Spontaneous Irony in Post-stroke Individuals

by

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ABSTRACT

This study examines spontaneous irony in elicited conversations between dyads assigned to three groups: left-hemisphere-damaged (LHD), right-hemisphere-damaged (RHD), and non-hemisphere-damaged (NHD). The conversational partners in all three groups were non-hemisphere-damaged. Subjects were also administered a battery of neuropsychological tests designed to assess functions hypothesized to underlie the successful communication of irony and sarcasm (i.e., recognition of auditory patterns and facial displays conveying emotions, speed of processing, and comprehension of nonliteral language). Spontaneous irony involves a set of utterances in conversation that is not meant to be interpreted literally and can include such devices as irony, sarcasm, punning, and hyperbole. The communication of spontaneous irony in normal speakers is accomplished through a quick, tight coordination of behavioural and/or prosodic features. For a variety of reasons this coordination may break down when one of the speakers has brain damage. This study found that the rate of production of irony was significantly less in the two clinical groups as compared to the control group with no significant difference between the LHD and RHD groups. There was no significant difference amongst the groups in terms of success of communication; all three had a success rate of approximately 90 per cent. Individual profiles were examined to determine whether any patterns emerged in the test results, however, no pattern unique to the clinical subjects with the lowest rates of irony emerged. When the conversations were examined in more detail, it was found that the NHD partners in the clinical groups produced a significantly lower rate of irony than the NHD partners in the control group. The rate was also significantly lower than the rate of irony of the clinical subjects. These results suggest that the NHD partners

adjust their content when their partners have had brain damage. Part of this adjustment may be due to the accommodation, described in previous literature, that occurs in interactions between disabled and nondisabled individuals. However, further exploration suggests that in addition to this overall accommodation there may be an adjustment that is dependent on whether the partner has had left or right hemisphere damage. Features present in the LHD group were pauses and paraphasias leading to disruptions in turntaking. These were not present in the RHD group which consisted of fluent speakers with no disruptions in turntaking. However, a reduction in discourse-oriented facial displays and prosodic features and a tendency toward tangential speech may act to change the quality of conversations in the RHD group. These aspects would have to be studied objectively in a future study to determine whether they were upheld.

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To my husband and best friend, Brian

and my parents,

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CHAPTER ONE

Introduction

From a psycholinguistic point of view, oral communication can be subdivided into phonology/prosody, morphology/vocabulary, and syntax. In addition to these components, there are also nonverbal behaviours, including facial displays and body language, that accompany oral language and influence communication. A compilation of data from research with patients with aphasia, hemispherectomy cases, sodium-amytal tests with epileptic patients, commissurotomized subjects, and dichotic and tachistoscopic studies with neurologically intact subjects as well as other types of studies suggests that in the majority of people, the left hemisphere is dominant for, or processes more efficiently, speech and language, i.e., phonological distinctions, vocabulary, and syntax (examples of reviews: Critchley, 1991, Springer and Deutsch, 1989). On the other hand, the right hemisphere appears to be more involved with prosody and the nonverbal aspects of communication.

Both the literature and clinical observations suggest that brain-damaged individuals and particularly those with right-hemisphere-damage may have "inappropriate reactions to humor, misinterpretation of metaphors, and difficulty producing and perceiving the emotional tone of linguistic utterances" (Sohlberg and Mateer, 1989, p. 215, see also Ylvisaker, 1992). These are individuals for whom traditional speech and language measures (i.e., those examining production and comprehension of vocabulary and grammatical structures) often indicate that performance is within the normal range.

Yet further investigation frequently finds more subtle deficits in communication particularly at the conversational level and within social contexts.

Extensive literature reviews have listed some of the deficits attributed to right hemisphere damage (see Ross, 1984, Gardener, Brownell, Wapner, and Michelow, 1983, Searleman, 1983). Below is a summary of some of the findings relevant to this study under the headings: prosody, nonverbal behaviour, abstract language, and pragmatics.

Prosody

Ross, Edmondson, Seibert, and Homan (1988) provide a comprehensive definition of prosody as representing "a complex component of the acoustic signal that communicates linguistic, attitudinal, emotional, pragmatic, and idiosyncratic information through the use of pitch, loudness, timbre, tempo, stress, accent, pausing, and intonation" (p. 130). Monrad Krohn (1947) suggested that prosody can be subdivided into four categories: 1) intrinsic prosody which refers to the standard patterns used linguistically to differentiate words or phrases such as statements versus questions or nouns from verbs (e.g., con'-vict vs. con-vict'); 2) emotional prosody which is used to convey feelings such as anger, pleasure, fear, and so on; 3) intellectual prosody which involves using prosody to subtly change the meaning of the words spoken in order to convey emphasis, sarcasm, skepticism, and so on; and 4) inarticulate prosody which includes grunts and other nonlinguistic sounds that nevertheless provide the listener with information.

For a relatively recent review of the literature relevant to the various types of prosody and the associated neuroanatomy and neuropsychology in normal, brain-injured, and psychiatric populations see Merewether-and Alpert (1990). Studies looking at emotional prosody, have found that right-hemisphere-damaged (RHD) patients are impaired in the comprehension and/or production of "affective speech." For example, Heilman, Scholes, and Watson (1975) found that right-hemisphere-damaged patients made more errors than left-hemisphere-damaged (LHD) patients in identifying neutral sentences read in happy, sad, angry, or indifferent tones. Tucker, Watson, and Heilman (1977) replicated this experiment and found that the RHD patients had difficulty not just in naming the emotions but also in discrimination (i.e., determining whether they were the same or different). Weintraub, Mesulam, and Kramer (1981) found not only similar results with RHD patients concerning discrimination of prosodic patterns but also that they had difficulty with the repetition and production of prosody. The flaw with their study was the lack of a LHD group with which to compare results. Heilman, Bowers, Speedie, and Coslett (1984) found that both left- and right-hemisphere-damaged patients were impaired in identifying intrinsic (or linguistic) prosody, i.e., filtered sentences with interrogative, declarative, or command prosodic patterns, relative to normals but that only RHD patients were impaired in comprehending emotional prosody.

On the other hand, Emmorey (1987) demonstrated that left hemisphere damage affects the ability to comprehend intrinsic prosody used at the lexical level. LHD patients

had difficulty discriminating between noun compounds and noun phrases that were contrasted by means of stress (e.g., greenhouse versus green house); RHD patients performed as well as normals on this task. She suggested that "the left hemisphere may be involved in the comprehension of both sentential and lexical prosody, while the right hemisphere may be involved with sentential intonation" (p.315).

Blumstein and Cooper (1974) found a left ear advantage (suggesting right hemisphere involvement) in a dichotic listening experiment using interrogative, declarative, continuation, and command prosodic patterns. Ley and Bryden (1982) demonstrated a dissociation by showing a left ear advantage for recognizing the emotional intonation of sentences (happy, sad, angry, and neutral) but a right ear advantage for the verbal content of the sentences. Shipley-Brown, Dingwall, Berlin, Yeni-Komshian, and Gordon-Salant (1988) showed left ear advantages for sentences with either intrinsic prosody (statement, question, continuation) or emotional prosody (happy, angry, sad).

Ross and his colleagues have written several articles suggesting that damage in the right hemisphere can produce aprosodias that are analogous to the subtypes of aphasia depending on the locus of the lesion (Ross, 1984, 1981; Ross, Harney, deLacoste-Utamsing, and Purdy 1981; Ross and Mesulam, 1979). He and his associates have hypothesized and provided evidence from case studies that a lesion in the anterior portion of the right hemisphere would produce an "expressive aprosodia" whereas a posterior lesion would produce a "receptive aprosodia." Other terms that have been used are

"motor aprosodia" and "sensory aprosodia" (see Hughes, Chan, & Su, 1983). Ross, Edmondson, Seibert and Homan (1988) performed Wada tests sequentially in both hemispheres on five epileptic candidates for surgery. They found that a left-sided Wada produced a dense aphasia while a right-sided Wada caused the patients to lose the ability to convey affect through speech. The effect was demonstrated through significant within-subject differences of the parameters obtained from acoustic analyses of the speech productions.

Mandarin Chinese speakers with focal right hemisphere lesions have been examined with interest because Mandarin is a tonal language (Hughes, Chan and Su, 1983). Twelve such subjects were given tests assessing their ability to identify the emotional content of phrases, discriminate (i.e., decide whether two phrases had the same or different emotional content) and repeat emotional prosody, and independently produce phrases with specified emotional prosody. They were found to have changes similar to English speakers, in their ability to produce and comprehend affective prosody, but no change in their ability to produce or comprehend the tones necessary for the linguistic aspects of Mandarin (i.e., these lesions did not produce a "tone" aphasia). The latter ability was assessed by having the subjects name and choose from a multiple choice format, pictures of words in which at least two were homophones differentiated semantically by tone only. Not only did they find evidence for an aprosodia in the subjects

but that there were subcategories of aprosodia (e.g., motor, sensory, global and even transcortical) dependent on lesion site as suggested by Ross (1981).

Shapiro and Danly (1985) acoustically analyzed the speech patterns of RHD and LHD patients and found that damage in the anterior portion of the right hemisphere caused the patients to produce flat speech whereas the speech of patients with damage in the posterior portion of the right hemisphere was hypermelodic. This pattern was found to be the case with both emotional and nonemotional stimuli in a task in which the patients were required to read the stimuli aloud. These deficits were not found in the LHD group. Ryalls (1986) questioned their interpretation of the results and later tried to replicate the findings. Ryalls, Joanette, and Feldman (1987) used a repetition rather than a reading task and concentrated on nonaffective as opposed to affective stimuli. The reasoning for the latter change was because Shapiro and Danly had argued for a primary disturbance in speech prosody caused by damage to the right hemisphere and, if this was so, Ryalls and his colleagues argued that the effect should be seen clearly with nonaffective stimuli. They acoustically analyzed the subjects' productions and found no significant differences among the three groups (LHD, RHD, and NHD). Because the examiners, like other researchers, could "hear" differences in the RHD subjects' speech, they queried whether acoustic analyses fully capture the changes in speech about which the patients complain. These changes include such aspects as changes in average pitch, reduction in vocal pitch range, reduced volume, and occasionally hoarseness. Ryalls et al. suggest that these changes are

similar to a description of "dysphonia or phonatory incompetence" and may be this problem as opposed to a dysprosodia (at least when nonaffective stimuli are considered).

Thus, most studies have explored either intrinsic (e.g., statement versus question) or emotional prosody (e.g., happy versus sad). LHD subjects appear to have difficulty processing prosody at the word and possibly the sentence level, whereas RHD subjects have difficulty with sentence level intonation. Results have been most clear with emotional prosody as demonstrated by RHD subjects' difficulty with discrimination, comprehension, repetition, and/or production of affective speech. Consequently, some authors (e.g., Ross) have suggested that there may be aprosodias comparable to the various aphasias. The literature is less clear with the production of prosody and in particular if nonaffective stimuli are used. Some authors suggest that the changes in output may be due to a dysphonia as opposed to a dysprosodia.

Nonverbal Behaviour

The literature suggests that not only is the right hemisphere involved in visuospatial processing but in particular it may be involved with processing the visual cues related to speech (i.e., lip-reading) or emotional expression (Thompson, 1985, Borod and Koff, 1990). Strauss and Moscovitch (1981) found a left visual field superiority (implicating the right hemisphere) for recognizing facial expression in a tachistoscopic study of normal subjects. Campbell (1986) also performed a tachistoscopic study and

showed a left visual field superiority for matching the sounds to the appropriate photographs of lip shapes. However, Campbell, Landis, and Regard (1986) studied two patients showing a double dissociation related to face recognition and lipreading. The patient with the right hemisphere lesion (right posterior temporal region) was impaired at identifying and producing facial expressive gestures and recognizing familiar faces but not with lip-reading. The patient with the left hemisphere lesion (left medial occipitotemporal region) was able to recognize faces and facial gestures but was impaired with lip-reading.

Benowitz, Bear, Rosenthal, Mesulam, Zaidel, and Sperry (1983) used the Profile of Nonverbal Sensitivity with commissurotomized patients with known lateralized damage. Five of the six RHD patients had difficulty evaluating facial expressions. Most of them were still able, however, to evaluate emotions conveyed auditorily or by body movements. The latter suggests that the difficulty was not due simply to a deficit in visuospatial processing. The LHD group performed in the normal range on the PONS. There was one commissurotomized patient to whom the stimuli could be presented to one hemisphere at a time due to the use of an occlusive optical system. This person showed more difficulty evaluating facial expressions when required to use his right hemisphere and with body movements when the left hemisphere processed the stimuli.

A phenomenon known as the McGurk illusion involves blends that are formed when different oral and visual speech sounds are presented simultaneously (e.g., a visual "ga" presented with an oral "ba" creates a heard "da" or "ta" (McGurk and MacDonald,

1976)). Another study discovered that the illusion is not under voluntary control nor limited to consonants (Summerfield and McGrath, 1984). It is possible that this coordination between visual and auditory processing also occurs at other levels of language comprehension, e.g., visual and auditory cues for conveying emotional mood, irony, or sarcasm.

In summary, the McGurk illusion studies suggest that visual and auditory processing may be coordinated and thus both intonation and facial expression may be relevant to signalling messages in conversation. RHD patients have been found to have difficulty identifying and producing facial expressive gestures whereas LHD patients appear to have difficulty recognizing facial shapes related to language (i.e., lip-reading).

Abstract Language

A review of psycholinguistic and neurolinguistic studies suggest that nonliteral and literal language "are organized according to different principles in the mind and represented in different places in the brain" (Van Lancker, 1990 p. 174). Subjects have been to shown to make faster judgements and show better recall for familiar idioms as opposed to novel literal phrases (e.g., Swinney and Cutler, 1979, Horowitz and Manelin, 1973). Gibbs (1986) found that normal subjects comprehended and remembered better the ironic meaning as opposed to the literal meaning of the same expression.

Goldstein (1948) has termed the deficit found in certain brain-damaged individuals as "a loss of the abstract attitude." They tend to interpret utterances such as metaphors, proverbs, indirect requests, and idioms in a more literal or concrete fashion. Many authors suggest that the right hemisphere is involved in efficient processing of abstract or nonliteral language although others have implicated the frontal lobes. Benton (1986) concluded that frontal lobe damage was responsible for impaired interpretation of proverbs but as emphasized by Van Lancker (1990) the patients with right frontal damage were more impaired than the ones with left frontal damage.

Hier and Kaplan (1980) found that RHD patients were able to perform as well as controls on a vocabulary test but were impaired in their ability to interpret proverbs (e.g., "Don't cry over spilt milk") and logico-grammatical sentences (e.g., "The elephant sat on the mouse. Was the mouse on top?"). The authors suggested that the difficulty with logico-grammatical sentences may be due to different mechanisms depending on the type of construction: 1) visuospatial deficits perhaps contributed to the difficulty with spatial relationships and 2) an "inability to manipulate the inner schemata of language may have contributed to difficulties... with passives."

Studies have demonstrated that RHD subjects show an impairment in the interpretation of metaphors (e.g., "He has a heavy heart") (Winner and Gardener, 1977) as well as difficulty with idioms (e.g., "He's turning over a new leaf") (Myers and Linebaugh, 1981; Van Lancker and Kempler, 1987). The latter study showed a double

dissociation with LHD subjects demonstrating difficulty with novel phrases but not familiar idioms and RHD subjects showing the reverse pattern. "Most idioms, proverbs, and social formulas are learned, produced, and comprehended as entire units rather than as a sequence of grammatically independent lexical components" (Van Lancker, 1990, p. 180). Van Lancker and Kempler (1987) suggest that perhaps the right hemisphere is involved in the interpretation of "formulaic speech." because of its stronger propensity to recognize familiar patterns. That is, the idiom, proverb, etc. become a "frozen" phrase which is analyzed as a whole and because the right hemisphere is no longer able to recognize the pattern there is a failure in comprehension. On the other hand, a person with an intact right hemisphere but a damaged left hemisphere would be able to recognize the "frozen" speech pattern and interpret it as well as single words are interpreted However, there may be more involved than this in a complete explanation as Brownell, Simpson, Bihrle, Potter, and Gardner (1990) found that RHD as opposed to LHD subjects do not appreciate metaphoric meaning even at the single word level. A partial explanation may be that the RHD subjects have difficulty generating alternative meanings although the researchers argue that this postulation still does not fully explain the differences between the groups.

Hirst, Ledoux, and Stein (1984) examined LHD and RHD subjects' ability to interpret indirect requests (e.g., "Can you X?"). The task involved viewing videotaped episodes in which an individual asked another "Can you X?" and the other responded

either with an action or a simple "yes". The subjects judged whether the response was appropriate given the context. Anterior aphasics were found to comprehend the nonliteral but not the literal meanings of the sentences. On the other hand, RHD subjects demonstrated comprehension of the literal interpretations but frequently failed to "distinguish between appropriate and inappropriate action responses." For example, passing the salt when asked "Can you pass the salt?," an indirect request, would be an appropriate response whereas swinging a tennis racquet in the living room as a response to the question, "Can you play tennis?," a direct question, is not. Perhaps these indirect requests are similar to idioms in that they too have become "frozen" phrases or social formulas that are recognized as a whole and thus interpreted more readily by LHD than RHD subjects.

