i>			
A. Speech acts			
1. Speech act pair analysis	✓		
2. Variety of speech acts	✓		
B. Topic			
3. Selection	✓		
4. Introduction	✓		
5. Maintenance	✓		
6. Change	✓		
C. Turn taking			
7. Initiation		✓	
8. Response	✓		
9. Repair/revision	✓		
10. Pause time	✓		
11. Interruption/overlap	✓		
12. Feedback to speakers		✓	
13. Adjacency		✓	
14. Contingency		✓	
15. Quantity/conciseness		✓	
D. Lexical selection/use across speech acts			
16. Specificity/accuracy	✓		
17. Cohesion		✓	
E. Stylistic variations			
18. The varying of communicative style	✓		
<i>Paralinguistic aspects</i>			
F. Intelligibility and prosodies			
19. Intelligibility	✓		
20. Vocal intensity	✓		
21. Vocal quality	✓		
22. Prosody		✓	
23. Fluency	✓		
<i>Nonverbal aspects</i>			
G. Kinesics and proxemics			
24. Physical proximity	✓		
25. Physical contacts	✓		
26. Body posture	✓		
27. Foot/leg and hand/arm movements	✓		
28. Gestures	✓		
29. Facial expression	✓		
30. Eye gaze		✓	

FIG 2: DEFICITS WITH REFERENCE TO PRAGMATICS IN CASE II

NAME: Mrs. M
 COMMUNICATIVE SETTING OBSERVED AT HOSPITAL

Communicative act	Appropriate	Inappropriate	No opportunity to observe
<i>Verbal aspects</i>			
A. Speech acts			
1. Speech act pair analysis	✓		
2. Variety of speech acts	✓		
B. Topic			
3. Selection		✓	
4. Introduction	✓		
5. Maintenance	✓		
6. Change	✓		
C. Turn taking			
7. Initiation		✓	
8. Response	✓		
9. Repair/revision	✓		
10. Pause time	✓		
11. Interruption/overlap	✓		
12. Feedback to speakers	✓		
13. Adjacency		✓	
14. Contingency		✓	
15. Quantity/conciseness		✓	
D. Lexical selection/use across speech acts			
16. Specificity/accuracy	✓		
17. Cohesion		✓	
E. Stylistic variations			
18. The varying of communicative style	✓		
<i>Paralinguistic aspects</i>			
F. Intelligibility and prosodies			
19. Intelligibility	✓		
20. Vocal intensity	✓	✓	
21. Vocal quality	✓	✓	
22. Prosody	✓		
23. Fluency	✓		
<i>Nonverbal aspects</i>			
G. Kinesics and proxemics			
24. Physical proximity	✓		
25. Physical contacts	✓		
26. Body posture		✓	
27. Foot/leg and hand/arm movements	✓		
28. Gestures	✓		
29. Facial expression	✓		
30. Eye gaze		✓	

FIG 3: DEFICITS WITH REFERENCE TO PRAGMATICS IN CASE III

NAME: Mr. Np
 COMMUNICATIVE SETTING OBSERVED AT HOME

Communicative act	Appropriate	Inappropriate	No opportunity to observe
<i>Verbal aspects</i>			
A. Speech acts			
1. Speech act pair analysis	✓		
2. Variety of speech acts	✓		
B. Topic			
3. Selection	✓	✓	
4. Introduction	✓	✓	
5. Maintenance		✓	
6. Change		✓	
C. Turn taking			
7. Initiation		✓	
8. Response	✓		
9. Repair/revision	✓		
10. Pause time	✓		
11. Interruption/overlap	✓		
12. Feedback to speakers		✓	
13. Adjacency		✓	
14. Contingency		✓	
15. Quantity/conciseness		✓	
D. Lexical selection/use across speech acts			
16. Specificity/accuracy	✓		
17. Cohesion	✓		
E. Stylistic variations			
18. The varying of communicative style	✓		
<i>Paralinguistic aspects</i>			
F. Intelligibility and prosodies			
19. Intelligibility	✓		
20. Vocal intensity	✓		
21. Vocal quality	✓		
22. Prosody	✓		
23. Fluency	✓	✓	
<i>Nonverbal aspects</i>			
G. Kinesics and proxemics			
24. Physical proximity	✓		
25. Physical contacts	✓		
26. Body posture	✓		
27. Foot/leg and hand/arm movements	✓		
28. Gestures	✓		
29. Facial expression	✓		
30. Eye gaze		✓	

FIG 4: DEFICITS WITH REFERENCE TO PRAGMATICS IN CASE IV

NAME: M. N.
 COMMUNICATIVE SETTING OBSERVED AT HOME

Communicative act	Appropriate	Inappropriate	No opportunity to observe
<i>Verbal aspects</i>			
A. Speech acts			
1. Speech act pair analysis	✓		
2. Variety of speech acts	✓		
B. Topic			
3. Selection	✓		
4. Introduction		✓	
5. Maintenance		✓	
6. Change			
C. Turn taking			
7. Initiation	✓		
8. Response	✓	✓	
9. Repair/revision	✓	✓	
10. Pause time	✓	✓	
11. Interruption/overlap	✓	✓	
12. Feedback to speakers	✓		
13. Adjacency		✓	
14. Contingency		✓	
15. Quantity/conciseness		✓	
D. Lexical selection/use across speech acts			
16. Specificity/accuracy	✓		
17. Cohesion	✓		
E. Stylistic variations			
18. The varying of communicative style	✓		
<i>Paralinguistic aspects</i>			
F. Intelligibility and prosodies			
19. Intelligibility	✓		
20. Vocal intensity	✓		
21. Vocal quality	✓		
22. Prosody	✓		
23. Fluency	✓	✓	
<i>Nonverbal aspects</i>			
G. Kinesics and proxemics			
24. Physical proximity		✓	
25. Physical contacts	✓		
26. Body posture	✓		
27. Foot/leg and hand/arm movements	✓		
28. Gestures	✓		
29. Facial expression	✓		
30. Eye gaze		✓	

FIG 5: DEFICITS WITH REFERENCE TO PRAGMATICS IN CASE 5

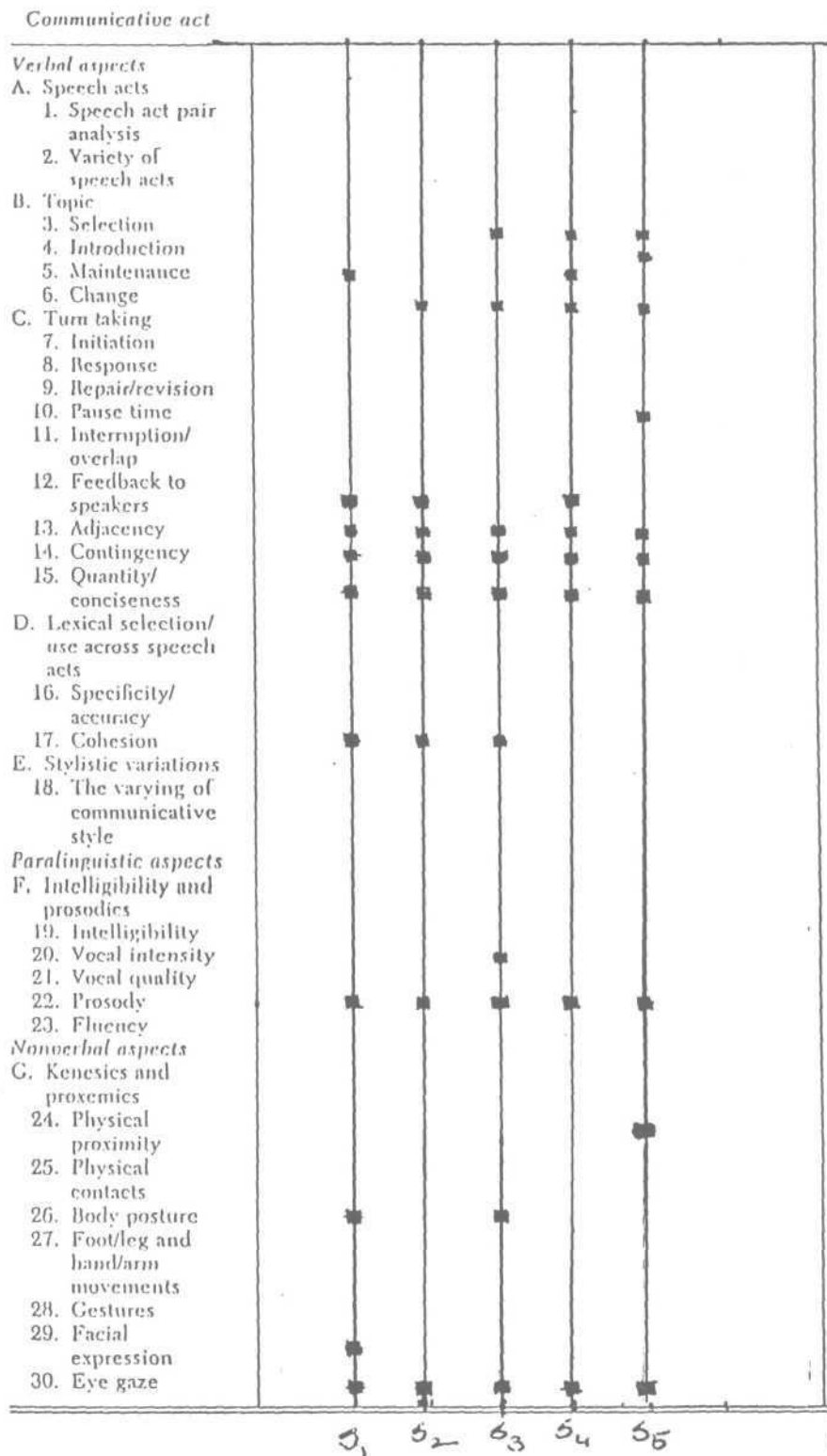


FIG 6 : PRAGMATIC PARAMETERS MARKED INAPPROPRIATE FOR THE SUBJECTS WITH RIGHT HEMISPHERE DAMAGE

- xii) 2/5 had difficulty in body posture
- xiii) 1/5 had difficulty in facial expression
- xiv) 5/5 had difficulty in eye gaze

Thus, the cluster of parameters identified as most frequently judged inappropriate were eyegaze, prosody, adjacency, contingency, and quantity and conciseness. The results are in collaboration with the results obtained by Prutting and Kirchner (1987).

Also the results indicated that topic introduction turn taking skills and cohesion were markedly impaired in the patients.

It was noticed that the intonation and stress patterns in all the subjects consisted of few variations and voice sound "flat" and monotonous. Thus, this finding supports the observation of House, Rowe and Standen (1987), MacKenzie et al. (1997), Dyskstra et al. (1995), Gandour et al. (1995) and Blonder et al. (1995).

Pause times in response to questions were seen to be long and the responses did not contribute to new information. Similar findings have been reported by Joannette and Boulet, 1990; Tompkins, et al. 1993. The subjects demonstrated

inability to produce comments that could move the conversation further. Also, in some subjects verbosity was observed without informativeness.

The subjects also demonstrated inability to initiate new topics for discussion, the inability to select appropriate topics for discussion given the context and participants and make relevant contributions to a topic. Inability to maintain topic frequently co-occurred with high frequency of new topic introductions. The findings concurred with Prutting and Kirchner (1987), Purdy et al. (1992), Kennedy et al. (1994), Myers and Brookshire (1994).

Cohesive errors, or errors in semantic relations between segments of narratives (eg. undetermined pronouns, inadequate lexical reiteration) were noticed in the subjects. The utterances did not appear to be related in a logical and sequential fashion; frequently resulting in misinterpretation and ambiguity. These findings were also reported by Joannette and Goulet (1990), Frederikson et al. (1990) and Prutting and Kirchner (1987), Davis et al. (1997), Uryase et al. (1991).

Also vocal intensity, physical proximity, body posture and facial expression were judged to be inappropriate in some of the subjects. Similar findings have been reported by Mackenzie, Begg, Brady and Lees (1997), Schmitt et al. (1997).

Discourse production is a complex activity involving a broad range of cognitive abilities beyond strictly linguistic ones. In addition to lexical and syntactic retrieval, ordering and structuring of content are necessary, as are linking sentences and ideas and selecting what should be mentioned and what should remain unsaid.

It was observed in the subjects that variable patterns of pragmatic deficits were present. The possibility is that these distinctive patterns are the expression of the extent and the localization of the lesion in the right hemisphere, presuming that the right hemisphere does contribute distinctively to verbal communication deficits.