In summary, RHD subjects appear to have difficulty interpreting abstract language. Suspected contributions to the impairment appear to be their reduced visuospatial abilities (e.g., necessary for logico-grammatical sentences involving spatial relationships), reduced ability to recognize familiar patterns (e.g., necessary for formulaic speech such as idioms and indirect requests), and reduced ability to generate alternative meanings (e.g., necessary for metaphors).

Pragmatics

Pragmatics can be defined as a

> system of rules that clarify (sic) the use of language in terms of situational or social context. For example, language may be used to command, placate, query, impress, threaten, or establish rapport with the listener. (Sohlberg and Mateer, 1989, p. 214)

It involves many of the paralinguistic aspects already discussed above (i.e., prosody, facial displays, gestures, and other nonverbal behaviours). It also involves such aspects as turntaking, greetings, repairing misunderstandings, and maintaining cohesiveness.

RHD individuals are often typified as being verbose and tangential with difficulties in interpreting humour and inferences. A study of humour in brain-damaged individuals by Bihrle, Brownell, Powelson, and Gardner (1986), an extension of Brownell, Michel, Powelson, and Gardner's (1983) study, found that RHD subjects had a preserved sense that a joke should have a surprise ending but had difficulty maintaining cohesion such that they often chose a nonsequitur ending. LHD patients erred in the other direction by often choosing an ending that fit the story but was not funny or surprising.

This inability to maintain cohesion or to integrate the important details necessary to understand a story also affects the RHD individual's ability to make inferences. Wapner, Hamby, and Gardner (1981) found that RHD subjects were poorer at providing the moral of a story or describing the emotions or motives of the characters although they could recall isolated facts. One suggestion is that this deficit is related to the proposed ability of the right hemisphere to process material in a holistic or gestalt fashion. In addition, Blonder, Bowers, and Heilman (1991) found that RHD subjects had difficulty

making logical inferences even when only one target sentence and four multiple choice responses were presented. They tended more frequently than either the LHD or control group to choose a nonsequitur or contradictory response. Thus, even in linguistically rather simple circumstances in which they had to weave few elements together to form a cohesive whole they had more difficulty than the other groups making a leap in logic or an inference.

A study by Brownell, Potter, Bihrle, and Gardner (1986) showed RHD subjects to have deficits in understanding connected discourse. They attributed the difficulties to being at least in part due to problems making inferences, a "susceptibility to following associations that are tangential to the overall meaning of a discourse," and to difficulty "switching gears" thereby becoming fixed on the initial interpretation. Roman, Brownell, Potter, Seibold, and Gardner (1987) examined script knowledge in RHD and elderly subjects as well as a younger control group. The subjects were asked to provide the sequence of steps for two common activities. In general, the RHD subjects were able to do this albeit with some abnormalities such as "an inability to inhibit personalizations and tangential remarks (and) difficulty continuing an incomplete script" (p. 167).

Kaplan, Brownell, Jacobs, and Gardner (1990) examined RHD subjects' ability to judge whether a speaker was being sarcastic (associated with a desire to be mean) or using well-motivated deceit (associated with a desire to protect someone's feelings). It was suggested that a deficit would be "consistent with a decreased ability to make an inference

based in large part on affective information" (p. 318). Taped vignettes without a "unique" or "sarcastic intonation" in the final utterance, were presented to the subjects. They were required to make their judgments based on the contextual information, i.e., the knowledge concerning the speaker's relationship to the other person in the vignette. The RHD subjects in general had no problem with the literally true statements but appeared to have difficulty integrating the contextual information with the false statements as an aid to interpreting them successfully.

To summarize, RHD subjects tend to be verbose, make tangential or personalizing remarks, and have difficulty interpreting humor and making inferences. Contributions to the impairments appear to be an inability to inhibit inappropriate responses, difficulty maintaining cohesion and integrating the important details as opposed to inconsequential details, and problems with "switching gears" such that alternative explanations are not explored (as with metaphors and other examples of abstract language described above).

Purpose of the Study

Much of what we say is not meant to be taken in a literal fashion. For example, we extend indirect requests such "Can you open the window?" but are not actually asking the listener if s/he can physically open the window but rather whether s/he would mind doing so. We think the person dense or rude if s/he does not open the window but merely

responds affirmatively. We also use devices such as metaphors (e.g., "he has a heavy heart"), slang (e.g., "that's a cool car"), or idioms (e.g., "bring home the bacon") as a means of adding spice to communication, fitting in with the group with whom we are speaking, or conducting conversations in a quick, formulaic manner. The purpose of these devices is dependent upon the situation. Irony is another device that adds variety to conversations and is not meant to be interpreted literally. The following sections will discuss this device in more depth along with an argument for studying irony within a conversational format.

Irony

Irony involves a combination of words and paralinguistic features such as intonation, facial displays, gestures, etc. that together with context convey a meaning different from that imparted by the words alone. Schaffer (1982) describes verbal irony as a "conflict between the literal meaning of the spoken words and what the speaker is believed to intend" (p. 2). In many cases it is approximately the opposite of the literal meaning of the words themselves. Some researchers (e.g., Coates, 1991) consider sarcasm and hyperbole as being subcategories of irony. Others (e.g., Schaffer, 1982) note that although irony and sarcasm overlap in some aspects, sarcasm is not merely a subset of irony. Instead, it is suggested that one can find examples of each that do not involve the

other. For the purposes of this study, sarcasm has been included as a category of irony because of the overlapping similarities.

Dictionary definitions (New Webster Encyclopedic Dictionary (Eds.: Thatcher and McQueen, 1984)) and examples of each of these devices are provided:

a) Irony - "a mode of speech by which words express a sense contrary to that really intended; sarcasm (sic), in which apparent praise really conveys disapprobation," e.g., "What a lovely day for a picnic" (it is pouring rain); "Isn't she a fantastic dancer" (she has just stepped on her partner's toes); "You're a great friend" (you have just told me I cannot borrow one of your CD's).

b) Sarcasm - "a bitter cutting expression; a satirical remark; a bitter gibe; a taunt," e.g., "I love your dress. Did you get it at Sally Ann?" (speaker would never consider shopping there and said it in a negative manner).

c) Hyperbole - "a figure of speech which expresses much more or less than the truth; an exaggerated statement; exaggeration," e.g., "He has a million suits" (someone has quite a few suits in his closet but not exactly a million).

Demorest, Meyer, and Phelps (1984) differentiate between sarcasm and deception. If a speaker tries to hide the truth so that the listener takes the words literally,

the remark is deceptive; however, if the speaker tries to signal in some way that the remark is not true, the statement is sarcastic. The authors suggest that

> with sincerity and deception, the speaker's statements, behavior and intonation are congruent, and each may be used to judge the communicative purpose. However, in the case of sarcasm, the speaker's statement is out of line with his behavior and intonation, and only the latter two cues may be used to accurately assess his purpose (p. 1528).

Several studies have dealt with the psycholinguistic aspects and the development of comprehension of irony or sarcasm in children (see Grice, 1978, Clark and Gerrig, 1984, Jorgensen, Miller, and Sperber, 1984, Demorest et al., 1984, Gibbs, 1986, Kreutz and Glucksberg, 1989).

Coates (1991) discusses the four main theories of irony which include the standard pragmatic theory (see Grice, 1978), pretense theory (see Clark and Gerrig, 1984), echoic mention theory (see Jorgensen et al. 1984), and echoic reminder theory (see Kreutz and Glucksberg, 1989). These theories do not suggest that signalling through intonation or behaviour is an important aspect in the comprehension of irony. The important element according to these theories appears to be the recognition by the listener that the ironic statement is counterfactual or against social norms or expectations. Much of the research has been performed with written irony which may be different from that encountered in natural conversation.

Gibbs (1986) reported on past suggestions that sarcastic utterances were thought to have special intonation properties such as nasalization, exaggeratedly slow speaking rate, and/or very heavy stress, however, his experiments involved written vignettes rather than spoken material. Schaffer (1982) described a larger inventory of vocal cues used by the four subjects in her study to signal irony including variations in pausing, voice quality changes (e.g., laryngealization, nasality, hyponasality, breathiness), heavier stress, more frequent pitch peaks or drops, and laughter (p. 45). She found that ironic statements are more marked than sincere ones and that any kind of marking would do as long as in some way it was different from that of the nonironic statements. Vocal cues are not the only means to mark a statement as ironic or sarcastic. In addition to prosody, there may be some types of nonverbal behaviour (e.g., facial expression, gestures) that help listeners disambiguate ironic comments from sincere ones. These nonverbal cues were not available in Schaffer's study as it involved taped stimuli which listeners had to decide were ironic or literal. Thus, it is possible to mark ironic statements through either visual or auditory means or a combination of the two. It is important to note also that the paralinguistic features may not be a necessary component. Sometimes the utterance may be recognized as ironic only because of the shared knowledge of the context or background relevant to the conversation (as with written irony). One has only to think of a friend or acquaintance with a particularly dry wit who provides little if any changes in

prosody or facial displays when speaking ironically to realize that these cues are not necessary although they do aid in successful communication.

Coates (1991) studied, in dyadic conversations between normal speakers, what she termed "inversions" in her original thesis but in a later manuscript (under revision) has called "spontaneous irony". Her definition of an instance of spontaneous irony is "a discourse event in which the words actually spoken are understood by those involved to mean the approximate opposite of their literal meaning" and could include irony, sarcasm, hyperbole, and other similar events. She observed that the speaker and listener used behavioural signals collaboratively to mutually comprehend that an instance had occurred. These behavioural signals included smiling, laughter, facial displays, head nodding and shaking, and discourse shift markers. Coates saw the spontaneous ironic device as being comprised of four phases consisting of

> calibration (wherein participants agreed to accept a viewpoint about the subject matter); delivery (in which the inversion was actually presented); acknowledgement (where the participants conveyed their mutual understanding and appreciation of the inversion); and closure (in which the participants signalled the closing of the inversion frame) (Coates, 1991, p. ii)

To summarize, most theories appear to have been developed to explain written irony and thus have not included behaviours used in conversation to convey that spoken utterances are not to be interpreted literally. Although some authors have suggested that there may be a special intonation pattern used to mark sarcastic comments, others have

noted a wider range of possible signals. Because of the variety of possible signals and the quick delivery and processing required in conversation, Coates suggested a collaborative approach consisting of a sequence of four phases to explain the process.

Analysis of Conversation

There are two main reasons for using a conversational format as the most appropriate means to study the phenomenon in question. The first involves the device itself and the second is the subject group in whom the device is observed. These are discussed below.

Coates (1991) has argued persuasively that irony needs to be examined in a conversational context. Her thesis is that spontaneous irony in dialogue is a collaborative affair that occurs quickly. Speakers signal in some manner that they are speaking nonliterally, listeners convey that they have understood, and they mutually indicate that the nonliteral portion has been completed. She also suggests, as have other discourse researchers, that it helps or is even necessary in order to fully understand the process, to study certain pragmatic aspects within a conversational context (see Watzlawick, Beavin, and Jackson, 1967, ch. 4, Black, 1988, Bavelas, Chovil, Lawrie, and Wade, 1991, Clark and Wilkes-Gibbs, 1986). Newman, Lovett, and Dennis (1986) state, "A basic fact of language research is that language use in isolation often bears little resemblance to language use in context" (p. 31). Coates points out that irony and sarcasm have typically

been studied as something that is said or written by one person. Irony in conversation, on the other hand, is created by two people in a conversational context.

Many of the aspects suggested as cues for recognizing irony or sarcasm such as prosody, facial displays, and context are those features that are supposedly not efficiently processed or attended to by RHD individuals. Some researchers have attempted to isolate these various parameters to examine the performance of brain-damaged individuals. As discussed earlier, RHD subjects may not show their subtle deficits until their performance is examined at the conversational level. To date very little research has focused on analyzing spontaneous conversations of RHD individuals.

This study is an attempt to amalgamate the techniques of discourse analysis used in the area of social psychology with the knowledge gained through neuropsychology about the deficits in communication from focal lesions. Spontaneous conversations were taped and analyzed according to objective and reproducible methods. The subjects producing these conversations were administered neuropsychological tests aimed at analyzing the underlying abilities thought to be necessary for successful performance. Statistical analyses were conducted to determine whether there are relevant relationships between the underlying abilities and functional performance.

The overall purpose of this study is to ascertain whether irony occurs less frequently or that there are more breakdowns in the communication of irony when one of the speakers is brain-damaged (in particular with RHD) than with two non-brain-damaged

speakers during dyadic conversations. Coates' (1991) framework of analysis of the four phases of spontaneous irony is incorporated to aid in determining whether and at what stage the breakdown occurs. In order for an ironic instance to be successful, both participants must be aware that irony has occurred and that it was understood by the other participant. A failure may be due to behaviours by either of the participants.

As described above, individuals with damage to the right hemisphere may have more difficulty producing and/or comprehending prosody (i.e., intonation, rate, rhythm of speech) and thus may misinterpret the prosodic cues used to convey emotion or mark nonliteral expressions and may rely instead on the words alone to convey the meaning. In addition, they may have visuoperceptual problems and, in particular, difficulty recognizing and interpreting facial expressions, body language, and gestures. Thus, they may have difficulty processing the subtle paralinguistic cues we use to embellish our communication. Also, both right- and left-hemisphere-damaged people may be slower in processing information. This may cause a delay in their ability to process the information typically used in the calibration and delivery phases of irony such that they are not able to follow that there has been a shift from literal to nonliteral communication. Thus, the purpose of the study is to determine whether there are more frequent failures in irony found in conversations with either right- or left-hemisphere-damaged people and to attempt an explanation of why this occurs.

CHAPTER TWO

Method

Pilot study

A pilot study was conducted to determine which tests and methods of analysis would be most appropriate. The subjects consisted of four neurologically intact volunteers and four individuals who had had a cerebral vascular accident (CVA) and were recruited from the local Stroke Club. Two had had left hemisphere damage and two had had lesions in the right hemisphere. There were no criteria regarding time post-onset and information about the presumed locus of lesion was obtained from self report concerning which side of the body had been affected by the stroke.

The original plan had been to pair these subjects with their spouses or a close friend for the conversational portion of the data. This decision was made partially for convenience as it was assumed the individuals post-stroke would not be driving but instead would be traveling to the lab with a friend or spouse. This assumption was wrong. In addition, after viewing the conversation between two spouses, it appeared that the quality of conversation was different from a conversation between strangers. This difference may be due to several possibilities, (1) people who know each other well may not require the same amount of calibration as strangers, (2) there may be more in-jokes or irony not understood by an outside observer, and (3) less overt acknowledgement may be required to show the speaker that the irony was understood. These factors made the

conversation harder to analyze and more difficult for the reliability measure. Also there was concern that that the tasks used may be sensitive issues with people who know each other well, e.g., holiday activities or plans disliked by each or tacky presents received by either participant.

In the pilot study, the dyads were given six tasks to discuss. Two of these were eliminated from the final study and one was adjusted. The tasks were as follows:

a) Pictures of seven bizarre-looking outfits from a feature in the "National Enquirer" were given along with the instructions, "Look at these with your partner. Choose the three worst-looking outfits. Talk to your partner about them and why you chose those three. If you had to wear one of the three you chose, where would you wear it?"

b) Wild and Wacky Weddings (again from the "National Enquirer") "Here are three weddings. Choose the one that seems the silliest or craziest to you. Describe it to your partner. Tell your partner what the ceremony was like and why you think it is silly or crazy."

c) "Plan a meal made of foods that you and your partner dislike. Discuss with your partner what this meal should consist of. Then both of you should decide who you would like to serve this meal to."

d) "Think of a holiday plan made up of places and activities that neither you nor your partner like. Talk about what this holiday would be. Then think of whom you would like to send on this holiday."

e) "What was the worst or tackiest present you have ever received. Describe it to your partner and tell what the occasion was. (You can also describe something that someone else has received or that you have given to someone if you cannot think of something you have received.)"

f) "Read this cartoon to yourself. Describe it to your partner." (There are three cartoons.)

Not all tasks were presented to each dyad, resulting in each dyad having a different selection of tasks to discuss. Dyads were stopped after approximately fifteen minutes of conversation. Some topics were more successful than others in generating instances of irony. In general, tasks (a) to (d) appeared to be the most successful. Thus (e) and (f) were eliminated and different pictures were used for (c) in the actual study.

Coates' (1991) rules were used to identify the instances of irony. The pilot data was then used to generate rules for determining success and failure in communication of the irony. The videotapes were watched carefully during the delivery of the identified instances and immediately after the delivery. Behaviours such as mutual smiling, laughter, head nodding, etc. seemed to indicate that the instances were acknowledged by the listeners. Observations of the successful instances suggested that the features that made them seem successful were at least one of the following: 1) the listener said or did something appropriate to the paraphrased rather than the literal meaning, 2) the listener and possibly the speaker smiled or laughed to acknowledge the irony, 3) the listener or the speaker closed the irony through some means such as a discourse marker (e.g., "well",

"O.K."), or 4) the listener escalated the irony by adding to it. The failures either showed an absence of the above or the speaker had to expand on what was said earlier to make the irony clearer. These observations were formed into a set of descriptive rules and then later into a decision tree (see appendix for final set of rules). These rules were then used by a second observer to score the set of data in order to obtain a reliability measure. This person was trained to recognize the irony by reading the appendices of Coates' thesis. Then practice was given in scoring the successes and failures. Once the agreement in the practice sections appeared to be high enough, the scorer then scored independently a different set of instances. The instances of irony were identified for the second scorer along with literal and paraphrased interpretations of each instance. The task for the scorer was to determine whether the instance was a success or failure according to the set of rules.