Despite these variations, most of the subjects were judged inappropriate in eye gaze, prosodic pattern and variation - turn-taking contingency, turn-taking adjacency, and quantity/conciseness. Parameters such as topic selection, topic introduction, topic change, other turn-

taking skills, and cohesion were noted to be deficient in 2 or fewer of the 5 subjects.

Thus, RHD patients remind us that language is only one aspect of communication. Despite adequate linguistic skills they are poor communicators.

SUMMARY AND CONCLUSION

The objective of the study was to scrutinise the pragmatic use of language in the right hemisphere damaged patients and to identify the inappropriate pragmatic features seen.

The design of the study consisted of outlining verbal, paralinguistic aspects and kinesics and proxemics seen in the population. For the purpose, the subjects were judged as "appropriate" or "inappropriate" on the pragmatic protocol developed by Prutting (1982). The communicative acts were assessed on observing a 15 minute conversation entire (for kinesics and proxemics) and the sample was audiotapes (for verbal and para linguistic aspects) for further analysis.

Results show that there are variable patterns of pragmatic impairments seen across patients. But most of them were consistently impaired in cohesion and coherence, prosody, eye gaze.

Thus, we can deduce that although the right hemisphere damaged patients evince adequate linguistic skills, they are poor communicators, and there is obvious detraction from the communicative exchange.

Suggestions for further research

1. The study can be replicated using other pragmatic assessment tools for further confirmation of the results.
2. Impairment in other areas of deficit in the RHDs can be probed into.
3. The correspondence between the impairments and their functional consequences : disabilities, or restrictions in daily life activities and handicaps, or broader changes in life role participation can be outlined.

BIBLIOGRAPHY

- Adamovich, B.L. & Brooks, R.L. (1981). A Diagnostic Protocol to Assess the Communication Deficits of Patients with Right Hemisphere Damage. In R.H.Brookshire (Ed.). Clinical Aphasiology : Conference Proceedings , 244-253, Minneapolis : BRK Publishers.
- Apel, K., Van Dyke, P.M. & Fedorak, A. (1992). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Ardila. A. & Rosselli, M. (1993). Spatial Agraphia. Brain and Cognition, 22, 148-160.
- Assal, G. (1969). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Bara, B.G., Tirassa, M. & Zettin, M. (1997). Neuropragmatics : Neuropsychological Constraints on Formal Theories of Dialogue. Brain and Language, 61, 7-49.
- Bear, DM. (1983) In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Behreus, S.J. (1988). The Role of the Right Hemisphere in the Production of Linguistic Stress. Brain and Language, 33, 104-127.
- Behreus. S.J. (1989). Characterizing Sentence Intonation in Right Hemisphere Damaged Population. Brain and Language, 37, 181-200.
- Benson, D.F. (1979). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Benowitz, L.F., Moya, K.L. & Levine, D.N. (1990). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Benton. A.L. & Van Allen, M.W. & Allen. N.W. (1968). Impairment in Facial Recognition in Patients With Cerebral Disease. Cortex, 4, 344-358.

- Bloise, C.G.R. & Tompkins, C.A. (1993). Right Brain Damage and Inference Revision Revisited. *Clinical Aphasiology*, 21, 145-153.
- Blonder, L.X., Bowers, D. & Heilman, K.M. (1991). The Role of Right Hemisphere in Emotional Communication. *Brain*, 114, 1115-1127.
- Blonder, L.X., Burns, A.F. Bowers, D., Moore, R.W. & Heilman, K.M. (1993). Right Hemisphere Facial Expressivity During Natural Conversation. *Brain*, 121, 44-56.
- Blonder, L.X., Gur, R. & Gur, R. (1989). The Effects of Right and Left Hemiparkinsonism on Prosody. *Brain and Language*, 36, 193-207.
- Blonder, L.X., Pickering, J.E., Heath, R.L., Smith, C.D. & Butler, S.M. (1995). Prosodic Characteristics of Speech Pre- and Post Right Hemisphere Stroke. *Brain and Language*, 51, 518-535.
- Bogen, J.E. & Gazzaniga, M.S. (1965). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Borod, J.C. (1992). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Borod, J.C. (1993). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Bowers, D., Bauer, R. & Gelman, K.M. (1993). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Broca (1865). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication: Conceptual, Methodological, and Clinical Issues. *Clinical Aphasiology*, 22, 1-23.

- Brookshire, R.H. & Nicholas, L.E. (1984). Comprehension of Directly and Indirectly Stated Main Ideas and Details in Discourse by Brain-Damaged and Non-brain Damaged Listeners. *Brain and Language*, 21, 21-36.
- Brownell, H.H. (1988). The Neuropsychology of Narrative Comprehension. *Aphasiology*, 2, 247-250.
- Brownell, H.H., Potter, H.H., Bihrlé, A.M. & Gardner, H. (1986). Inference Deficits in Right Brain Damaged Patients. *Brain and Language*, 227, 310-321.
- Brownell, H., Pincus, D., Blum, A., Rehak, A. & Winner, E. (1997). The Effects of Right Hemisphere Brain Damage on Patient's Use of Terms of Personal Reference. *Brain and Language*, 57, 60-79.
- Bruder, G.E., Quitkin, F.M., Stewart, J.W., Martin, C., Voglmaier, M. & Harrison, W.M. (1989). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Bryden, M. & Ley, R. (1983). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*. 57, 1-11.
- Chuney, C.R. & Canter, G.J. (1993). Informational Content in the Discourse of Patients With Probable Alzheimer's Disease and Patient's With Right Brain Damage. *Clinical Aphasiology*, 21, 123-134.
- Cicone, M., Wapner, & Gardner, H. (1980). Sensitivity to Emotional Expressions and Situations in Organic Patients. *Cortex*, 16, 145-158.
- Code, C. (1987). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. *Clinical Aphasiology*, 22, 1-23.
- Code, C. (1997). Can the Right Hemisphere Speak? *Brain and Language*, 57, 38-59.
- Colsher, P.L., Cooper, W.E. & Graff-Radford, N. (1987). Intonational Variability in the Speech of Right Hemisphere Damaged Patients. *Brain and Language*, 32, 379-383.

- CorbaUis, M.C. (1997). Mental Rotation and the Right Hemisphere. *Brain and Language*, 57, 100-121.
- Critchley, M. (1962). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. *Clinical Aphasiology*, 22, 1-23.
- Cummings, J. (1985). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Cummings, J.L. (1997). Neuropsychiatric Manifestations of Right Hemisphere Lesions. *Brain and Language*, 57, 873-880.
- Damasio, A.R., Damasio, H. & Van Hoesen, G.W. (1982). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Davidson, R.J. & Tomarken, A.J. (1989). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Davis, G.A., O'Neil Pirozzi, T.M. & Coon, M. (1997). Referential Cohension and Logical Coherence of Narration after Right Hemisphere Stroke. *Brain and Language*, 56, 183-210.
- Dax, M. (1836). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. *Clinical Aphasiology*, 22, 1-23.
- DeRenzi, E. (1986). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Devreese, L.P., Neri, M., Ruichi, S. & Salvioli, G. (1996). Grammatical Ambiguity Resolution in Right Hemisphere-Damaged Patients : Evidence From an Insertion Task. *Aphasiology*, 10 (8), 801-814.

- Drews E (1997) In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language. 57, 1-11.
- Dykstra. K., Gandour, J. & Stark. R.E. (1995). Disruption of Prosody After Frontal Lobe Seizures in the Non-Dominant Hemisphere. Aphasiology, 9(5), 453-476.
- Eisenson J (1962). In Y. Joannette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. Clinical Aphasiology, 22. 1-23.
- Ellis H D (1983) In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Evans J.J . Hweggs. A.J., Antoun, N. & Hodges, J.R. (1995) Progressive Prosopagnosia Associated With Selective Right Temporal Lobe Atrophy. A New Syndrome? Brain, 118, 1-13.
- Frederiksen C H. & Stemmer, B. (1993). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Friedman R.B. , Ween, J.E. & Albert. M.L. (1993). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Gainotti. G. (1972). Emotional Behavior and hemispheric Side of Lesion. Cortex. 8, 41-55.
- Galin D (1974) In D vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language. 57, 1-11.
- Gandour J. . Larsen, J., Dechongkit. S.. Ponglorpisit S & Khunadorn F. (1995). Speech Prosody in Affective Contexts in Thai Patients with Right Hemisphere Lesions. Brain and Language, 51, 422-443.
- Gardner H Brownell. H.H., Wapner. W. & Michelow, D. (1983) In D vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57. 1-11.

- Heilman. K.M., Watson, R.T. & Bowers, D. (1983). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language. 57, 1-11.
- Heilman. K.M., Watson. R.T. & Valenstein. E. (1985). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Hier, D.B., Mondlock, J. & Caplan, L.R. (1983). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Hillis. T.E. & Hillis. A. (1985). Paucityys. Verbosity : Another Analysis of Right Hemispher Communication Deficits. Clinical Aphasiology, 15, 83-96. Minneapolis : BRK Publishers.
- Hirst. W., LeDoux, J. S. Stein S (1984). Constraints on the Processing of Indirect Speech Acts : Evidence from Aphasiology. Brain and Language, 23, 26-33.
- Holland, A.L. (1977). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84. San Diego: Singular Press.
- Horner, J., Lathrop, D.L., Fish, A.M. & Dawson, D. (1987). Agraphian in Left and Right Hemisphere Stroke and Alzheinen Dementia Patients. In R.H.Brookshire (Ed.). Clinical Aphasiology, 17, 73-83, Minneapolis : BRK Publishers.
- Hough, M.S. (1990). Narrative Comprehension in Adults with Right and Left Hemisphere Brain Damage : Theme Organization. Brain and Language, 38, 253-277.
- House. M.S., DeMarco. S., Bedsole, J.K., Fox, B.O. & Pabst, M. (1993). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- House. A., Rowe. D. & Standen. P.J. (1987). Cited in RH Communication Disorders Theory and Management by C.A. Tampkins. Singular Publishing Group. Inc. San Diego, California.

- Gardner. H., Brownell, H.H., Wapner, W. & Michelow, D. (1983). Missing the Point : The Role of the Right Hemisphere in the Processing of Complex Linguistic Materials. In Right Hemisphere and Verbal Communication, Y. Joannette, P. (Goulet, & D. Hanneguain (1990). 166-187. New York : Springer-Verlag Inc.
- Goldberg, E. & Casta, I.D. (1981). Hemispheric Differences in the Acquisition and Use of Descriptive Systems. Brain and Language, 14, 144-173.
- Golper, C.A.C., Gordon. M.E. & Rail, M.T. (1984). Coverbal Behavior and Perceptions of Organicity. Clinical Aphasiology 14, 94-105, Minneapolis : BRK Publishers.
- Goodglass, H. & Kaplan, E. (1983). The Boston Diagnostic Aphasia Examination. Philadelphia Lea and Febiger.
- Gordon, H. (1970). Hemispheric Asymmetries in the Perception of Musical Chords. Cortex, 6, 387-398.
- Gordon. H. & Bogen, J.E. (1981). In D. van Lancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Grice, M.P. (1975). Logic and Conversal. In P. Cole and J.L. Morgan (Eds.). Syntax and Semantics. New York: Academic Press, 3, 41-58.
- Hashimoto, R., Tanaka, Y. & Yoshida. M. (1998). Selective Kana Jargonaphic Following Right Hemipsheric Infarction. Brain and Language, 63. 50-63.
- Hecaen, H. & Angelergues, R. (1962). In D. van Lancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Heilman, K.M. (1979). In D. van Lancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Heilman, K.M., Scholes. R. & Watson, R.T. (1975). In D. van Lancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.

Jackson. H. (1879). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. Clinical Aphasiology, 22. 1-23.

Joanette. Y. & Goulet. P. (1990). Narrative Discourse in Right-Brain-Damaged Right Handers. In Y.Joanette and H.H.Browne II (Eds.). Discourse Ability and Brain Damage : Theoretical and Empirical Perspectives. 131-153, New York : Springer-Verlag.

Joanette. Y., Goulet, P. & Hannequin, D. (1990). Right Hemisphere and Verbal Communication. New York : Springer-Verlag.

Joanette. Y. & Goulet. P. & Hannequin. D. (1990). Right Hemisphere and Verbal Communication. New York : Springer-Verlag.

Jogermani. M. & Pierce. R.S. (1995). Semantic Attribute Knowledge in Adults with Right and Left Hemisphere Damage. Aphasiology, 9(1), 1-21.

Just, M.A. & Carpenter. P.A. (1992). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.

Kaplan, J.A., Brownell, H.H., Jacobs, J.R. & Gardner, H. (1990). The Effects of Right Hemisphere Damage on the Pragmatic Interpretation of Conversational Remarks. Brain and Language, 38, 315-333

Keenan. J., Mac Whinney, X., Mayhew, D. (1977). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.