Because of the cooperative nature of irony as theorized by Coates and substantiated by the viewing of the videotapes, there had to be an interpersonal focus when analyzing the data. Both participants had to be viewed and the behaviours of either could contribute to the judgement of success or failure of the irony. If the instance of irony could not be considered a clear success, then it was decided that it should be considered a failure. It is quite possible that the listener was aware that the utterance was ironic, however, if it was not acknowledged then the speaker would not be aware that s/he

had been understood and thus it would not be completely successful. This bias is evident in the scoring rules.

The percentage agreement between the two scorers was 79 per cent. To determine whether this was significantly above chance level (this was necessary to determine because there are only two choices: success or failure), 79 was converted to a z-score and then compared to the Normal curve. The z-score of 2.14 is at .015 on the Normal curve and significantly above chance when the $p = .05$ level is considered. Thus, the scoring of the success or failure of the irony was considered to be reliable.

A variety of neuropsychological measures were used with these pilot subjects to determine what tests should be in the battery. These subjects had not been assessed previously and thus retrospective measures could not be used. Factors such as administration time, portability of test materials (some subjects were assessed within their homes), and subject frustration were considered along with the hypothesized parameters to be measured. For example, the Profile of Nonverbal Sensitivity was tried but eliminated from the battery because subjects became frustrated, it was too long, and it was not portable. The battery that was used for the actual study is described below.

Current Study

Subjects

Subjects comprise three groups; 1) RHD: 9 right-hemisphere-damaged CVA[1] subjects paired with 9 neurologically normal partners, 2) LHD: 9 left-hemisphere-damaged CVA subjects paired with 9 neurologically normal partners, 3) NHD: 11 neurologically normal subjects act as a control group and are paired with 11 neurologically normal partners. The decision regarding which role the NHD subjects would play was quasi-randomly determined. As they called to volunteer for the study, their names were placed on a list. When they were called to set an appointment for videotaping, the decision regarding whether they were paired with another NHD subject or a clinical subject was based on their availability. The 22 NHD subjects making up the control group dyads were randomly assigned by flipping a coin as either the control group member or the conversational partner of the control group member.

The brain-damaged groups have met the following criteria: (a) have been given a CT or MRI scan to determine locus of lesion or have been seen by a neurologist who has determined approximate site of lesion from clinical symptoms; (b) do not have a concomitant neurological problem as determined from a self-administered health status questionnaire (see appendix); (c) adequate visual acuity - with or without glasses to match

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[1] CVA: Cerebral Vascular Accident (stroke)

pictures in a picture-matching task; (d) adequate hearing for one-to-one conversation; (e) onset of CVA was between 6 and 24 months prior to the study; and (f) score 12 or more on the Auditory Comprehension Test for Sentences (Shewan, 1979); (g) score above the 16th percentile on the Raven's Coloured Progressive Matrices (Raven, 1947); and (h) subjects with left CVA, score at least 17/20 (reliability determined by means of a second rater) on the Spontaneous Speech section of the Western Aphasia Battery (Kertesz, 1982) (such that they are able to comprehend instructions and their content, structure, and length of utterances are potentially adequate to support inversions).

Table 1
Demographic Information of Clinical Subjects

Subj. No.	Locus of Lesion	Time Post-onset (mos.)	Age (yrs)	Ed. (yrs)	Gender	Hand.
11	CT scan: normal Impression[2]: left-sided CVA, verbal apraxia, dysphasia	15	72	16	M	R
17	CT scan: normal Impression: left-sided CVA, right hemiparesis, mild anomia	19	64	11	F	R
42	CT scan: posterior limb of left internal capsule with upward extension into paraventricular area	17	58	13	M	R
45	CT scan: left internal capsule	10	70	10	M	R
50	CT scan: intracerebral bleed involving posterior limb of	18	69	14	M	R

[2] If CT scan results were normal or unavailable, the neurologist's impression based on such features as hemiparesis, communication difficulties, etc. was used to assign subjects to LHD or RHD groups.

	left internal capsule, basal ganglia					
57	CT scan: normal Impression: moderate right hemiplegia, dysphasia, query lacunar infarct in basal ganglia or brainstem	12	66	16	M	R
62	No CT scan results available Impression: mild left CVA, right facial paresis, resolving right hemiparesis	22	68	14	F	R
72	CT scan: 2 large cerebral infarcts, one in the left parietal lobe and one more anteriorly in the left frontal lobe	5	85	11	M	R
74	CT scan: intracerebral hemorrhage in left parietal area	29	77	16	M	R
2	CT scan: normal Impression: right-sided CVA, left-sided weakness	22	64	12	F	R
7	CT scan: evidence of mild generalized cerebral atrophy Impression: left-sided weakness, query right CVA	28	60	9	M	R
8	CT scan: evidence of right-sided cerebral infarct; oval low density adjacent to the right lateral ventricle	22	70	14	F	R
31	CT scan: normal Impression: right CVA with left hemiplegia	16	73	13	F	R
41	CT scan: normal Impression: left hemiparesis, suspect lacunar hypertensive infarct in cerebellum or brainstem	8	65	12	M	R

47	CT scan: vague low density in a somewhat segmental distribution involving the right temporal parietal lobe	6	69	13	F	R
48	MRI results: right thalamic lacunar infarct and possible tiny infarct in the right cerebral peduncle	9	70	15	F	R
53	CT scan: normal Impression: Right-sided CVA, left-sided weakness,	13	64	12	M	R
70	CT scan: subarachnoid and intracerebral hemorrhage, secondary to rupture of right posterior communicating artery aneurysm	5	62	18	F	R

Eleven clinical subjects completed portions of the tests and/or videos but were not included in the study because they did not meet the inclusion criteria for a variety of reasons including: inadequate hearing (n=1); other neurological disorder present, e.g., epilepsy, M.S., head injury (n=3); did not complete the video portion (n=2); lesions in both hemispheres (n=3); CT scan indicated cerebellar lesion (n=1); below cutoff criteria on Raven's Coloured Progressive Matrices (n=1).

Because it was difficult to obtain enough subjects that fit the criteria within the timeframe of the study, the time post-onset criterion was extended slightly in both directions so that subjects were actually 5 to 29 months post-onset rather than 6 to 24 months. The latter range had been an arbitrary time chosen as a means to eliminate those subjects who had either not stabilized from the effects of the CVA (i.e., it was too soon

after the CVA to test for ongoing symptoms) or perhaps had learned to compensate for the communication difficulties associated with the CVA. It was thought that a slight laxing of the acceptable range would not jeopardize the intent of this inclusion criterion.

Two subjects (# 57 and #41) were included in the study despite the fact that the neurological impression indicated that possibly the lesion was in the cerebellar or brainstem region. This impression was not corroborated by the CT scan which was unable to localize a lesion. #57 had right hemiplegia and dysphasia, symptoms also suggestive of a lesion in the left hemisphere and # 41 had left hemiparesis, suggestive of a possible right hemisphere lesion. Thus, they were included in the appropriate groups. Also subject #72 was left in the study despite having two lesions. Because both lesions were localized to the left hemisphere only and he fit the rest of the inclusion criteria, the decision was made to keep him in the LHD group. Other subjects with multiple lesions were dropped because the lesions were in both hemispheres and thus did not allow assignment to an appropriate group.

The Spontaneous Speech section of the Western Aphasia Battery was scored separately by two examiners. The scores varied by a difference of +/- 2 points. The correlation between the two sets of scores of the two examiners was $r = .63$, $p = .068$, thus making the strength of the relationship between the two sets of scores to be 39.7%. More to the point, however, was the fact that the reliability between the two scorers that the subjects met the criteria level (i.e., scored at least 17/20 on the subtest) was 100%. In

other words, both scorers agreed that these 9 left CVA subjects were eligible according to this criterion.

Demographics

1) Education:

Table 2
Education Level of Groups (n)

Education	NHD	LHD	RHD	Total
High School (< 12 yrs)	1	3	4	10
College (13-15 yrs)	2	3	4	13
University (> 16 yrs)	8	3	1	17
Mean (S.D.)	15.18 (1.97)	13.56 (2.35)	13.11 (2.47)	14.35 (2.32)
Range	12-18 yrs	10-16 yrs	9-18 yrs	9-18 yrs

A one-way analysis of variance showed a significant difference between groups in terms of education ($F(2, 26) = 3.5555$, $p = .0432$). There was no significant difference between the two clinical groups ($T = -.413$, $p = .683$, $df = 26$) but the NHD group was significantly better educated than the clinical groups ($T = 2.635$, $p = .014$, $df = 26$). In order to make the three groups more equivalent in terms of education the oldest subject with the highest level of education in the NHD group (age 78, 18 years education) along with that person's conversational partner were eliminated from the analyses. This reduced the number of dyads in the control group from 11 to 10. With this adjustment, the

between group difference for education level was no longer significant ($F(2, 25) = 2.7359$, $p = .0842$; control group mean = 15.40, S.D. = 2.011).

2) Gender:

Table 3
Gender Composition of Groups (n)

Gender	NHD	LHD	RHD	Total
Male	4	7	3	16
Female	6	2	6	22

A one-way analysis of variance showed that the difference between groups in terms of gender was not significant ($F (2, 25) = 2.1922$, $p = .1327$).

3) Dyads:

Table 4
Gender Composition of Dyads (n)

	NHD	LHD	RHD	Total
Male-Female	6	4	4	14
Female-Female	4	2	4	10
Male-Male	0	3	1	4

4) Age:

Table 5 Age Composition of Groups (n)				
Age (years)	NHD	LHD	RHD	Total
50-59	1	1	0	9
60-69	8	4	6	18
70-79	1	3	3	7
>80	0	1	0	1
Mean (S.D.)	64.80 (4.66)	69.89 (2.35)	66.33 (4.33)	65.74 (6.74)
Range	54-70	58-85	60-73	52-85

A one-way analysis of variance showed no significant difference amongst the three groups in terms of age ($F(2, 25) = 1.9310$, $p = .1660$).

5) Time post-onset:

Table 6 Time Post-onset of CVA (mos.)		
	LHD	RHD
Mean	16.11	14.33
Range	5-29 mos.	5-28 mos.

A t-test indicated no significant difference between the two clinical groups in terms of time post-onset ($t = .56$, $p = .59$, $df = 16$).

6) Locus of Lesion:

As can be noted from the table, the CT scan results for 9 out of the 18 clinical subjects were either unable to localize the lesion or unavailable. For these cases, the neurological impression (obtained from the medical chart) or apparent physical symptoms (as in the cases of #57 and #41, see above) were used to localize the lesion to the left or right hemisphere but further localization was not possible. The neurological impression was usually based on one or a combination of features such as hemiplegia, hemiparesis, dysphasia, etc.

7) Native Language:

It must be noted that two of the RHD subjects had English as a second language with German as their first language (#41 and #53). Both had been in Canada for the majority of their adult life (i.e., > 30 years) and were fluent speakers of English.

8) Non-Hemisphere-Damaged Subjects

The NHD subjects made up two groups;(1) the control group subjects and their conversational partners and (2) the conversational partners of the clinical subjects. The demographics of the NHD subjects in these two groups were examined to determine whether there were any statistically significant differences.

a)

Table 7 NHD Subjects: Gender Composition			
Gender	Control	NHD Partners	Mean (SD)
Male	7	6	1.70 (0.47)
Female	13	12	1.67 (0.49)

A t-test showed no significant difference between the NHD subjects in the control group and those that were the conversational partners of the clinical subjects, $t = 0.21$, $p = .831$, $df = 36$.

b)

Table 8 NHD Subjects: Age Composition		
Age (years)	Control	NHD Partners
50-59	6	5
60-69	10	10
70-79	4	3
>80	0	0
Mean (SD)	63.60 (6.49)	63.61 (6.77)
Range	52-75	50-73

A t-test showed no significant difference between the groups in terms of age, $t = -0.01$, $p = .996$, $df = 36$.

c)

Table 9 NHD Subjects: Education Composition		
Education	Control	NHD Partners
High School (</=12 years)	3	2
College (13-15 years)	6	8
University (>/=16 years)	11	7
Mean (SD)	15.00 (1.95	14.82 (2.46)
Range	12-18	11-21

A t-test indicated no significant difference between the two groups in terms of education, $t = 0.24$, $p = .809$, $df = 36$.

d)

Table 10 NHD Subjects: Raven's Coloured Progressive Matrices (scores) Mean (SD)	
Control	NHD Partners
34.10 (1.48)	33.44 (2.50)

A t-test indicated that the two groups were not significantly different in terms of overall IQ level as estimated by the Raven's test $t = 0.99$, $p = .327$, $df = 36$.

Thus, the control group subjects and the NHD partners of the clinical subjects appeared to be similar in terms of age, education level, gender, and overall IQ level as measured by the Raven's.

Inclusion Criteria Measures

Table 11
Inclusion Criteria Results of Clinical Subjects

Subj.No.	A.C.T.S. (Max=21)	W.A.B. Spontaneous Speech Examiner 1 (Max = 20)	W.A.B. Spontaneous Speech Examiner 2 (Max = 20)	Raven's (Max = 36)	Picture Match (Max=5)
11	20	19	20	34 (>95 %ile)	5
17	19	20	18	29 (75 %ile)	5
42	21	20	20	35 (>95 %ile)	5
45	21	17	18	32 (>95 %ile)	5
50	20	20	20	29 (90 %ile)	5
57	20	20	20	32 (90-95 %ile)	5
62	19	18	19	23 (25-50 %ile)	5
72	14	17	17	25 (90 %ile)	5
74	16	17	19	27 (75-90%ile)	5
2	18	DNT[3]		22 (25-50 %ile)	4
7	12	DNT		21 (25-50%ile)	3
8	18	DNT		28 (75-90 %ile)	5
31	21	DNT		32 (> 95 %ile)	5

[3] DNT means "Did not test". The Western Aphasia Battery was used only with LHD subjects to assess possible expressive difficulties due to aphasia. The RHD subjects did not have expressive language difficulties that would have been shown by the WAB.

41	19	DNT	34 (>95 %ile)	5
47	12	DNT	20 (25-50 %ile)	3
48	21	DNT	32 (> 95 %ile)	5
53	16	DNT	31 (90-95 %ile)	5
70	19	DNT	35 (> 95 %ile)	5

Table 12
Summary of Group Results for Inclusion Criteria Measures
Mean (SD)

Test	NHD	LHD	RHD	Total
Ravens	33.90 (1.29)	29.56 (4.07)	28.33 (5.85)	31.40 (4.42)
ACTS	20.20 (1.03)	18.89 (2.37)	17.33 (3.39)	19.13 (2.31)
Picture Match	5 (0)	5 (0)	4.44 (0.88)	4.88 (0.46)

A one-way analysis of variance indicated that there was a significant difference among the three groups on the Raven's score ($F(2,25)=4.8855$, $p=.0162$). The normal control group performed significantly better than the two clinical groups ($T(25) = 3.061$, $p = .005$), however, the LHD group was not significantly different from the RHD group on this measure ($T(25)=-.632$, $p=.533$). Thus, any difference in the conversational measures between the two clinical groups cannot be attributed to differences in global IQ levels as measured by this screening device.

Likewise, the difference between groups was significant for the results of the Auditory Comprehension Test for Sentences ($F(2,25) = 3.3228$, $p = .0525$). There was a significant difference between the NHD group and the clinical groups ($T(25) = 2.188$, $p = .038$, however, the RHD group was not significantly different from the LHD group ($T(25) = -1.363$, $p = .185$). At first glance, this may seem to be surprising because the LHD group would be expected to perform more poorly than the RHD group on this language measure, however, the reduced scores may be due to different causes. Although the test purports to assess auditory comprehension, it involves choosing amongst four pictures that vary in minor details thus requiring adequate visuoperceptual skills for success. It is likely that the RHD subjects had difficulty not because of poor auditory comprehension but rather because of their reduced attention to visual detail.

The picture matching task showed three subjects to have some difficulty with matching pictures. These subjects all had right hemisphere damage. The errors were pointed out to the subjects and thus, this measure functioned as a training and/or information-gathering procedure rather than an exclusionary measure per se. The original purpose for this measure was to exclude subjects who had poor visual acuity and to sensitize the examiner as to whether the subject had a hemianopia or neglect. These three subjects did not appear to suffer from either poor visual acuity or a visual field problem but rather from an inattention to detail. Pointing out the errors, it was hoped, would act to make them aware of the need to pay closer attention. Nevertheless, it is

possible that this reduced attention to detail may explain at least some of the errors on the tests involving making choices amongst a set of pictures varying in minor details (e.g., the ACTS and the Metaphor Picture subtest of the RHLB).