Kennedy. M. & Perez. W. (1993). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84. San Diego: Singular Press.

Kennedy, M., Strand. E., Burton, W. & Peterson. C. (1994). Analysis of First Encounter Conversations of Right-Hemisphere Damaged Adults. Clinical Aphasiology, 22. 67-80.

Kent. R. & Rosenbek. J. (1982). Prosodic Disturbance and Neurologic Lesion. Brain and Language. 15.. 259-291.

Kiefer. M., Weishrod, M., Kun. I., Maier, S. & Spitzer, M. (1998). Right Hemisphere Activation During Indirect Semantic Priming : Evidence from Event-Related Potentials. *Brain and Language*, 64, 377-408.

Klonoff, P.S., Sheperd, J.C. O'Brien, K.P., Chiapello, D.A. & Hodak, J.A. (1990). In *Right Hemisphere Communication Disorders : Theory and Management*. L.A. Tompkins (1996). 19-84, San Diego: Singular Press.

Kolb. B. & Wishaw, I.Q. (1990). In *Right Hemisphere Communication Disorders : Theory and Management*. L.A. Tompkins (1996). 19-84, San Diego: Singular Press.

Koul. R.K. & Llyod. L.. (1998). Comparison of Graphic Symbol Learning in Individuals With Aphasia and Right Hemisphere Brain Damage. *Brain and Language*. 67. 398-421.

Landis. T., Cummings, J. Benson. D.F. & Palmer, P. (1986). In D.vanLancker (1997). *Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere*. *Brain and Language*, 57, 1-11.

Landis. T., Cummings, J.L., Benson, D.F. & Palmer, P. (1986). In D.vanLancker (1997). *Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere*. *Brain and Language*. 57, 1-11.

Laavanya (1996). *Comprehension of Humor in the Brain Damaged*. Unpublished Dissertation Submitted to the University of Mysore, Mysore.

LeDaux. J.E.. Wilson, D.H. & Gazzaniga. M.S. (1977). In D.vanLancker (1997). *Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere*. *Brain and Language*, 57, 1-11.

Lemieux. S.. Goulet. P. & Joannette. Y. (1993). In *Right Hemisphere Communication Disorders : Theory and Management*. L.A. Tompkins (1996). 19-84. San Diego: Singular Press.

Liotti. M. & Tucker. D.M. (1992). *Right Hemisphere Sensitivity to Arousal and Depression*. *Brain and Cognition*, 18, 138-151.

- Mackenzie. C. Begg, C. Brady. M. & Lees, K.R. (1997). The Effects of Verbal Communication skills of Right Hemisphere Stroke in Middle Age. *Aphasiology*, 11(10), 929-945.
- Malone, D.R., Morris, H.H., Kay, M.D. & Levin, H.S. (1992). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57. 1-11.
- McNeil, M.R. & Prescott. T.E. (1978). Revised Token Test. Austin. TX : PRO.ED.
- McNeil. M.R.. Odell , K... Campbell, T.F. (1982). The Frequency and Amplitude of Fluctuating Auditory Processing in Aphasic and Non-aphasic Brain Damaged Persons. In R.H.Brookshire (Ed.). *Clinical Aphasiology : Conference Proceedings* . 220-229. Minneapolis : BRK Publishers.
- MacKisack. E.L., Myers, P.S. & Duffy. J.R. (1987). Verbosity and Labelling Behavior : The Performance of Right Hemisphere and Non-brain Damaged Adults on an Inferential Picture Description Task. In R.H.Brookshire (Ed.). *Clinical Aphasiology*, 17, 143-151, Minneapolis : BRK Publishers.
- McCarthy. R.A. & Warrington, E.K. (1990). In *Right Hemisphere Communication Disorders : Theory and Management*. L.A.Tompkins (1996). 19-84. San Diego: Singular Press.
- Milner. B. (1980). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Molloy. R., Browne II. H. & Gardner, H. (1990). Discourse Comprehension by Right-Hemisphere Stroke Patients : Deficits of Prediction and Revision. In Y.Joanette & H.Brownell (Eds.). *Discourse Ability and Brain Damage : Theoretical and Empirical Perspectives*. 113-130. New York : Springer-Verlag.
- Myers, P.S. (1979). Profiles of Communication Deficits in Patients With Right Cerebral Hemisphere Damage. in R.H.Brookshire (Ed.). *Clinical Aphasiology : Conference Proceedings*. . 38-46, Minneapolis : BRK Publishers.
- Myers. P.S. (1981). Right Hemisphere Communication Impairment. In R.Chapey (Ed). *Language Intervention Strategies in Adult Aphasia* (2nd ed.). 444-461. Baltimore : Williams and Wilkins.

- Myers. P. (1984). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. Clinical Aphasiology, 22, 1-23.
- Myers, P. (1986). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. Clinical Aphasiology, 22, 1-23.
- Myers. P.S. (1986). Right Hemisphere Communication Impairment. In R.Chapey (Ed.). Language Intervention Strategies in Adult Aphasia (2nd Ed.), 444, 461,, Baltimore : Williams and Wilkins.
- Myers. O.S., Brookshire, R.H. (1994). The Effects of Visual and Inferential Complexity on the Picture Descriptions of Non-Brain-Damaged and RHD Adults. Clinical Aphasiology, 22, 25-34.
- Myers. P.S.. & Brookshire. R.H. (1995). Effects of Noun Type on Naming Performance of Right-hemisphere Damaged and non-brain Damaged Adults. In T.E. Prescott (Ed.). Clinical Aphasiology, 118-122, Minneapolis : BRK Publishers.
- Myers, P.S., Linebaugh. C.W. & Mackisack-Morin, L. (1985). Extracting Implicit Meaning : Right Versus Left Hemisphere Damage. Clinical Aphasiology, 15, 72-82. Minneapolis : BRK Publishers.
- Myers, P.S. & Mackisack, E.L. (1986). Defining Single Versus Dual Definition Idioms : The Performance of Right Hemisphere and non-brain Damaged Adults. In R.H.Brookshire (Ed.), (1986). Clinical Aphasiology, Vol.16, Minneapolis : BRK Publishers.
- Myers, P.S. & Mackisack. E.L. (1990). Right Hemisphere Syndrome. In L.L.LaPointe (Ed.), Aphasia and Related Neurogenic Language Disorders. 177-195, New York : Thieme Medical Publishers.
- Ombredane. A. (1951). In Y. Joanette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. Clinical Aphasiology, 22, 1-23.

- Pardo. J.V., Fox, P.T. & Reichle. M.E. (1991). Localization of a Human System for Sustained Attention by Position Emission Tomography. *Nature*, 349. 61-64.
- Patry. R. & Nespoulous, J.L. (1990). Discourse Analysis in Linguistics : Historical and Theoretical Background, in Y.Joanette & H.H.Brownell (Eds.). *Discourse Ability and Brin Damage : Theoretical and Empirical Perspectives*. 3-27, New York : Springer-Verlag.
- Pell. M.D. & Baum, S.R. (1997). The Ability to Perceive and Comprehend Intonation in Linguistic and Affective Contexts by Brain-Damaged Adults. *Brain and Language*, 57, 80-99.
- Perkins, J.M. , Baran. J.A. & Gandour. J. (1996). Hemispheric Specialization in Processing Intonation Contours. *Aphasiology*, 10(4), 343-362.
- Phelps. M.E., Mazziotta, J.C. 8, Huang, S.C. (1982). In *Right Hemisphere Communication Disorders : Theory and Management*. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Posner, M.I. & Peterson. S.E. (1990). Review and Proposed Accounts of Selected Symptoms. In *Right Hemipshere Communication Disorders : Theory and Management*. C.A.Tompkins (1996), 19-84, SanDiego : Singular Press.
- Prutting, C.A. & Kirchner, D.M. (1987). A Clinical Appraisal of the Pragmatic Aspects of Language. *Journal of Speech and Hearing Disorders*. 52. 135-145.
- Purdy. M.H.. Belanger. S. & Liles. B.Z. (1992). RHD Subjects' Ability to Use Context in Inferencing. *Clinical Aphasiology*, 21, 134-143.
- Rapcsak. S.Z., Polster. M.R.. Glisky, M.L. & Comer, J.F. (1996). False Recognition of Unfamiliar Faces Following Right Hemisphere Damage : Neuropsychological and Anatomical Observations. *Cortex*.
- Regard. M. & Landis, T. (1986). In D.vanLancker (1997). *Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere*. *Brain and Language*. 57, 1-11.
- Regard, M. & Landis, T. (1988). In D.vanLancker (1997). *Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere*. *Brain and Language*, 57, 1-11.

- Regard, M. & Landis, T. (1989). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Richards, L. & Chiarello, C. (1997). Activation Without Selection : Parallel Right Hemispher Roles in Language and Intentional Movement. *Brain and Language*, 57. 151-178.
- Robin, D.A., Tranel, D. & Damsio, H. (1990). Auditory Perception of Temporal and Spectral Events in Patients With Focal Left and Right Cerebral Lesions. *Brain and Language*, 31, 151-170.
- Robinson, R., Kubos, K., Starr, L., Rao, K. & Price, T. (1984). mood Disorders in Stroke Patients : Importance of Location of Lesion. *Brain*, 197, 81-93.
- Roman, M., Brownell, H.H., Potter, H.H., Seibold, M.S. & Gardner, H. (1987). Script Knowledge in Right Hemisphere - Damaged and in Normal Elderly Adults. *Brain and Language*, 31, 151-170.
- Rommetneit, R. (1974). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57. 1-11.
- Ross, E. (1980). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*. 57. 1-11.
- Ross, E.D., Thompson, R.D. & Yenkosky, J. (1997). Lateralization of Affective Prosody in brain and the Callosal Integration of Hemispheric Language Functions. *Brain and Language*, 57, 27-54.
- Sackeim, H.A., Greenberg, M.S., Weiman, M.A., Gur, R.C., Hungerbubler, J.P. & Geschwind, N. (1982). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Samuelsson, H., Jensen, C., Ekholm, S., Newer, H. & Blomstrand, C. (1997). Anatomical and Neurological Correlates of Acute and Chronic Visuospatial Neglect Following Right Hemisphere Stroke. *Cortex*. 33, 271-285.

- Scherer. K.R. (1986). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language. 57. 1-11.
- Schmitzer. A.B.. Strass. M. & DeMarco. S. (1997). Contextual Influences on Comprehension of Multiple-Meaning Words by Right Hemisphere Brain-Damaged and Non-Brain Damaged Adults. Aphasiology. 11, 447-459.
- Schmitt. J.J., Hartje. W. & Willman. K. (1997). Hemispheric Asymmetry in the Recognition of Emotional Attitude Conveyed by Facial Expression. Prosody and Propositional Speech. Cortex, 33. 65-81.
- Schneiderman. E.I. & Saddy, J.D. (1988). A Linguistic Deficit Resulting From Right Hemisphere Damage. Brain and Language, 34, 38-53.
- Schneiderman. E.I.. Musargi. K.C. & Saddy, J.D. (1992). Story Arrangement Ability in Right brain-Damaged Patients. Brain and Language, 93. 107-120.
- Schwartz, T.H.. Ojemann. G.A.. & Dodrill. C.B. (1997). Reading Errors Following Right Hemisphere Injection of Sodium Amobarbital. Brain and Language. 58, 70-91.
- Seigal. M. Carrington. J. & Radel. M. (1996). Theory of Mind and Pragmatic Understanding Following Right Hemisphere Damage. Brain and Language. 53(1), 40-50.
- Shapiro. L.P & Danly. M. (1985). The Role of the Right Hemisphere in the Control of Speech Prosody in Prepositional and Affective Contexts. Brain and Language, 25, 19-36.
- Shields. J. (1991). Semantic Pragmatic Disorder : A Right Hemisphere Syndrome? British Journal of Disorders of Communication, 26. 383-392.
- Sidtis. J.J. (1980). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Sidtis. J.J. (1984). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language. 57. 1-11.