Design

The study consists of two parts: 1) videotaped spontaneous conversations between pairs of subjects and 2) a series of neuropsychological measures administered individually to each of the subjects. The first part is similar in design to that used by Coates (1991) to elicit instances of irony between dyadic speakers in spontaneous conversation. Interactions between pairs consisting of one brain-damaged subject and one non-brain-damaged subject and between pairs of two neurologically normal speakers (control group) were videotaped, analyzed, and compared.

To allow the information, both visual and auditory, to be as accessible as possible, subjects were videotaped in the Human Interaction Lab with a split screen. Subjects were seated at a table across from each other. The screen shows frontal views of each person from the table top up so that facial expressions and gestures of both partners can be seen clearly and simultaneously. The audio allows for qualitative analysis of prosodic features.

Tasks.

Tasks similar to the ones used in Coates' study were presented to the subjects for two reasons (1) to allow comparison with her study and (2) because they seemed to be tasks that elicit irony well. Although they are similar to the ones used in the pilot study, some changes were made and so they are outlined again as follows:

a) "Plan a full course meal made of really awful foods that both of you (and probably others) dislike. Discuss what this meal should consist of. Then both of you should decide who you would serve this meal to. How you would issue the invitation?"

b) Pictures of seven bizarre-looking outfits from a "National Enquirer" feature of the ten worst dresses were given along with the instructions, "Both of you are to look at these pictures. (i) Agree upon the three worst-looking outfits and discuss why you think so. (ii) If female: Decide which of these three outfits you would wear if you had to and where would you wear it. (iii) If male: Decide which of these three worst outfits you would give as a present and who you would give it to."

c) Each person looks at three pictures. "Look at these pictures together. Talk about what you see in the pictures and give your opinion about the situations." One is of a wedding taking place on a roller coaster (again from the "National Enquirer"), the second is of a woman impersonating the Queen doing her ironing, and the third is an advertisement depicting ridiculously dressed people at a pre-Christmas sale.

d) "Think of a holiday plan made up of places and activities that both of you (and probably others) agree would be awful. Talk about what this holiday would be. Then think of who you would like to send on this holiday. How would you encourage that person to go?"

As Coates summarized, at least two of the tasks involve "describing or telling something absurd" (p. 28) (such as, talking about pictures of bizarrely dressed women, or describing a silly picture from a paper such as the "National Enquirer") while the other two tasks create "an incongruity between what subjects were asked to do and what they normally do" (p.28) (e.g., planning a meal of disliked foods or a holiday consisting of disliked places and activities). Each dyad performed the four tasks to produce a video approximately fifteen to twenty minutes long.

The first review of the data suggested that the third task involving the description of silly pictures did not yield many instances so rather than using valuable time rescoring something that does not add to the information already available, this task was eliminated from the data set. Discourse analysis can be labour intensive so it makes sense to concentrate resources on the material that yields the most information. As Potter & Wetherell (1987) state,

> Discourse analysis, at least at present, is an extremely labour-intensive approach.... There is a danger here of getting bogged down in too much data and not being able to let the linguistic detail emerge from the mountain of texts. (p.161)

Neuropsychological Measures.

To further explore the abilities that may be reduced in those subjects having difficulty comprehending irony the following neuropsychological tests were administered to the three groups of subjects to investigate possible relationships.

1) Picture Matching Task.

The Picture Matching task involved practice pictures from the ACTS and Metaphor Picture subtest. Subjects were shown a picture and asked to match it to one of four choices. This task was used to help screen out subjects with visual acuity too poor to recognize pictures. It also helped sensitize the examiner to those subjects who may have had a visual field cut or neglect in which case an adaptation in the presentation of stimuli could be made. It also acted as a training method to prepare subjects for the amount of attention to detail required for later tasks.

2) Victoria Emotion Recognition Test.

The Victoria Emotion Recognition Test (VERT: Mountain, 1993) was used to investigate the ability to recognize intonational patterns and facial expressions. A pilot study indicated that this measure was preferable to the Profile of Nonverbal Sensitivity (PONS: Rosenthal, Hall, DiMatteo, Rogers, and Archer 1979) because of ease of administration, reduced administration time, and fewer complaints from subjects regarding difficulty of judgements. Mountain (1993) critiqued the PONS in her dissertation as being "very long and not consistent with the materials and methodology used in experimental

studies of deficits in recognition of emotion" (p.29). The VERT involves three sections 1) a visual subtest wherein pairs of photographs depicting the four emotions, happy, angry, sad, and afraid, are presented. Subjects are requested to indicate whether the pictures are the same or different in intensity and emotion and to identify the intensity and emotion of each picture; 2) an auditory subtest in which two taped phrases of nonsense words are presented with the same instructions as the visual subtest; and 3) an auditory/visual subtest in which a photograph and taped phrase are presented simultaneously with similar instructions to the previous two subtests. During the pilot study, subjects were found to have difficulty with the auditory subtest. They encountered difficulty in retaining both phrases in mind in order to make the necessary judgements and frequently requested repetitions of the stimuli. Thus, it was decided that this subtest would be altered to present one phrase at a time. This eliminated the measure of judging whether the phrases were the same or different; only the identification score was obtained. Because all three groups would have the test presented in the same way and because comparisons were to be made with the control group's performance rather than with the norms provided with the test, this change was deemed to be preferable to frustrating the subjects.

3) Symbol Digit Modalities Test

Another contributing factor may be reduced speed of processing and so the Symbol Digit Modalities Test (oral version) (SDMT: Smith, 1973) was used as a measure

This test was found by Ponsford and Kinsella (1992) to be the "best single measure of the deficit in speed of information processing" (p. 830). It also had the advantage of avoiding reduced performance due to hemiparesis or poor motor control. The test has a series of nine symbols paired with numbers at the top of the page (similar to the Digit Symbol Subtest on the WAIS-R). The symbols are arranged below in random order with blank boxes beneath each symbol. The subject must identify orally the required digits to match each symbol as quickly as possible for a period of ninety seconds. The examiner rather than the subject writes the digit in the box.

4) Right Hemisphere Language Battery

Another possible explanation for difficulty comprehending irony may be a reduced ability to understand nonliteral or figurative language. The Metaphor Picture subtest from the Right Hemisphere Language Battery (Bryan, 1989) was used as a measure of this ability. This subtest involves choosing from a series of four line drawings the picture that best matches a sentence containing a metaphor (e.g., "He was very busy so she gave him a hand."). The choices include a metaphorical meaning, a literal meaning, and two foils. The choice of this subtest with its pictorial stimuli and multiple choice format was an attempt to reduce any difficulty the LHD group may have had due to expressive difficulties.

In addition, the other subtests of the Right Hemisphere Language Battery (Written Metaphors, Comprehension of Inferred Meaning, and Appreciation of Humour) were presented to the subjects for further information. These measures were not used for statistical comparisons but instead were included as additional information regarding the abilities of the subjects and are elaborated upon in the discussion section of the study. In the Written Metaphor subtest, the subjects are presented with a written metaphor and four possible choices. The metaphor and choices are read to the subject and they are requested to choose the one that is closest in meaning to the original stimulus. The choices include a metaphoric meaning, a literal interpretation and two foils. The Inference subtest involves a short written paragraph that is read to the subjects with four questions which request information that can be inferred from the paragraph. The Humour subtest presents a joke in written format that again is read to the subject. The subject is then required to choose the funny ending for the joke from a set of four possibilities.

Questionnaires

Subjects and families were asked to complete a questionnaire regarding the subject's use of language (pragmatics) in situations that they have encountered in daily life (see appendix for questionnaire). The problems addressed in the questionnaire are not those that are typically associated with aphasia which involves more overt receptive and expressive language difficulties. Instead, they are questions related to the recognition and

use of humour, whether the subject varies prosody or speaks in a monotone, the ability to recognize when someone has misunderstood, and so on. Aphasic patients may or may not have these communication problems. The results of these questionnaires were compared to the statistical results of the study to see whether there is any ecological validity to the study, that is, if one group is found to be significantly different, that this difference corresponds to a perceived difficulty in everyday life.

Procedure

Potential participants for the control group and as conversational partners for the post-stroke individuals were solicited through posters or letters (see appendix for content) to various organizations that had a high senior citizen membership (i.e., over age 50) and by word-of-mouth. Names and addresses of potential CVA subjects were obtained from hospital records. These people were contacted by letter that provided similar information to that in the poster and were informed that they would receive a telephone call asking if they wished to participate. The subjects were informed that the videotaping would require a visit to the university but that the testing could occur either at the university or in their homes. Because of logistics, some received the testing prior to the videotaping and others vice versa. Again because of logistics, no attempt was made to randomize or control this factor. It depended on a variety of circumstances including transportation, time commitment, and so on. Some subjects completed the testing and videotaping on the

same day while others required two appointments at varying intersession periods. Prior to the testing or videotaping, whichever occurred first, the participants read and completed an information and consent form (see appendix). When necessary, this form was read to the participant.

The videotaping portion of the study occurred at the Human Interaction Lab in the Psychology Department of the University of Victoria. Prior to the conversation, the participants were briefed as to the nature of the conversation. They were informed that the topics were not serious and that they were meant to be fun. Each topic was written on a card in separate file folders. These were read to the participants and clarifications that were needed were provided at that point. They were told that most participants took about fifteen minutes for all four topics but that there was no time limit. When they had exhausted discussing one topic, they were to proceed to the next. At the end of the videotaping the participants were encouraged to observe a portion of their videotape to allow them to make an informed decision regarding the use of the videotape by the researcher (see appendix).

The neuropsychology tests were completed in the same order with all subjects. Factors that influenced the choice of order included subject motivation and ease of administration. The order was Picture Matching, Symbol Digit Modalities Test, Victoria Emotion Recognition Test, Right Hemisphere Language Battery, Raven's Coloured Progressive Matrices, and Auditory Comprehension Test for Sentences.

Scoring of Videotapes

After the conversational data was collected via videotape, it was analyzed for instances of irony using the scoring rules developed by Coates as a basis. The rules had to be expanded upon and clarified in order to develop an objective and reliable measure (see appendix for an outline of the rules). These instances were then scored as to whether or not they were successful (see appendix for the decision tree).

Reliability of Scoring

A measure of interjudge reliability is required because of the subjective nature of the decisions required for scoring the videotapes; "we require evidence that the observer saw the behavior of interest, categorized it correctly, and recorded this accurately" (Bavelas, 1978, p. 222). Ideally there should be 90 to 100 per cent agreement between two independent scorers using the same scoring rules on the data in order to produce a minimal amount of error variance in the data due to scoring error.

A second observer was used to ascertain the reliability of the videotape scoring. Training was provided through reading Appendix B and C from Coates' thesis for familiarity in how to identify the various types of instances of irony, looking at examples of successes and failures from the pilot study, and practicing the scoring of the pilot videotapes.

Because the reliability between the two scorers was initially low in this practice phase, the rules were examined and clarified to help improve the reliability. Clarifications included adding examples of what was to be considered an instance and what was not and a decision tree to be used for ambiguous situations. It was important for both scorers to diligently follow these rules. After revising the rules, both scorers scored a few sections together. Because reliability was still not high enough, the more subtle types of irony (hyperbole and minimizations) were eliminated from the scoring rules. As stated, these types are more subtle and, thus, easily missed by overhearers. We, as normal-functioning communicators, are extremely adept at understanding nonliteral language which forms a large component of our daily communication. Because nonliteral language is so frequent and often so easily interpreted we may not notice that the words do not convey their literal meaning. Thus, although the two examiners had high agreement when working in conjunction, some of these more subtle examples slipped by when each was listening separately.

Once it was established that both scorers were looking for the same types of examples and were achieving a high rate of reliability, some practice sections were scored separately. On the final practice section, the two scorers achieved 92 per cent agreement which was judged to be high enough to justify going to the next step. This involved having the second examiner independently score a stratified random sample of the data.

To ascertain the reliability between the two scorers, the percentage agreement was calculated by dividing the number of instances of spontaneous irony agreed upon by both scorers by all possible instances identified by either scorer. This method is in fact a conservative measure of the amount of agreement between the two scorers. Considering only the instances of irony does not take into account all the utterances for which the two scorers agreed were not irony. Thus, if the total number of utterances agreed upon, whether they were ironic or not, was divided by the total number of utterances in the sample used for the reliability measure, then well over 90 per cent agreement would have been achieved. However, it is possible that this 90 per cent agreement level may consist primarily of the nonironic utterances and that any discrepancies between the two scorers may consist of mainly the ironic statements. To avoid achieving a spurious measure of agreement, the more conservative approach was used, resulting in a level of 78 per cent agreement.

As discussed by Schober and Clark (1989), overhearers are at a disadvantage in understanding conversations from which they are excluded. The two scorers would be considered overhearers and even though they are able to observe and listen to the speakers and can stop the tape and relisten at any point, they are not a part of the collaboration that exists between the two speakers. Schober and Clark (1989) suggest that whenever "grounding" (i.e., establishing a mutual framework of understanding) is a component of the communication, that overhearers will be at a disadvantage. They found that

participants in a conversation in which the task involved one of the speakers matching a sequence of tanagram shapes to his/her partner's hidden sequence, were 99 per cent accurate in their matching. However, overhearers who listened to the conversation but did not participate were only 88 per cent accurate after the third trial whereas late overhearers (i.e., they heard the conversation from trial 3 onwards but not the earlier trials) were only 68 per cent accurate. According to Coates' hypothesis, calibration or grounding is a feature of irony and thus is a relevant consideration in this study. This overhearer disadvantage may have played a role in reducing the reliability measure from the ideal level of at least 90 per cent agreement to the actual level of 78 per cent. Because the reliability was less than this ideal level and, as described above, the instances are often quite subtle and easy to miss, the scoring of the whole set of data was double-checked by the second scorer and discrepancies were eliminated through joint discussion. Any ambiguous ones were judged to be non-scorable and eliminated from the data sample. The use of two scorers was thought to be a necessary protection to ensure that a consistent set of instances of irony was fully captured. Unlike Coates' (1991) study which was a descriptive one that did not claim to have identified all instances of irony within the data set, this study is a quantitative one which is attempting to show differences between the three groups in terms of the rate of irony. Thus, consistency in analyzing the three groups is important.

Reliability of the judgements regarding success and failure of the ironic instances between the two scorers was determined by calculating the percentage agreement between the two observers for the instances of irony which both had identified. There was 100 per cent agreement between the two scorers with these judgements. The reason perhaps for the higher reliability in determining success and failure as opposed to the actual identification may be that the rules were biased in favor of the overhearers' interpretation. If it was not clear from the overhearer's perspective whether or not the instance was successful then it was considered a failure. The decision for this bias was made because it was felt that if it was not clear to the scorer, then it likely was also not clear to the speaker and thus should be considered a failure because all aspects of the ironic instance (i.e., calibration, delivery, acknowledgement, closure) were not engaged. For example, often the lack of acknowledgement on the part of the listener forced the instance to be considered a failure. It was thought that if the listener did not acknowledge the irony in some way, then the speaker would not be able to judge that the s/he had been understood. However, it is possible that if the two interlocutors had been consulted they may have had a different view from that of the overhearers about the rate of success. Thus, the reliability between speakers and overhearers quite likely would be less than the 100% agreement found between the two scorers (or overhearers).

Statistical Analyses and Hypotheses

The measures determined from the videotapes for the study consist of: 1) rate of instances of irony created, and 2) percentage of instances successfully comprehended. Rate was used rather than the total number of instances in order to equalize the differences in speaking time. That is, one dyad may have more instances merely because they spoke for a longer period of time during the task. Thus, rate was calculated by dividing the number of instances by the time period (number of minutes). The unsuccessful instances were also examined in terms of the four phases suggested by Coates (calibration, delivery, acknowledgement, and closure) to determine at what stage the breakdowns occurred.

The hypotheses that were tested are as follows:

1. The dyads in the RHD group will have a lower rate of spontaneous irony than those in the LHD or NHD groups.
2. The dyads in the RHD group will have a lower percentage of irony that is successful than those in the LHD or NHD groups.
3. The total score on the Victoria Emotion Recognition Test (VERT) will account for a significant portion of the variance in the rate of irony produced by the dyads.
4. The total score on the VERT will account for a significant portion of the variance in the percentage of irony that is successful for each dyad. Scores on the Symbol Digit Modalities Test (SDMT) and the Matching Metaphors to Pictures from the Right Hemisphere Language Battery (RHLB) will also account for some of the variance.

5. Both LHD and RHD subjects will have lower scores on the SDMT (i.e., will show a deficit when compared to NHD subjects).
6. RHD subjects, as a group, will score lower on the VERT - Visual Identification of Emotion than LHD or NHD subjects.
7. RHD subjects, as a group, will score lower on the VERT - Auditory Identification of Emotion than LHD or NHD subjects.
8. RHD subjects, as a group, will score lower on the RHLB - Matching Metaphors to Pictures than LHD or NHD subjects.

CHAPTER THREE

Results

SPSS for Windows 6.0 was used to calculate the statistics and an alpha level of .05, unless otherwise stated, was the test for significance.

Description of Conversations

The average length of the conversation period was 13.27 minutes. Mean time spent talking about each of the topics was: meal planning, 4.84 minutes; outfits, 3.30 minutes, holiday plan, 5.16 minutes. Table 13 lists the means and standard deviations for each of the three groups in terms of length of spoken time, number of ironic instances, and rate of ironic instances. The rate was calculated by dividing the number of instances by the time and was used as the comparison measure in order to equalize the time taken amongst the dyads for each of the tasks.

Table 13
Summary of Group Results for Conversational Measures
Mean (SD)

	Meal			Outfits			Holiday			Total		
Grp	Time (min.)	Irony (n)	Rate	Time (min.)	Irony (n)	Rate	Time (min.)	Irony (n)	Rate	Time (min.)	Irony (n)	Rate
N	5.82 (2.39)	3.70 (2.11)	0.68 (0.33)	3.17 (1.31)	2.00 (1.49)	0.70 (0.54)	5.47 (1.59)	5.80 (4.37)	1.08 (0.80)	14.45 (3.98)	11.50 (5.56)	0.80 (0.35)
Lt	4.56 (1.18)	2.67 (1.73)	0.58 (0.29)	3.76 (1.25)	1.89 (1.90)	0.56 (0.61)	4.77 (0.58)	2.44 (2.13)	0.51 (0.42)	13.01 (1.74)	7.00 (3.43)	0.51 (0.42)
Rt	4.03 (1.31)	2.33 (2.65)	0.55 (0.59)	2.99 (0.86)	1.44 (0.88)	0.47 (0.30)	5.20 (2.49)	2.22 (2.44)	0.60 (0.66)	12.22 (3.02)	6.00 (4.24)	0.60 (0.66)

Group Differences

Hypothesis 1: The dyads in the RHD group will have a lower rate of spontaneous irony than those in the LHD or NHD groups.

A one-way analysis of variance was used to determine whether there was a significant difference amongst the groups in terms of rate of instances of irony. The overall between group difference was found to be nonsignificant ($F(2, 25) = 1.7482$, $p = .19$). When the normal control group was contrasted with the two clinical groups combined, the difference was significant ($T(25) = 1.860$, $p = .04$, one-tailed test[4]), however, the difference between the two clinical groups was not significant ($T(25) = .189$, $p = .85$). Therefore the hypothesis was not supported by the data.

The number of subjects in each group was small. A power analysis suggested that to show the large effect size that is expected given the above results (i.e., Effect size = $f = \sqrt{\frac{\eta^2}{1-\eta^2}} = 0.37$[5]) at a power level of 0.8, 25 dyads per group would be required (Cohen, 1988, p. 384). Obtaining these many subjects is not a feasible option both

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[4] Because k=2 for this contrast, The ANOVA is virtually the same as a t-test and thus an expected direction can be specified in advance allowing a one-tailed test to be used.

[5] For a discussion of what constitutes a "small", "medium", or "large" effect size and how these relate to correlation ratios and proportion of variance, see Cohen (1988, pp. 280-288). He defines effect size as "the degree to which the phenomenon is present in the population" (p. 9) and provides tables to determine appropriate sample sizes given the effect size expected, degrees of freedom dependent on the number of groups in the study, alpha level (e.g., .05, .01), and power level. Cohen suggests that in socio-behavioural research that large effect sizes are not common (see p. 284). He also suggests using a power level of .8 as a means of protection against Type II errors (b = .2). Thus with df =2, a = .05, p = .8, f = .40; the above value was obtained from the appropriate table (p. 384).

because of the lack of a large enough subject pool to draw upon and because the analysis is so labour intensive. Thus, further subject recruitment was not instigated. Instead the dyads were examined individually to determine whether any patterns were evident.

Hypothesis 2: The dyads in the RHD group will have a lower percentage of irony that is successful than those in the LHD or NHD groups.

The percentage of successfully communicated ironic instances was calculated for each group. The NHD group produced 100/115 (87%); the LHD group produced 59/63 (94%), and the RHD group produced 49/54 (91%) successful instances. Thus, there does not appear to be a significant difference amongst the three groups in terms of overall percentage of success.

Hypothesis 3: The total score on the Victoria Emotion Recognition Test (VERT) will account for a significant portion of the variance in the rate of irony produced by the dyads.

A multiple regression analysis was conducted to determine which, if any, of the test results contributed more to the variance in irony production amongst the subjects. The rate of spontaneous irony for each dyad was used as the dependent variable. Education level and the scores on the Raven's Coloured Progressive Matrices (as a gross measure of IQ level) were entered as a block first in the multiple regression equation. These were thought of almost as control measures with the view of determining what

additional contribution to the variance was given by the test measures. The second block, consisting of the scores on the Symbol Digit Modalities Test, Metaphor Picture Subtest, and Victoria Emotion Recognition Test (Total Score), were entered simultaneously.

The scores for the following subjects were considered in the equation: left CVA subjects (n=9), right CVA subjects (n=9), and the randomly chosen partners who formed the control group (n=10). The rationale for the choice of subject scores to enter in the equation was that the subjects in the control group would be functioning within the normal range and that it would not matter which of the pair represented the dyad. On the other hand, it was thought that any reduction in rate of spontaneous irony scores would be due to the presence of the CVA subjects and thus their scores were entered. Both partners' scores could not be entered because the rate scores were a joint measure for the conversation and thus there was only one score per dyad. Other options were considered but discarded. One option was to consider only the left and right CVA subjects (n=18), however, this reduced the *n* and the variance of the scores too much. Another option involved including both partners of the normal control group and giving the same irony score to both partners, however, there was the question of omitting the partners of the CVA subjects who were also involved in the conversations. A third option was to include all the subject scores and give the same rate score to both partners, however, there was a concern that any differences would be washed out by not knowing which of the two partners contributed to the differences in rate. A final option was to "dyadize" the rest of

the test scores (e.g., by using the difference between the two partners' test scores as the score to be entered in the equation) and thus reduce the *n* to 28 with the rationale that the NHD partners would act as a constant. After considering these options, it appeared that the most economical and efficient and also seemingly logical method was to use the randomly selected control group members in the equation.

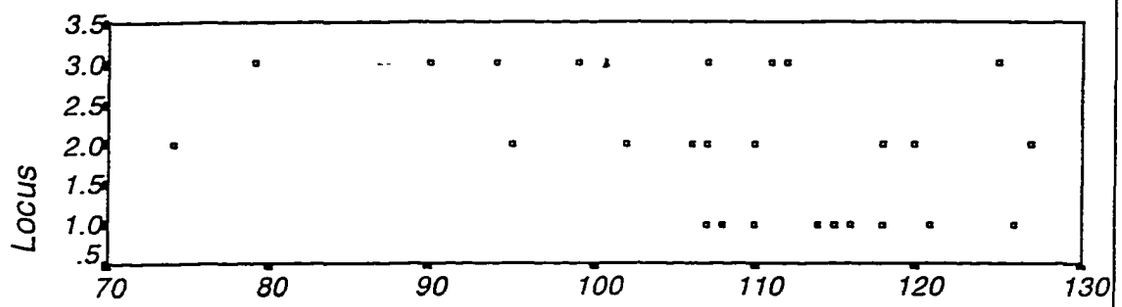
With the above option, none of the test measures contributed significantly in the two step multiple regression analysis (see Table 14). An examination of the correlation matrix (see appendix 16) showed that the test measures were significantly correlated with education level and the Raven's scores but not with the rate of irony. Scatterplots of the subtest scores (see Figures 1 to 4) making up the omnibus measure of the total score from the VERT were produced and revealed that there were different patterns amongst the three subtests thus, suggesting that these measures should be entered separately in the multiple regression analysis. This was done as a post hoc analysis. Again, education level and the scores on the Raven's Test were entered in the first block and the second block consisted of the scores on the Symbol Digit Modalities Test, Metaphor Picture, and subtests of the VERT (Visual Emotion Identification, Auditory Emotion Identification, and Auditory/Visual Emotion Identification). Under these conditions, again none of the measures was found to be a significant contributor to the irony variance.

An examination of the correlations (see matrix in appendix 16) between the rate of spontaneous irony and the various measures revealed that several of these measures

Figure 1

Victoria Emotion Recognition Test

Total Scores



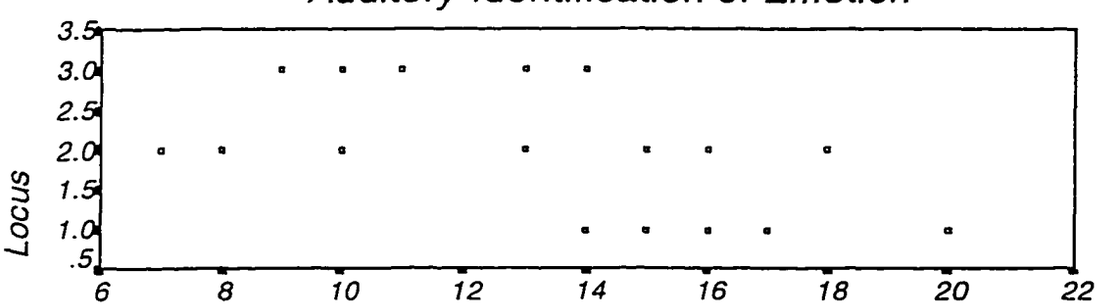
X-axis: VERT Total Scores

Y-axis: 1=N, 2=L, 3=R

Figure 2

Victoria Emotion Recognition Test

Auditory Identification of Emotion



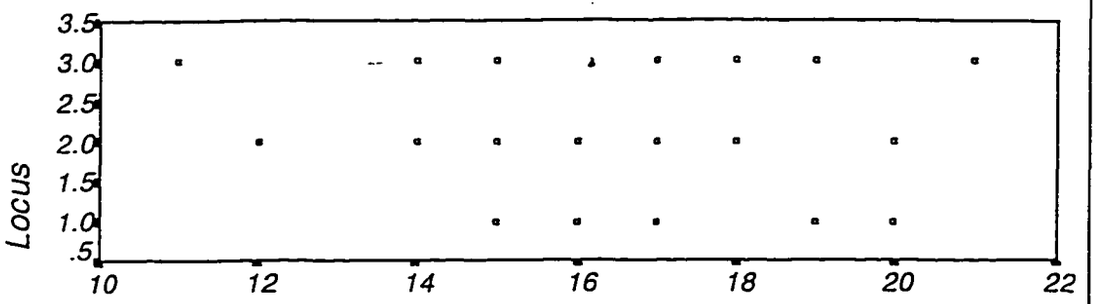
X-axis: VERT Auditory Identification Scores

Y-axis: 1=N, 2=L, 3=R

Figure 3

Victoria Emotion Recognition Test

Visual Identification of Emotion



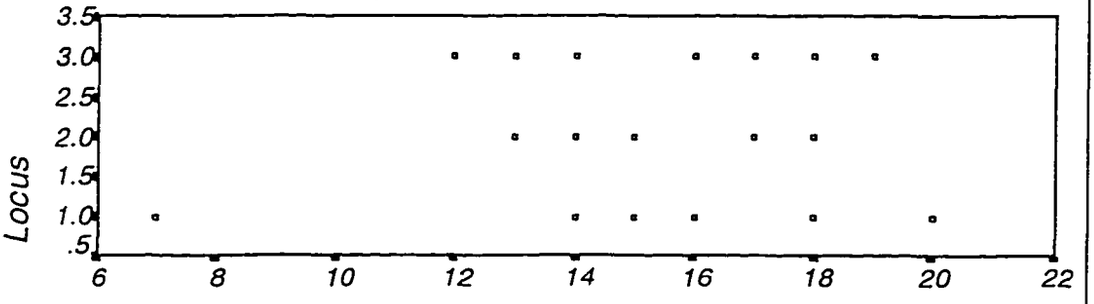
X-axis: VERT Visual Identification Scores

Y-axis: 1=N, 2=L, 3=R

Figure 4

Victoria Emotion Recognition Test

Auditory/Visual Identification of Emotion



X-axis: VERT Auditory/Visual Identification Scores

Y-axis: 1=N, 2=L, 3=R

were highly correlated with each other. Because of this factor and the fact that the method of regression used is a highly conservative one, there is less chance of one of the tests being shown as a significant contributor on its own. The correlation matrix also showed that age ($r = -.391$, $p = .039$) and the Auditory Emotion Identification subtest ($r = .4719$, $p = .011$) were significantly correlated with the rate of irony. To determine which of the measures and the demographic variables was the best predictor of the rate of spontaneous irony, a stepwise multiple regression analysis was conducted. Education level, the Raven's scores, and age were entered as a first block and SDMT, Metaphor Picture, Auditory Emotion Identification, Visual Emotion Identification, and Auditory/Visual Emotion Identification were entered in the second block in a stepwise fashion. This analysis revealed that age contributed significantly to the rate of irony variance (see Table 15).

Hypothesis 4: The total score on the VERT will account for a significant portion of the variance in the percentage of irony that is successful for each dyad.

As above, the scores for the 9 LHD, 9 RHD, and 10 NHD control subjects were considered in a hierarchical multiple regression analysis. The scores that were entered in Step 1 in the equation were Education level and Raven's Coloured Progressive Matrices and in Step 2 were Symbol Digit Modalities Test, Metaphor Picture, Victoria Emotion Recognition Test (Total Score). The percentage of successfully communicated

spontaneous irony for each dyad was used as the dependent variable. None of the variables contributed significantly to the successful irony variance (see Table 16). Because the percentage of success was so similar amongst the three groups further analyses were not considered.

Table 14

Summary of Hierarchical Regression Analysis for Variables Hypothesized to Contribute to Rate of Irony Variance (N = 28)

Variable	B	SE B	β
Step 1			
Education	.022	.033	.150
Raven's	.013	.017	.165
Step 2			
Metaphor Picture	.032	.035	.227
SDMT	.004	.009	.124
VERT (Total)	.005	.008	.187

Note: R square = .177 $p > .05$.

Table 15

Summary of Stepwise Regression Analysis for Variables Hypothesized to Contribute To Rate of Irony Variance (n=28)

Variable	B	SE B	β
Step 1			
Age	-.023	.011	-.384*
Education	.032	.031	.219
Raven's	.003	.017	.035
Step 2			
No variables entered/removed for this block.			

Note: R Square = .210

* $p < .05$

Table 16

Summary of Hierarchical Regression Analysis for Variables Hypothesized to Contribute to Percentage of Successfully Communicated Irony Variance (N = 28)

Variable	B	SE B	β
Step 1			
Education	1.056	2.118	.114
Raven's	-.013	1.010	-.003
Step 2			
Metaphor Picture	3.477	2.247	.403
SDMT	-.065	.571	-.035
VERT (Total)	-.002	.495	-.001

Note: R square = .119

$p > .05$

Remaining Hypotheses:

5. Both LHD and RHD subjects will have lower scores on the SDMT (i.e., will show a deficit when compared to NHD subjects).
6. RHD subjects, as a group, will score lower on the VERT - Visual Identification of Emotion than LHD or NHD subjects.
7. RHD subjects, as a group, will score lower on the VERT - Auditory Identification of Emotion than LHD or NHD subjects.
8. RHD subjects, as a group, will score lower on the RHLB - Matching Metaphors to Pictures than LHD or NHD subjects.

A one-way analysis of variance was used to examine the group differences that were hypothesized on the various neuropsychological measures (see Table 17). As can be seen from Table 17, the fifth hypothesis (i.e., that the clinical groups would have lower scores on the SDMT than the NHD group) was supported by the data but hypotheses 6 through 8 were not.

Table 17
Analysis of Variance for Neuropsychological Measures

Source	df	F	T value (pooled variance)
Symbol Digit Modalities Test			
Between Groups	2	3.2679*	
Within Group Error	25	(128.6382)	
NHD contrasted with LHD & RHD	25		2.499**
LHD contrasted with RHD group	25		.540
Visual Identification of Emotion (VERT)			
Between Groups	2	.5361	
Within Group Error	25	(5.9396)	
NHD contrasted with LHD & RHD	25		1.017
LHD contrasted with RHD group	25		-.193
Auditory Identification of Emotion (VERT)			
Between Groups	2	7.8165*	
Within Group Error	25	(6.9156)	
NHD contrasted with LHD & RHD	25		3.749**
LHD contrasted with RHD group	25		1.255
Metaphor Picture			
Between Groups	2	2.5401	
Within Group Error	25	(5.9840)	
NHD contrasted with LHD & RHD	25		1.935**
LHD contrasted with RHD group	25		1.156

Note: Values enclosed in parentheses represent mean square errors.

*$p < .05$. **$p < .05$, one-tailed test.