- Simos. P.G., Molfese, D.L. & Brendon, R.A. (1997). Behavioral and Electrophysiological Indices of Voicing-Cue Discrimination: Laterality Patterns and Development. *Brain and Language*, 57, 122-150.
- Staton, D., Brumback, R.A. & Wilson, H. (1982). Reduplicative Paramnesia : A Disconnection Syndrome of Memory Cortex. 18, 23-36.
- Stemmer, B., Giroux, F. & Joannette, Y. (1994). Production and Evaluation of Requests by Right Hemisphere Brain Damaged Individuals. *Brain and Language*. 47, 1-31.
- TenHouten, W., Hoppe, K., Bogen, J. & Walter, D. (1986). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Tompkins, C.A. (1990). Knowledge and Strategies for Processing Lexical Metaphor After Right or Left Hemisphere Brain Damage. *Journal of Speech and Hearing Research*, 33, 307-316.
- Tompkins, C.A. (1991). Redundancy Enhances Emotional Inference by Right and Left Hemisphere - Damaged Adults. *Journal of Speech and Hearing Research*, 34, 1142-1149.
- Tompkins, C.A. (1994). Applying Research Principles to Language Intervention. In R.Chapey (Ed.). *Language Intervention Strategies in Adult Aphasia* (3rd Ed.), 571-583, Baltimore : Williams and Wilkins.
- Tompkins, C.A. (1996). *Right Hemisphere Communication Disorders : Theory and Management*. San Diego : Singular Press.
- Tompkins, C.A., Baumgaertner, A., Lehman, M.T. & Fossett, T.R.D. (1997). Suppression and Discourse Comprehension in Right Brain Damaged Adults : A Preliminary Report. *Aphasiology*, 11, 505-519.
- Tompkins, C.A., Boada, R. & McGarry, K. (1992). The Access and Processing of Familiar Idioms by Brain Damaged and Normally Aging Adults. *Journal of Speech and Hearing Research*. 35. 626-637.

- Tompkins, C.A., Bloise, C.C.R., Timko, M.L. & Baumgaertner, A. (1994). Working Memory and Inference Revision in Brain Damaged and Normally Aging Adults. *Journal of Speech and Hearing Research*, 37, 896-912.
- Tompkins, C.A., Boada, R. & McGarry, K., Jones, J., Rahn, A.E. & Ranier, S. (1993). Connected Speech Characteristics of Right-Hemisphere-Damaged Adults : A Reexamination. *Clinical Aphasiology*, 21, 113-122.
- Tompkins, C.A. & Flowers, C.R. (1985). Perception of Emotional Intonation by Brain-Damaged Adults : The Influence of Task Processing Levels. *Journal of Speech and Hearing Research*. 28. 527-538.
- Tucker, D.M. & Frederick, S.L. (1989). In *Right Hemisphere Communication Disorders : Theory and Management*. L.A. Tompkins (1996). 19-84, San Diego: Singular Press.
- Tompkins, C.A., Lehman, M.T., Wyatt, A.D. & Schutz, R. (1998). Functional Outcome Assessment of Adults with Right Hemisphere Brain Damage. *Seminars in Speech and Language*, 19(3), 303-320.
- Tompkins, C.A. & Mateer, C.A. (1985). Right Hemisphere Appreciation of Prosodic and Linguistic Indications of Implicit Attitude. *JBrain and Language*. 24, 185-203.
- Uryase, D., Duffy, R.J. & Liles, B.Z. (1991). Analysis and Description of Narrative Discourse in RHD Adults : A Comparison with Neurologically Normal and LHD Aphasic Adults. *Clinical Aphasiology*, 19, 125-138.
- Van Lancker (1980). In D.vanLancker (1997). *Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere*. *Brain and Language*, 57, 1-11.
- Van Lancker, D. (1991). Personal Relevance and the Human Right Hemisphere. *Brain and Cognition*, 17, 64-92.
- Van Lancker, D. & Canter, G.J. (1982). Impairment of Voice and Face Recognition in Patients With Hemispheric Damage. *Brain and Cognition*, 1, 185-195.
- Van Lancker, D. & Kempler, D. (1987). Comprehension of Familiar Phrases by Left-But not by Right-Hemisphere Damaged Patients. *Brain and Language*. 32,265-277.

- Van Lancker. D. & Klien . K. (1990). Preserved Recognition of Familiar Personal Names in Global Aphasia. *Brain and Language*, 39, 511-529.
- Van Lancker. D. & Nicklay, C. (1992). Comprehension of Personally Relevant (PERL) Versus Vowel Language in Two Globally Aphasic Patients. *Aphasiology*, 6., 37-61.
- Van Lancker. D. & Pachana, N. (1995). Acquired Dysprosodic Speech production : Mood. Motivational. Cognitive, or Motor Disorder? *Brain and Language*, 48, 193-196.
- Van Lancker. D. & Sidtis. J. (1982). The Identification of Affective Prosodic Stimuli by Left and Right Brain Damaged Subjects : All Errors are Not Created Equal. *Journal of Speech and Hearing Research*, 35, 963-970.
- Wallace, G.C. & Canter, G.J. (1985). Effects of Personally Relevant Language Materials on the Performance of Severely Aphasic Individuals. *Journal of Speech and Hearing Disorders*, 50. 385-390.
- Wapner. W., Hamby. S. & Gardner, H. (1981). The Role of the Right Hemisphere in the Comprehension of Complex Linguistic Materials. *Brain and Language*, 14. 15-32.
- Wechsler, A. (1973). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.
- Weekes, B. (1995). Right Hemisphere Writing and Spelling. *Aphasiology*. 9(4), 305-319.
- Weinstein, E.A. (1964). In Y. Joannette and P.Goulet (1994). Right Hemisphere and Verbal Communication : Conceptual, Methodological, and Clinical Issues. *Clinical Aphasiology*, 22, 1-23.
- Whitehead. R. (1991). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84. San Diego: Singular Press.
- Whiteley, A.M. & Warrington, E.K. (1977). In D.vanLancker (1997). Rags to Riches; our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. *Brain and Language*, 57, 1-11.

- Wilkins. A.J.. Shallice, T. & McCarthy, R. (1987). In Right Hemisphere Communication Disorders : Theory and Management. L.A. Tompkins (1996). 19-84, San Diego: Singular Press.
- Winner, E. & Gardner. H. (1977). The Comprehension of Metaphor in Brain-Damaged Patients. Brain. 100, 717-729.
- Ylvisaker, M.S. & Szekeres, S.F. (1994). Communication Disorders Associated with Closed Head Injury. In R.Chapey (Ed.), Language Intervention Strategies in Adult Aphasia (3rd Ed.), 546-667, Baltimore : Williams and Wilkins.
- Yokoyama, K., Jennings, R., Ackles, P., Hood. P. & Boller, F. (1987). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.
- Zaidel, E. (1977). In D.vanLancker (1997). Rags to Riches: our Increasing Appreciation of Cognitive and Communicative Abilities of the Human Right Cerebral Hemisphere. Brain and Language, 57, 1-11.
- Zatorre. R.J. (1988). Pitch Perception of Complex. Tones and Human Temporal Lobe Function. Journal of the Acoustical Society of America, 84, 566=572.
- Zoccolotti, P.. Scabini. D. & Violani , C. (1982). In Right Hemisphere Communication Disorders : Theory and Management. L.A.Tompkins (1996). 19-84, San Diego: Singular Press.