Post Hoc Analyses

When the conversations were examined to determine who was producing the irony the following results were found:

Table 18
Total Number of Ironic Utterances for Each Partner in Dyads

NHD			LHD			RHD		
Dyad	NHD (control)	NHD	Dyad	CVA	NHD	Dyad	CVA	NHD
69/66	5	5	72/59	1	4	47/21	3	0
36/37	2	4	62/63	4	7	31/32	5	3
28/27	4	4	11/10	4	0	7/1	4	2
38/20	3	6	50/51	7	1	41/40	0	0
24/23	2	2	17/12	3	5	53/54	3	4
76/75	5	8	57/56	5	1	48/34	6	7
19/18	10	1	45/43	2	0	8/4	2	0
29/26	12	11	42/22	12	1	70/71	6	5
33/25	10	4	74/73	4	2	2/3	3	1
5/39	8	9						
Total	61	54		42	21		32	22
Mean	6.1	5.4		4.67	2.33		3.56	2.44
S.D.	3.64	3.13		3.24	2.45		1.94	2.51

The total numbers of productions were transformed into rates for comparison purposes (see appendix). A one-way analysis of variance was used to compare the rates of the three groups of NHD partners. The overall between group difference was not significant ($F(2,25) = 2.6887$, $p = .0876$), however, when the rates of the partners in the control group were contrasted with the rates of the partners in the two clinical groups

combined, the difference was significant (T(25) = 2.304, p = .030). There was no significant difference between the rates of the partners in the two clinical groups (T(25) = -.265, p = .793). When the rate of irony of the clinical subjects was compared to that of the NHD partners in the control group, there again was no significant difference in the overall between group variance. When the clinical groups were combined and contrasted with the NHD control subjects, there was no significant difference between them (T(25) = .698, p = .491) and again no significant difference between the two groups of clinical subjects (T(25) = .561, p = .579). Thus, it appears that the clinical subjects produce irony at the same rate as normal subjects, however, their partners, for some reason, produce irony at a significantly lower rate.

Individual Differences

A scatterplot (see Figure 5) of the rate of spontaneous irony indicated that five dyads had a rate below the lowest score of the control group. These five dyads (see Table15) were examined in more detail to determine whether there was a significant pattern. Two of the dyads were from the LHD group and the other three were from the RHD group.

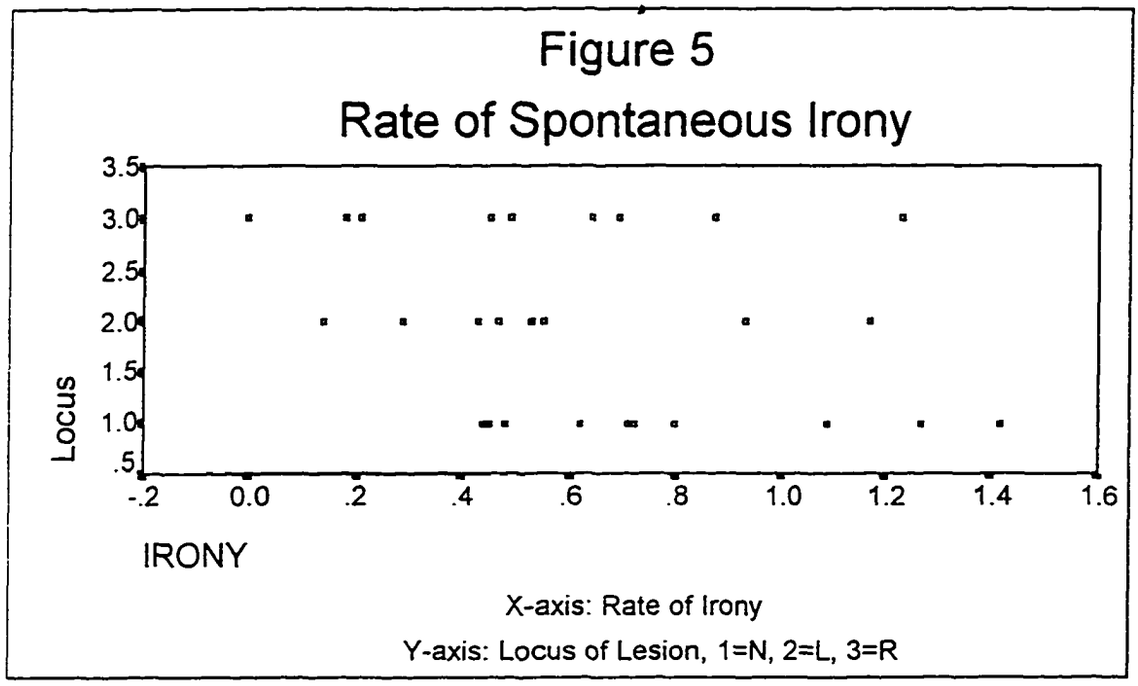


Figure 5
Rate of Spontaneous Irony
Locus
3.5
3.0
2.5
2.0
1.5
1.0
.5
-.2
0.0
.2
.4
.6
.8
1.0
1.2
1.4
1.6
IRONY
X-axis: Rate of Irony
Y-axis: Locus of Lesion, 1=N, 2=L, 3=R

Table 19 [6]
Test Results of Clinical Subjects in Dyads with Lowest Rates of Irony score (z-score)

Dyad	Locus	Irony Rate	Metpic	SDMT	VERT Aud	VERT Vis	VERT Audvis
8/4	Right	0.21 (-1.73)*	9 (-0.58)	41 (-1.05)	13 (-1.70)*	17 (-0.21)	18 (0.95)
41/ 40	Right	0 (<-5)*	3 (-8.08)*	35 (-1.84)*	10 (-3.38)*	15 (-1.24)	11 (-1.57)*
45/ 43	Left	0.14 (-1.94)*	8 (-1.83)*	23 (-3.44)*	13 (-1.7)*	18 (0.3)	14 (-0.49)
47/ 21	Right	0.18 (-1.82)*	4 (-6.83)*	22 (-3.57)*	14 (-1.15)	15 (-1.24)	16 (0.23)
11/10	Left	0.29 (-1.48)	10 (0.68)	41 (-1.05)	13 (-1.70)*	18 (0.30)	17 (0.59)

Only four of the five dyads would be considered to have a deficit in the rate of spontaneous irony (i.e., <-1.65 SD below the mean of the control group or in other words a significant difference at the p = .05 level) (Clark, 1986). Three out of the five subjects show deficits on the Metaphor Picture subtest of the Right Hemisphere Language Battery and the Symbol Digit Modalities Test. Two of these subjects also show a deficit on the Auditory Emotion Identification subtest of the Victoria Emotion Recognition Test. The other two subjects only show a deficit on the Auditory Emotion Identification subtest.

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[6] * identifies those scores that are <-1.65 SD from the mean of the normal control group and therefore are to be considered a deficit (p < .05).

However, this pattern is not unique as other subjects also show deficits on these subtests (see table 20) and yet do not show a deficit in the rate of spontaneous irony in their conversations.

The test results of other subjects also showing similar deficits on the test measures but not in the rate of irony are displayed:

Table 20
Test Results of Subjects Showing A Similar Pattern of Deficits but with Rates of Irony in the Normal Range
score (z-score)

Dyad	Locus	Irony Rate	Metpic	SDMT	VERT Aud	VERT Vis	VERT Audvis
7/1	Right	.64 (-0.42)	5 (-5.58)*	16 (-4.37)*	10 (-3.38)*	11 (-3.30)*	18 (0.95)
17/12	Left	.53 (-0.76)	5 (-5.58)*	33 (-2.11)*	10 (-3.38)*	16 (-0.73)	19 (1.31)
31/32	Right	.69 (-0.27)	2 (-9.33)*	36 (-1.71)*	11 (-2.82)*	17 (-0.21)	13 (-0.85)
48/34	Right	1.23 (1.36)	9 (-0.58)	20 (-3.84)*	11 (-2.82)*	18 (0.30)	11 (-1.57)
72/59	Left	.43 (-1.06)	2 (-9.33)*	17 (-4.24)*	7 (-5.06)*	12 (-2.79)*	9 (-2.30)*

For example, subjects #7, 17, 31, and 72 all have deficits on SDMT, Metaphor Picture, and Auditory Identification of Emotion as can be seen in the table and yet their rates of irony are in the normal range.

The test results of four clinical dyads with the highest rates of irony scores are

shown in Table 21. As can be seen one of the subjects (#48) performed in the deficit range on the Symbol Digit Modalities Test and Auditory Emotion Identification subtest and yet the rate of spontaneous irony was well within the normal range. Thus, something other than the functions measured by the performance on these tests is contributing to the reduced rate of irony in the conversations of the four lowest dyads.

A question arises regarding whether the gender composition or the age discrepancy between the partners may be factors. For example, the male-male dyads may have a tendency to be more "businesslike" and less playful, thus, producing less irony with each other. When the five lowest dyads in terms of rate of irony are examined, there does not appear to be a particular pattern in terms of gender. Two of the dyads have two females, one has two males, and one is made up of a female and male. The other possibility is that if the partners have a large discrepancy in age, for example, more than a 10 year age difference, that their interactions may involve less bantering than those closer in age. Again, this did not appear to be the case when the five dyads with the lowest rates of irony were examined. In these dyads, the age discrepancy ranged from one to ten years, with three of the dyads just differing in one or two years. See appendix 17 for a description of the composition of the dyads in terms of age, gender, and education.

Table 21
Clinical Subjects in Dyads with Highest Rates of Irony
score (z-score)

Subj. No.	Locus	Irony Rate	Metpic	SDMT	VERT Aud	VERT Vis	VERT Audvis
48/34	Right	1.23 (1.36)	9 (-0.57)	20 (-3.84)*	11 (-8.41)*	18 (0.30)	11 (-1.57)
42/22	Left	1.17 (1.18)	10 (0.68)	61 (1.61)	18 (1.09)	20 (1.34)	16 (0.23)
62/63	Left	0.93 (0.45)	10 (0.68)	40 (1.18)	16 (-0.03)	15 (-1.24)	12 (-1.21)
70/71	Right	0.87 (0.27)	10 (0.68)	63 (1.88)	14 (-1.15)	21 (1.85)	19 (1.31)

Questionnaires

A scoring system was developed for the questionnaires to ascertain whether there was a quantitative difference between the RHD and LHD groups in their responses. With locus of lesion as the independent variable and self-report and family member report of changes in pragmatic skills as the dependent variables in a one-way analysis of variance there was no significant difference between the two groups in the responses to the questionnaires (self-report: $F(1,14) = .9019$, $p = .3584$); (family member report: $F(1,14) = .2529$, $p = .6228$). The self-report measure was significantly correlated with the family member report ($r = .7073$, $p = .003$).

Table 22
Results from Questionnaires

	No. of cases	Missing cases	Mean	S.D.	Range
Self-report	16	2	6.719	1.570	4 to 9
Family member report	16	2	7.063	1.526	4 to 9

The comments that were added to these questionnaires focused more on the actual speech patterns of the subjects, e.g., "voice not as clear," "speech slurred when tired," "difficulty thinking of words," etc. than with having noticed any pragmatic differences.

The results of the questionnaires for the five subjects with low rates of irony scores are as follows:

Table 23

Questionnaire Results for Clinical Subjects with Lowest Rates of Irony

Subj. No.	Locus	Self-report	Family report
8	Right	7/9 (no change)	8/9 (slurred speech when tired)
41	Right	8/9 (smaller capacity to deal with arguments)	7/9 (changes mood quickly)
45	Left	No Response	No response
47	Right	7/9 (voice not as clear)	7/9 (slight change in speech)
11	Left	8/9 (vocabulary has improved)	8/9 (initially unable to communicate verbally, has progressed to 80% full verbal recovery)

As can be seen, the four subjects who responded to the questionnaire are above the mean in both the self-report and family-report scores .

CHAPTER FOUR

Discussion

This study examined the conversations of three groups of subjects: left-hemisphere-damaged (LHD), right-hemisphere-damaged (RHD), and neurologically intact individuals all paired with neurologically intact subjects. The clinical subjects had had cerebral vascular accidents (CVAs) 5 to 29 months prior to the study. The conversational tasks involved lighthearted, humourous topics that, it was hoped, would encourage ironic or sarcastic comments from the participants. The subjects were also administered several neuropsychological measures that were hypothesized to explain any differences amongst the three groups in the amount of ironic comments produced and the success of their communication.

The control group produced significantly more ironic statements than the two clinical groups, however, there was no significant difference between the LHD and RHD groups in the rate of spontaneous irony. There was also no difference amongst the three groups in terms of the success in communication of the ironic statements; all three groups had a success rate of approximately 90 per cent. When the groups were examined to determine which of the partners were producing the ironic statements, the results showed that when NHD subjects were paired with the post-stroke individuals they, as a group, produced significantly fewer instances than either their brain-damaged partners or the control subjects who were paired with neurologically-intact partners. When the test

results of the clinical subjects of the five lowest functioning dyads in terms of irony production were examined, no pattern that was different from other clinical subjects with higher rates was apparent.

Thus, the results of this study have shown that conversational dyads in which one of the speakers has sustained a focal lesion produce a reduced rate of ironic instances. However, the results do not demonstrate that this deficit is more prominent when one of the partners has had a focal lesion in the right hemisphere. This failure to produce results as hypothesized may be due to a combination of factors:

1) the number of dyads per group is low and to show the expected relatively large effect size given the current results, at least 25 dyads per group are required (i.e., 150 subjects as compared to the 58 in the study)). Even if a lower power level is used (e.g., 0.6 which as Cohen has explained, increases the level of a Type II error), about 15 dyads would be required resulting in a need for 36 additional subjects (Cohen, 1988);

2) the clinical subjects that tended to volunteer were likely a select group of post-stroke individuals. Other subjects had been contacted but were unable to participate either because they were in poor health or because the trip to the university was too onerous for them. The ones that did participate may have had relatively mild strokes and thus any differences would be less likely to be shown;

3) according Hughes et al., 1983 there is a tendency for aprosodia to resolve. They found clear symptoms of aprosodia only in subjects who were less than 6 months post-onset.

The subjects in this study were 5 months and beyond post-onset. Thus, if Hughes et al.'s contention is true, then any chance of showing clear differences would be greatly diminished;

4) the lesions were perhaps too heterogeneous to show clear group differences especially in groups with a small *n*. An improved study may specify particular loci of lesions, e.g., temporoparietal or frontotemporal.

There did not appear to be a difference amongst the three groups in terms of the percentage of successfully communicated instances of irony. All three showed approximately 90 per cent success. Thus, there were not more breakdowns in communication within the conversations of the clinical groups when compared to the control group but rather a diminished rate of overall attempts at being ironic in the dyads with clinical subjects. This diminished rate appeared to be due to a reduction in production by the NHD partners of the clinical subjects as compared to those in the control group. The clinical subjects attempted as much irony as the partners in the control group.

The best predictor for the dyadic rate of irony as determined from a post hoc stepwise multiple regression analysis appeared to be age. Age was negatively correlated with the rate of irony which may mean that as people age they become less flexible and produce less irony. This would have to be explored further in a future study.

When individual dyads were examined there did not appear to be a pattern of test results that seemed to contribute to the reduction of rate of irony. In the dyads with the lowest rates of irony, the functions that were in the deficit range were speed of processing (as measured by the Symbol Digit Modalities Test); recognition of emotion auditorily (Auditory Emotion Identification subtest), and recognition of metaphors (Metaphor Picture subtest). However, these deficits were not specific to the dyads with reduced rates of irony. Other dyads that also showed these deficits, had rates of irony within the normal range. The results of the other subtests of the Right Hemisphere Language Battery were also examined (see appendix) to see whether a pattern emerged. They, too, did not suggest a pattern to be explored further.

The measures that were hypothesized to account for the differences in rate were all related to the clinical subjects' ability to comprehend irony, however, it remains unclear whether the clinical subjects are poorer at comprehending irony. Although the group results show no overall difference in the success of communication of irony amongst the three groups, the clinical subjects in the lower functioning dyads were not given the chance to demonstrate their ability. Instead the pattern that emerged was that the normal partners' attempts at irony were much less when one of the partners has had brain damage. In the five lowest dyads (all of which contained a clinical subject) only one of the NHD partners attempted an ironic statement. The NHD partners in the other four dyads made no attempts. There must be something that is inhibiting the NHD partners from making

attempts. It is quite possible that the reduced rate in irony in the two clinical groups is due to different factors.

Thus, rather than focusing on the variables affecting comprehension of irony, the focus should be on what affects the production of irony. In addition, the focus should be not on whether the post-stroke subjects can produce irony because these results suggest that they can, but rather, on the factors in the interaction that are inhibiting the NHD partner's production of irony. This could be done through a more in-depth form of discourse analysis (i.e., perhaps a micro-analysis of facial displays and prosodic detail of both partners). Schober and Clark (1989) report from the literature that speakers accommodate to their listeners in terms of many factors (e.g., loudness, speed, dialect, pronunciation). Isaacs and Clark (1987) found that people also accommodated to their listeners in terms of content. Their study showed that individuals "were able to assess each other's level of expertise almost immediately and to adjust their choice of proper names, descriptions, and perspectives accordingly." The task involved having pairs of subjects, some of whom were experts while others were novices concerning knowledge of New York, sequence various postcards of New York City through talking about them. They found that the directors were able to adjust to their partners very quickly, i.e., before they had even arranged four cards. The authors suggest that speakers likely pursue

> a basic strategy: (a) Begin assuming only as much expertise as you think might be shared by your partner; and (b) use your partner's responses to adjust to his or her actual expertise. (Isaacs & Clark, 1987, p. 35)

As in the above study, there is likely some sort of accommodation occurring during the conversational tasks involving irony.

Elliott, MacNair, Herrick, Yoder, and Byrne (1991) summarized past research examining interactions between disabled and nondisabled individuals that suggested that "nondisabled persons display more discomfort, terminate conversations earlier, smile less, and exhibit more inhibited gross motor behavior when paired with a person with a disability" (p. 1293). In their study which used confederates who posed as either a depressed or physically-disabled participant (i.e., wheelchair-bound), they found that when depressive behaviours (e.g., lethargy, pessimism, tiredness, sadness) were exhibited by the confederates that the subjects spoke less and gazed less frequently during the interactions.

> The reactions of a nondisabled individual appear to be strongly influenced by the behavior of a person with disability in dyadic interactions. Behaviors that confirm stereotypic notions about persons with physical stigma can trigger cognitive, verbal, and nonverbal expressions of disapproval and discomfort, and negative attitudes may be reinforced. However, when a person with disability behaves in a socially skilled manner, interpersonal acceptance may be fostered. (Elliott et al., 1991, p. 1299)

The NHD conversational partners were not blind to the fact that their video partner may have had a stroke. This fact was contained in the information and consent form (see appendix) signed prior to participating in the study. Although the details concerning the group in which they were to be placed was not given, it was often apparent

either from the partner's physical manifestations of the stroke (e.g., hemiplegia, obvious communication difficulties) or from information provided by the partner that the person had had a stroke. Thus, the dynamics of the conversations may well have exhibited some of the features of the interactive pattern between nondisabled and disabled participants as described above by Elliott et al. (1991).

Schaffer (1982) suggested in her dissertation that another maxim she termed "Principle of Engagement: 'be interesting'" be added to Grice's Conversational Maxims and Lakoff's Maxim of Politeness. She proposed that the use of irony is a means of obtaining the attention and interest of the listener by forcing that person into a more active role, "she must carefully follow what I said or risk missing something" (p.22). Other examples that would fit under this Principle of Engagement would be joking, teasing, swearing, and role-playing. It may be that the accommodation made by the NHD conversational partners was based on a judgement that the clinical subjects were unable to fulfill this more active role. Thus the NHD partners, in a sense, simplified the listening task or, at least, did not make it more complex, for the clinical subjects.

When the five lowest dyads in terms of rate of irony are considered, there appears to be a different quality in the interactions although not all for the same reasons. The NHD partner in dyad #45/43 appeared to be nervous and laughed too frequently. The nervousness may have been due to a combination of factors including the fact that he was being videotaped. However, the other subjects in the study did not appear unduly affected

by this fact and seemed to have very natural-sounding conversations. A more salient factor may have been the initial interaction between subjects #45 and #43 even prior to the beginning of the videotaping. The subject who had had a CVA was obviously showing the effects of the CVA; his arm was in a sling and he walked with a cane. The NHD partner offered to help the subject to his seat but this offer was brushed off by the other, thus presenting the CVA subject as a curmudgeonly, independent man. This encounter appeared to affect the rest of the interaction. Mills, Belgrave, and Boyer (1984) demonstrated that discomfort by nondisabled subjects could be reduced by having the physically disabled person mention the disability along with a request for aid. If this strategy is not used then the authors speculate that nondisabled people may "avoid social interaction with the physically disabled (because) they tend to assume disabled persons may have a strong emotional reaction to their disability which would color the interaction and make it more difficult and unpleasant" (p. 2). It appeared that the post-stroke individual in this dyad not only did not use this strategy but in effect accentuated his disability and did not put his partner at ease. In addition to the obvious physical disability, the post-stroke individual was slow in responding to his partner; there were long pauses affecting the normal back and forth of turntaking. The NHD partner seemed to feel obliged to fill the pauses and this may have contributed further to his feeling of discomfort.

NHD: Awful foods. Have you got things that you totally dislike?
(Pause)
NHD: (laugh) as far as food (LHD smiles) I like most things.
LHD: I never thought of it. Um

NHD: Well, I guess one thing I probable dislike is haggis.
LHD: (smiles) Yeah.
NHD: (laugh) and uh such things as heart
(Pause)
NHD: So we could have those. Are there any vegetables that you dislike?
LHD: No
NHD: (laugh)
NHD: Any meats? or fish?
(Pause)
LHD: Raw oysters (NHD laughs) (LHD smiles) Can't stand them.

As the example shows, the normal back and forth of turntaking between the two partners was lacking with the NHD partner contributing almost twice as many turns.

Dyad #11/10 consisted of a clinical subject who had obvious expressive difficulties. He produced literal paraphasias and jargon words due to mild to moderate verbal apraxia but compensated for the oral difficulties by producing communicatively appropriate gestures in conjunction with his speech. Although the partners were able to perform the tasks adequately and communicate their ideas to each other, the conversation was not as playful as others. The LHD subject produced ironic comments but these were never escalated by the partner who did not produce any irony or sarcasm.

NHD: (reads directions aloud) Well, first of all we plan the full-course meal of awful foods.
LHD: Soup for sar.. for starts.
NHD: All right
LHD: I don't know. Something
NHD: Peppery
LHD: Yeah hot, hot.
NHD: A peppery pea soup that looks awful
LHD: Yeah that's good.
NHD: Like the look of it is enough that you don't want to eat

LHD: (look of disgust) Looks alry alry eaten. Like it's arl eaten. (playfully spoken)
NHD: That's right and we don't like and we know from the balance that we're going to invite somebody to this. If we put a lot of pepper in it, it's going to be terribly hot. (spoken in a serious manner)
LHD: Sure, that's right and a little sot. Lots of salt.
NHD: Very salty.

Although the LHD subject made a playful attempt of suggesting a soup that looked as though it had already been eaten, the NHD partner responded to that in a serious vein.

Dyad #4/8 also had a different cast to it in comparison to some of the other interactions. The NHD partner appeared to have a different agenda in mind then just having a spontaneous conversation with the post-stroke individual. Afterwards, she commented independently to the examiner that she had been trying "to draw the other person out". Instead of responding freely to the comments made by her partner, she appeared to be analyzing covertly what the appropriate response should be and sometimes did not pick up on initiations made by the CVA subject that could have led to more humourous ironic content. Instead, she appeared to direct the conversation in a more serious bent.

RHD: This is horrible foods, well
NHD: Yes, things you don't like
RHD: Well, my son mixed up a spaghetti sauce one time (NHD nods) He was only a kid but he was experimenting and he put dill pickles in it (NHD - slight smile) and I don't think there's anything any more horrible than spaghetti sauce with dill pickles in it (smiles)
NHD: OK. I am not fond of liver and particularly when it's overcooked so what do you think about
RHD: It's like leather then (eyebrows raised)

NHD: It's like leather so what do you think about spaghetti sauce and pickles and liver. (said seriously)
RHD: Spaghetti sauce on liver (laugh)
NHD: Yeah spaghetti yeah with pickles (spoken seriously)
RHD: With dill (eyebrows raised)-pickles
NHD: OK
RHD: On liver
NHD: And liver and overcooked liver and that'll be the meal that we don't like. OK who are we going to give it to?

The RHD subject had made several attempts to be playful both through the content ("spaghetti sauce with dill pickles," "liver that is like leather") and nonverbal aspects (smiles, raised eyebrows), however, the NHD subject did not respond to these in a like manner but instead remained task-oriented and serious.

The clinical subjects in the other two dyads (#40/41 and #47/21) appeared to this examiner as being the stereotypical RHD subjects. They seemed to have flat affect and a reduced pitch range, although neither of these functions were measured objectively. The RHD subject in dyad #40/41 also tended to make personal and tangential comments not as relevant to the task at hand, thus sending the conversation in different directions.

NHD: Basically I have a husband who's mad about good food and I have a good appetite so I don't usually think in terms of bad food and there aren't all that many things that I dislike. How do you feel about starting a course that you dislike?
RHD: I tell you my experience is uh like I'm a married man and usually my wife cooks what I like but sometimes I'm at places where my wife is not the cook [NHD: and you get things you don't like] Yeah. Yet you don't want to offend [NHD: your guest, so you eat what you don't like] Yeah right so I usually try to eat it. Um I give you an example. Before I went in to the xxxx Hospital, they have fine food there and there's nothing wrong with it. They're good in there. I had rice quite often and I always pass the rice to my wife, she loves

rice. But since this is half of the food I got and I had no choice, I started eating it and it became acceptable and now I can eat rice.
NHD: You grew accustomed to it and now enjoy it.
RHD: Yeah I grew accustomed. I bet you have some food that you would rather not have if you had a choice.
(They went off on other tangents and never did accomplish the task of creating a menu of disliked foods and thinking of a person to invite.)

Subjects #41 and #47 appeared to be reduced in affect when listening to the partners. They were able to appreciate their partner's humour when it did occur or at least respond in kind with a smile. What appeared to be missing from the interactions was what Chovil (1991/92) has termed "discourse-oriented facial displays". For example, she found that eyebrow movements can convey both syntactic and semantic information. "Among other functions, brow movements provided emphasis, marked questions and offers, and formed part of the displays that conveyed reactions such as surprise or disbelief, or indicated listener reaction" (p. 191). If one's conversational partner is not conveying this information either when speaking or listening, then it is likely that the speaker will accommodate his speech pattern to be more like the partner. That is, the lack of discourse-oriented facial displays of one of the partners may act to convey that the conversational topic should be dealt with in a more serious vein, i.e., with less emphasis and fewer phrases marked by changes in prosody or facial displays and thus the partner follows suit.

On the other hand, two partners in the control group who had produced a variety of ironic instances commented that it was easy to complete the tasks because they worked well together bouncing ideas off each other. Several of the examples of irony involved escalations of the previous ironic instances. This comment of "bouncing ideas off each other" reinforced the idea of the collaborative nature of irony as hypothesized by Coates (1991). The normal subjects also appeared to be much more expressive than the RHD clinical dyads in terms of prosody and facial displays. Again, this was an observation of the examiner and not objectively measured.

5 & 39: (read instructions together)
39: Well certainly mussels, raw mussels on a half-shell.
5: Raw oysters on a half-shell.
39: Sounds pretty disgusting.
5: Frogs' legs would be for me.
39: Oh yes (look of disgust) yes. Mhm
5: How many courses? A full-course meal. So we're only at the beginning.
39: Well, I've heard that they serve sheep's eyeballs in Arabia.
5: That would be wonderful (both laugh). I'm sure some of our friends would love that.
39: (laugh)
5: Oh well snake. People eat snake [Yes] and things as a main course. So put all the...What would you put with it? I suppose uh [we need some] We've got an entree, we've got a dinner and then we need a dessert. So what rotten dessert can you think of? I can't
39: Ooh. Perhaps something that's fermented but doesn't taste very good.
5: Mm. I can't think of an awful dessert at all. Nothing. Unless it was
39: Perhaps some fruit, some canned fruit that had gone off, you know, the colour is terrible and normally you wouldn't eat it (laugh)
5: Oh I know what. That, with let's say green (look of disgust) jello, like green jello [Oh yes] and [ooh and brown peaches (look of disgust)] and custard so that it all go into one another and all look gooey along with your [really horrible] turned-off fruit (both laugh) Sounds great.
39: Yeah sounds really revolting.

5: And really burnt coffee at the end of it.
39: Oh wonderful (both laugh).

As can be seen, the two NHD partners contributed equally to the conversation with a back and forth nature of turntaking. Humourous attempts were followed up by the other partner.

Another difference amongst the groups was that the NHD partners in the clinical groups seemed to control the metacommunicative function of the tasks, i.e., they guided their partners through the task by keeping track of what had been decided to that point and what still needed to be accomplished, asking their partners for their opinions, summarizing the outcome of the task, etc. On the other hand, the partners in the control group seemed to share this function more evenly. Again, this would have to be studied more objectively in a future study.

Another of the RHD subjects (dyad # 70/71) appeared to have reduced discourse-oriented facial displays. Yet, the rate of irony for the dyad was in the top four of the clinical dyads and thus not considered to be a deficit. The functions as measured by the various neuropsychology tests were all within the normal range. When the rates for the various topics are examined separately, it can be seen that the rate increases with each topic (meal: 0.18. outfits: 0.75, holiday: 1.77). It may be that despite the reduced facial displays and rather monotone pitch range, that the appropriate responses of the RHD subject to the attempted irony acted to dispel the normal partner's original

accommodation to the RHD subject. Thus, future research may find that there is an interaction between such functions as recognition of intonational patterns, speed of processing, and the ability to produce appropriate discourse-oriented facial displays and prosody that act together to have an effect on the quality of conversations and rate of spontaneous irony.

The questionnaires did not yield information that helped to explain the deficits in the rate of irony found in the five lowest dyads or suggest that the subjects or their family members were aware of pragmatic difficulties. Rather than commenting on pragmatic deficits, the subjects and their family members focused on the more salient features of the subject's communication such as slurred speech, vocal hoarseness, and reduced vocabulary. The conclusion cannot yet be made that pragmatic deficits do not occur in these subjects. The accommodation that speakers make occurs rapidly and seemingly without conscious awareness on the part of the speakers. Thus, family members may not be aware that there has been a change in the quality of conversations. It may also be that the pattern observed in dyad #70/71, in which the rate of irony increased once the partners became further acquainted, may also be happening in the interactions between the subjects and their family members. Families would have had a longer time to accommodate to the CVA subject's communicative abilities. In addition, the validity of the questionnaire needs to be reviewed. The families may have observed the subject with much worse communicative abilities and may be making comparisons not so much with how the

subject performed premorbidly but rather to how they were functioning earlier in the recovery phase. Thus, this particular questionnaire needs to be adjusted to better tease out the parameters that are relevant to the individual differences.

In summary, dyads in which one of the members is brain-damaged produce less irony. There are not more breakdowns in communication, but rather a diminished rate of attempts by the neurologically-intact partners. The functions hypothesized to affect the clinical subjects' ability to comprehend irony did not fit into a clear pattern. It is suggested that future research should examine turntaking, facial displays (especially the discourse-oriented ones proposed by Chovil), and prosodic features of the clinical subjects to determine whether these factors have an effect on the accommodation of the NHD speakers to their partners. The biases and perceptions of the NHD partners and whether they feel compelled to perform the metacommunicative functions of the conversational tasks may change the quality of the conversations and should be examined in more depth. In addition, a more finely tuned questionnaire should be developed to determine whether the observations made in the lab are also apparent in everyday situations. Not only should the opinion of family members be solicited but also a debriefing questionnaire should be given to the conversational partners of the clinical subjects to determine their perception of what occurred during the conversation.

Although the outcome of this study is tentative, further research in this area may lead to results that have therapeutic relevance. If it is aspects of the interaction that are

contributing to the changes in communication then this is the level that should be focused on in therapy. Videotaping conversations between post-stroke individuals and family members, friends, and strangers may lead to a better understanding of the difficulties the individual is having. For example, in the case of LHD patients, it may be that lengthy pauses are affecting turntaking and that if the NHD partners are trained to slow down their expected timing of turntaking, then the interaction will be more satisfying to both partners. Perhaps a nonverbal cue from the post-stroke individual would help fill the pauses so that the partner does not become uncomfortable waiting for a response. If the problem appears to be a lack of discourse-oriented facial displays on the part of the post-stroke RHD individual, then this may be an appropriate focus for therapy. Just as exercises to stimulate speech and language have been developed, perhaps stimulation of facial displays could be initiated. At the very least an improved understanding by both the post-stroke individuals and their family members would be of benefit. Finally, it may help to teach the post-stroke individual strategies such as that suggested by the research of Mills et al. (e.g., mention the disability and request aid) as a means of reducing the discomfort of potential conversational partners. Role-playing and videotaped feedback may assist in teaching the strategies.

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Appendix

Appendix 1

Information Provided in Poster Soliciting Subjects

VOLUNTEERS AGED 50 AND OVER REQUIRED FOR COMMUNICATION STUDY

University of Victoria Psychology student is studying subtle effects on communication from a stroke. The results will help therapists who work with stroke victims, the patients, and their families.

People who have not had a stroke are required for a comparison group . Participation involves about an hour and a half and may be divided into two sessions. At least 30 minutes of the session must be done at the University of Victoria.

Volunteers must be reasonably healthy, without a medical history of heart disease, stroke, alcoholism, severe head injury, seizures, brain surgery, or dementia.

For more information please call Diane at Ph.:xxxxx.

Appendix 2

Letter Sent to Potential Clinical Subjects

Dear _____,

I am writing to request your participation in a Psychology study that I am doing at the University of Victoria. This study is being done as part of my Ph.D. degree in Neuropsychology. You may also remember me as a Speech-Language Pathologist who works with people who have had strokes at xxxxxx Hospital. The study will compare subtle changes in communication that may occur after either a left-sided or right-sided stroke. The information gained from the study could be helpful to therapists who work with stroke patients and future patients and their families.

The study involves two parts. In the first part, you will be videotaped while talking with another person about certain items that are given to you. The topics will be easy and non-stressful to discuss. This will take about a half-hour and must be done at the University of Victoria. Transportation can be arranged if necessary.

The second part involves looking at pictures, listening to a tape, and answering questions. It may or may not be done at the same time as the video and will require about two hours. It can be done either at the university or in your home, whichever is most convenient for you.

Your help with this project would be very much appreciated. It is through volunteers such as yourself that researchers are able to learn more about how the brain operates and how to help people in their recovery after a stroke.

I will be telephoning you within the next few days to ask whether you are willing to help with this project. Please call me if you have any questions at xxx-xxxx.

Yours truly,

Diane Pinch, M.Sc. CCC-SLP(C)

Appendix 3

INFORMATION AND CONSENT FORM

PURPOSE

The purpose of this study is to examine how having a stroke may affect the way people communicate.