APPENDIX

Definitions for Communicative Parameters Assessed Using the Pragmatic Protocol

VERBAL ASPECTS (Speech act pair analysis)

The ability to take both speaker and listener role appropriate to the context.

Types : Directive compliance - 0 personal need, imperatives, permissions, directives, question directives, and hints.

Query/response - request for confirmation, mental requests for repetition, requests for speech constituent repetition.

Request/response - direct request, inferred requests, requests for clarification, acknowledgment of request for action.

Comment/acknowledgment - description of ongoing activities, of immediate subsequent activity, of state or condition of objects or person naming, acknowledgments that are positive, negative, expectative, or indicative.

Examples : Appropriate behaviors: Initiates directives, queries, and comments, responds to directives by complying : responds to queries; responds appropriately to requests; and acknowledges comments made by the speaker. Appropriate behaviour can be verbat or nonverbal as in the case of taking appropriate action to a directive or request. Inappropriate behaviors; Does not initiate directives, queries, and comments; does not respond to directives, request, or queries by the speaker; and does not use acknowledgments made by the speaker either nonverbally or verbally.

Variety of speech Acts

The variety of speech acts or what one can do with language with as comment, assert, request promise, and so forth.

Examples : Appropriate behaviors : The partner shows both appropriate use of and diversity in the number of different speech acts he can accomplish.

Inappropriate behaviors: The partner shows inappropriate use or a reduced range of different speech acts he or she can use (eg. a particular child whose productive repertoire is restricted to requests for objects with no other observed speech act types).

Topic

- a) Selection The selection of a topic appropriate to the multidimensional aspects of context.
- b) Introduction Introduction of a new topic in the discourse.
- c) Maintenance Coherent maintenance of topic across the discourse.
- d) Change Change of topic in the discourse.

Examples : Appropriate behaviors : The speaker/listener is able to make relevant contributions to a topic, is able to make smooth changes in topic at appropriate times in the discourse, is able to select appropriate topics for discussion given the context and participants, and is able to end discussion of a topic at an appropriate place in the discourse.

Inappropriate behaviors: . The introduction of too many topics within a specified time limit, the inability to initiate new topics for discussion, the inability to select appropriate topics for discussion given the context and participants, and the inability to make relevant contributions to a topic. Inability to maintain topic may frequently co-occur with high frequency of new topic introductions.

- Turn taking Smooth interchanges between speaker/listener
- a. Initiation Initiation of speech acts.
- b. Response Responding as a listener to speech acts.
- c. Repair/revision The ability to repair a conversation when a breakdown occurs, and the ability to ask for a repetition when misunderstanding or ambiguity has occurred.
- d. Pause time Pause time that is too short or too long between words, in response to a question, or

between sentences.

- e. Interruption/overlap Interruptions between speaker and listener; overlap refers to two people talking at once.
- f. Feedback to listener Verbal behaviour to give the listener feedback such as yeah and rally; nonverbal behavior such as head nods to show positive reactions and side to side to express negative effects or disbelief.
- g. Adjacency Utterances that occur immediately after the partner's utterance.
- h. Contingency Utterances that share the same topic with a preceding utterance and that add information to the prior communicative act.
- i. Quantity/conciseness The contribution should be as informative as required but not too informative.

Examples : In all of the above categories, appropriate and inappropriate behavior is judged in relationship to both speaker and listener in the dyad.

Appropriate behaviors : Initiating conversation and responding to comments made by the speaker, asking for clarification when a portion of the message is misunderstood and revising one's own message to facilitate understanding, avoiding interrupting or talking before the other partner is finished, giving feedback to the speaker as a way of moving the conversation forward, appropriate length of pauses in the conversation to support timing relationships in the conversation, and making comments relevant and informative.

Inappropriate behaviours : Little initiation in the conversation forcing one partner to take the burden of moving the conversation forward, no response of inappropriate responses to requests for clarification by the partner, no attempt to ask for repair, long pauses that interrupt timing relationships in the conversation, pause time that is too short and results in overlap or interruptions, little or no feedback to the speaker, and inability to produce comments that are relevant and informative.

Inappropriate behaviors : Mismatch between the style and status of listeners or no difference when required.

PARALINGUISTIC ASPECT

Intelligibility	The extent to which the message is understood.
Vocal intensity	The loudness or softness of the message.
Vocal quality	The resonance and/or laryngeal characteristics of the vocal tract.
Prosody	The intonation and stress patterns of the message; variations of loudness, pitch and duration.
Fluency	The smoothness, consistency and rate of the message.

Examples :

Appropriate behaviors : Speech that is clear: not too loud or too soft; appropriate in quality; and shows appropriate use of intonation, stress, and pitch to support the communicative/linguistic intention of the message.

Inappropriate behaviors: Speech that is so unclear as to result in frequent misinterpretations of the message; speech that is too loud or too soft; a quality of speech that is inappropriate to age or sex of speaker and interferes with communication; and the lack of prosodic variation that supports affect and the linguistic aspects of the message.

NONVERBAL ASPECTS

Physical proximity	The distance that the speaker and listener sit or stand from one another.
Physical contacts	The number of times and placement of contacts between speaker and listener.
Body posture	Forward lean is when the speaker or listener moves away from a 90 degree angle toward the other person: recline is slouching down from waist

and moving away from the partner;

side to side is when a person moves to the right or left.

Foot/leg and hand/arm movements	Any movement of the foot/leg or hand/arm (touching self or moving an object or touching part of the body, clothing, or self).
Gestures	Any movements that support, complement, or replace verbal behavior.
Facial Expression	A positive expression as in the corners of the mouth turned upward, a negative expression is a downward turn, a neutral expression is the face in resting position.
Eye gaze	One looks directly at the other's face; mutual gaze is when both members of the dyad look at the other.

Examples :

Appropriate behaviours : Use of nonverbal aspects of communication that demonstrate level of affiliation between partners, aid in regulating discourse turns, and may supplement or support linguistic aspects of the message.

Inappropriate behaviors :Use of nonverbal aspects that interfere with interpersonal/social aspects of communication, behaviors that detract from the content of the message rather than support and regulate discourse.