PROCEDURES

You and your partner will be videotaped while talking about various topics or explaining certain items that I give to you. You will also be given some tests that assess language, problem-solving ability, recognition of facial expression and vocal intonation, and speed of processing. These tests involve completing a form while listening to a tape, answering verbal questions, and paper-and-pencil tasks.

SUBJECT RIGHTS

Before testing begins, the examiner will answer any general questions about the study that you might have. After testing is finished, more detailed information can be provided if requested.

All of the demographic information and test answers that you provide will be kept confidential. A code number, rather than your name, will be used on score sheets, and subject names will never be revealed when communicating the results of this study. Data records, furthermore, will be kept in a file in a secure place. Obviously, your videotape is not anonymous to anyone who knows you. However, you have the right to decide how your videotape may be used and will indicate your choices on an accompanying sheet.

Participation in this study is completely voluntary. It is your right to withdraw from this study at any time. If you decide to withdraw, no pressure will be placed upon you to continue.

Please note that this study will be used for the examiner's doctoral dissertation research. As such, written records (without subject names), including demographic information, test forms, and profile summaries of results, will be kept until at least six months after the examiner's oral defense of the dissertation (approximately two years). They will then be shredded. The videotapes will also be erased at this time with the exception of small portions that may be copied from some of the videotapes (with subjects' permission) as examples to be used for demonstration or teaching purposes. This demonstration tape would be retained at the researcher's discretion. However, you may request to have your data records withdrawn from this study and destroyed at any time.

CONSENT

I have read and fully understand the above information. My participation in this study is completely voluntary.

_____ _____

Signature Date

Appendix 4

PERMISSION FORM SPECIFYING VIDEOTAPE USAGE

Project: Communication of Spontaneous Irony

Diane Pinch

Please indicate below the way(s) in which we may use the videotape made during this experiment. You may select some and not others -- or none at all. Your experimenter will answer any questions you may have about these options.

Your tape would be identified only by subject number. The sheet that connects your name with this subject number will be kept separate in a secure place. Obviously, however, videotapes are not anonymous to anyone who knows you.

_____analysis by the examiner and coworkers on this project (e.g., Diane Pinch, Esther Strauss, other members of dissertation committee, and possibly a research assistant)

_____portions played as an example for professional audiences (e.g., at a professional presentation at another university)

_____portions played as an example for classes at University of Victoria

_____still photographs in journal articles or books

_____none of the above; please erase the tape

Signature _____ Date _____

Project _____Subject or Group Number _____

Appendix 5

Questionnaires for Subjects and Family Members

Questionnaire for Subjects

1. Since the stroke, have you noticed a change in the way you communicate?

   yes (0)[7] no (1)

2. Describe the change you have noticed.

3. Does your voice tend to be monotone in pitch?

   never (2) sometimes (1) always (0)

4. Do you recognize when other people are being funny?

   never (0) sometimes (1) always (2)

5. How do you know?

6. Do people recognize when you are trying to be funny?

   never (0) sometimes (1) always (2)

7. How can they tell?

8. Are you able to let people know when they have not understood you?

   never (0) sometimes (1) always (2)

9. How do you do this?

---

[7] The numbers in the brackets represent points allocated in the scoring system. These numbers were not present on the copies completed by the subjects and their family members.

Questionnaire for Family Member

1. Since the stroke, have you noticed a change in the way the subject communicates?

2. Describe the change you have noticed.

3. Does his/her voice tend to be monotone in pitch?

   never (2) sometimes (1) always (0)

4. Does the subject recognize when you are being funny?

   never (0) sometimes (1) always (2)

5. How do you know?

6. Do you recognize when the subject is trying to be funny?

   never (0) sometimes (1) always (2)

7. How can you tell?

8. Does the subject let you know when s/he has not understood you?

   never (0) sometimes (1) always (2)

9. How does s/he do this?

Appendix 6

HEALTH STATUS QUESTIONNAIRE

Subject Number: Date of Testing:

Date of Birth: Age:
Gender: M F Handedness: L R
Education: Occupation (current or prior to retirement):

Do you now or have you had any of the following? (please tick any that are relevant)

__ hearing or visual problems
__ any neurological problems
__ heart disease or heart attack
__ cancer
__ depression
__ hospitalization for any other reason
__ complications or problems at birth
__ learning disabilities in school

How would you rate your present health? excellent good fair poor

Are you currently taking medications?

How much alcohol do you drink?

Appendix 7

INSTRUCTIONS FOR IDENTIFYING INSTANCES OF SPONTANEOUS IRONY[8]

An instance of spontaneous irony is a discourse event in which people convey a message which is not meant to be interpreted literally. In many cases it is approximately the opposite of the literal meaning of the words actually said. In general, spontaneous irony has three identifying features: (a) a discrepancy between the literal and intended meaning, (b) a contradictory (and often humourous) twist to the utterance, and (c) spontaneity that is arising from the immediate moment. Examples are provided below. The irony is often accomplished through the addition of certain paralinguistic activities such as a change in intonation pattern and/or visible activities such as facial displays. In other words, the intended meaning of the utterance is not necessarily contained in the literal meaning of the words but rather the audible and visible activities must be used to interpret the utterance adequately. It is important to note, however, that paralinguistic features are not a necessary feature and that in some cases, instances of spontaneous irony may only be obvious through shared knowledge of the context or background conversation. It must also be noted that spontaneous irony does not include instances of other nonliteral speech because they do not fit the humour or spontaneity criteria just described. Examples that are not included are:

*indirect or polite requests (e.g., "Can you pass the salt?")

*cliches (e.g., "I am addicted to ice cream")

*slang (e.g., "you are the cat's meow")

*metaphors (e.g., "he has a heavy heart")

*equivocation (e.g., if given a gift you do not like and you comment that it is "interesting" to be polite)

---

[8] Expansion/adaptation of rules from Linda Cof rules from Linda Coates' study

*jokes (these are scripted and not considered spontaneous)

Also not to be included in this study are more subtle types of spontaneous irony such as:

*minimizations (presents point as if unimportant or barely adequate; an understatement) e.g., "Let's have crackers with pig brain dip" "OK that'll do"

*hyperbole (extreme embellishment or overstatement of a feature) e.g., "He has a million suits in his closet" (i.e., he has many but not literally a million suits)

TYPES OF SPONTANEOUS IRONY:

Reversal or use of antonyms: the paraphrased or intended meaning is approximately opposite the literal meaning of the words.

e.g. huge for small, "What a huge dog" describing a chihuahua

"You're such a slug" for someone who is energetic

"What a nice dress" for "What a bizarre dress"

Impossibility: presents as possible or true that which is not; is counterfactual

e.g. when asked to choose someone to send on a rotten holiday, "VanderZalm and Harcourt to share a single room" (They are political rivals and would not want to share a room)

"I'll just wave my magic wand and the work will be done" for impossible work load

when asked where she would wear one of the ugly outfits, "To bed" (This is counterfactual or not literally true; instead she is indicating how much she dislikes the thought of wearing one of the outfits)

Sarcasm: includes cutting or cruelly humourous remarks. These may not show the "opposite" meaning between literal and paraphrased meanings to the same extent as described in some of the other types of spontaneous irony but instead perhaps a stretching of the point or caricature of the intended meaning. These remarks may be accompanied by a change in intonation or facial displays, e.g., rolling of the eyes, to indicate to the listener that the remark is sarcastic.

e.g., Mulroney should be sent on a holiday to Russia "to learn how to invest even more of his money"

Another speaker, when deciding who should be sent on a holiday suggested "Saddam Hussein, Tanya Harding, and "Charlie Brown" (a pseudonym for an acquaintance of one of the them). The partner responded "particularly Charlie Brown" with lower pitch and rolling of the eyes.

Personal insults (relatively uncommon with strangers): overt criticism of the other person or self

e.g., "You're a nerd" and meaning "you're hip/cool"

Play on words (puns) e.g., "maybe their marriage will have a lot of ups and downs" when discussing a wedding having taken place on a roller coaster

Escalations: multiple spontaneous ironies (often increasingly subtle)

e.g., "Where would I wear it? I would wear it down to Goodwill and give it to them", talking about a bizarre dress she would never wear in public (spontaneous irony by first speaker, she would not literally wear the outfit to Goodwill but is instead indicating how much she dislikes the dress and that she would not want to wear it)

"They might turn you out." (escalation by second speaker; Goodwill would not literally send her out of the store. Instead the listener is agreeing that the dress looks atrocious)

TASKS USED TO ELICIT EXAMPLES

a) "Plan a full course meal made of really awful foods that both of you (and probably others) dislike. Discuss what this meal should consist of. Then both of you should decide who you would serve this meal to. How you would issue the invitation?"

b) Pictures of seven bizarre-looking outfits from a National Enquirer feature of the 10 worst dresses were given along with the instructions, "Both of you are to look at these pictures. (a) Agree upon the three worst-looking outfits and discuss why you think so. (b) If female: Decide which of these three outfits you would wear if you had to and where

you would wear it. (c) If male: Decide which of these three worst outfits you would give as a present and who you would give it to."

c) Each person looks at three pictures. "Look at these pictures together. Talk about what you see in the pictures and give your opinion about the situations." One is of a wedding taking place on a roller coaster (again from the National Enquirer), the second is of a woman impersonating the Queen doing her ironing, and the third is an ad picturing ridiculously-dressed people at a pre-Christmas sale.

d) "Think of a holiday plan made up of places and activities that both of you (and probably others) agree would be awful. Talk about what this holiday would be. Then think of who you would like to send on this holiday. How would you encourage that person to go?"

Remember the task itself is often ironic, e.g., people do not usually plan a meal of disliked foods. Therefore it is not an instance of irony if the participant is merely conforming to the task and listing disliked foods (e.g., "Let's have tripe and spinach with chocolate sauce"). They may say utterances that are merely clarifications of the task (e.g., "So we should invite someone we do not like") or roleplay or carry out the pretense or fantasy of the task (e.g., "Let's invite Mike Harcourt;" "Let's say we are Cordon Bleu Chefs and want to demonstrate our culinary ability;" "I would phone Brian Muroney to invite him"). These should not be included as examples of spontaneous irony. On the other hand, the following would be considered spontaneous irony: if the person says that tripe and spinach with chocolate sauce would be wonderful (not literally true); if the person says "I'm sure Mike Harcourt would love to come to this meal," again not true; or if the person says, "I would contact Brian Mulroney by ESP," an impossibility.

In the task involving the bizarre outfits, in which the participant is asked to decide which of the worst outfits she would wear and in what situation, it would be merely conforming to the task to choose a place such as a costume party. In order to complete the task she had to suggest something and this is a reasonable place to suggest wearing the outfit. On the other hand, an answer such as "to bed" is a suggestion that is not literally true. She would not literally wear it to bed. Instead she is conveying how much she dislikes the outfit and that she would not want to wear it anywhere and thus this example should be considered an instance of spontaneous irony.

A final note is that one must be careful not to make assumptions about the participant's response to the task e.g., even though the outfits are presented as being outrageous, it is possible that the participant will not necessarily agree and thus when s/he says s/he likes something, this may be literally true and may therefore not be an instance of irony but rather a literal statement. One must pay attention to the context of that particular conversation and to the paralinguistic information provided by that individual speaker. This is why it is important to watch the conversation through at least once.

SUMMARY LIST

INCLUDE	DO NOT INCLUDE
Reversals	Literally true statements
Impossibilities	Serious messages
Counterfactual statements	Indirect requests
Personal insults	Cliches
Sarcasm	Slang
	Metaphors
	Equivocation
	Jokes
	Emphasis
	Minimizations
	Hyperbole
	Play on words

IDENTIFYING INSTANCES OF IRONY

Watch the dyad all the way through to get used to the communicative styles of the interactants, e.g., one interlocutor may have a particularly melodious voice and may thus trigger more instances of possible spontaneous irony than are really present and vice versa, an interactant may have a particularly dry sense of wit and his/her productions may be very subtle. Follow the content of the conversations closely. Usually, you will have to be aware of what has been previously said in order to identify the instances. Frequently, segments in the tape that seem playful or humourous will be instances. Out of the ordinary intonation (e.g., singsong quality, too flat, too stressed, etc.), smiling, and laughter will often serve as good cues to identify an instance. Remember, spontaneous irony in conversation is often subtle.

1. Consider every utterance. Does the person literally mean what s/he is saying, bearing in mind that the task may dictate that they talk about a hypothetical situation or fantasy (e.g., the task is to construct a menu of disliked foods which one normally does not do) e.g., "Let's have tripe" said in a serious tone of voice would not be an instance whereas "Tripe would be a wonderful dish to serve" would be an example of a reversal and thus an instance of irony.

2. When you find something on the tape that might be an instance of spontaneous irony, rewind the tape so that you can listen again. Write the words and the paralinguistic features down on the form, along with any background information needed to understand the context.

3. Examine the transcribed words. Being as explicit as you can, write down the literal (i.e., dictionary) meaning of the words. Be careful that you are examining the words in isolation (i.e., do not look at intonation, facial displays, etc.)

4. Then write out a paraphrased meaning, i.e., what the person was intending to mean. Use the paralinguistic features and visible attributes of the utterance along with the context, to decipher the meaning. Because of the subtle nature, it may be possible for you to interpret more than one plausible intended meaning. If so, write out each one.

5.

If the intended and literal meanings mean essentially the same (i.e., are congruent), then it is **not an instance**.	If the intended and literal meanings are definitely incongruent, consider whether they are examples of any of the following: 1. Indirect or polite requests e.g, Can you pass the salt? 2. cliches e.g., I'll eat anything (said in "regular" tone of voice with no paralinguistic features used to indicate mockery, minimization, or exaggeration) 3. slang (e.g., "he is the cat's meow") 4. metaphors (e.g., "he has a heavy heart") 5. humor (a joke is funny and may cause laughter	If there is more than one plausible intended meaning, consider the following: 1. If all intended meanings are congruent with the literal, then it is not an instance. 2. If all intended meanings are incongruent with the literal, then it is one. 3. If some are congruent and some are not and all are equally plausible, then do not consider it as an instance (too ambiguous).

	but is not necessarily ironic 6. equivocation e.g., if given a gift that you do not really like, you say it is "interesting" to be polite 7. minimizations 8. hyperbole 9. play on words If the instance can be labelled as an example of any of the above, then it is not an instance of irony. If it is not any of the above, then it is to be considered an instance of irony.	

Appendix 8

Procedure to Judge Success or Failure of Spontaneous Irony:

1. Set the VCR counter to 0.

2. Watch the video through once without stopping while glancing at the transcription sheet. Note: These transcriptions are just a method to help you locate the instances. They do not contain all the nonverbal features that you may need to judge success or failure of the instances.

3. Rewind the video to 0 and play it again stopping at the starred sections. You may want to write down the counter number. so you can find the item again.

4. The starred items are instances of irony. An ironic instance is a set of words that is intended to mean approximately the opposite of its literal meaning and can include irony, sarcasm, punning, etc. (Note: This is Linda Coates' definition from her thesis). Common types of irony are reversals, presenting something as possible or true when not, etc. I have given you a paraphrased and literal interpretation for each instance along with a categorization of the instance. If at any point you disagree with the paraphrased or literal interpretation, the type of irony listed, or the identification of the starred section as irony, please note that on the transcription sheet along with your reasoning.

5. Your job is to decide whether the irony was successful or not. An instance of irony can be broken down into four stages:

a. Calibration - the two participants establish a common ground or shared viewpoint

b. Delivery - the speaker delivers the actual instance of irony

c. Acknowledgement - participants let each other know the irony has been successfully understood (e.g., through mutual smiling or laughing)

d. Closure - participants signal each other that the irony is over and serious discussion that is to be taken literally is resuming (e.g., through discourse shift markers such as the words, "so". "back to the main point", etc.).

Thus, it is primarily (c), the Acknowledgement stage that we are interested in for judging success. Nevertheless, you should look not only at behaviours immediately after the irony but also during the delivery because sometimes the listener anticipates the irony and acknowledges it while the speaker is still delivering it. The behaviours may happen very quickly so you may have to replay the sequence several times to be sure. In order for an instance of irony to be successful both participants must be aware of the irony and that it was understood. A failure may be due to behaviours by either one of the participants.

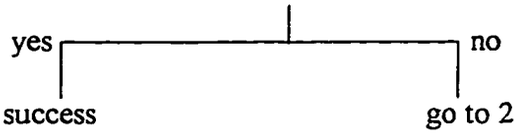
Decision tree for deciding success or failure:

1. Does the listener respond in a manner clearly appropriate to the:

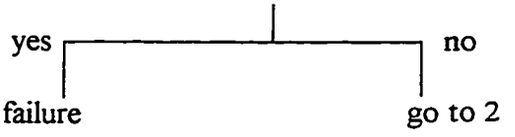
paraphrased meaning either verbally or nonverbally, e.g.,	literal meaning either verbally or nonverbally, e.g.,
i) If the person says "I love oysters" meaning that s/he hates them and the listener suggests that they go to a Mexican restaurant rather than the oyster bar, than s/he is responding to the paraphrased	iii) If the person says "I really love oysters" meaning that s/he hates them and the other person puts them on her/his plate then s/he is responding to the literal meaning.

interpretation.

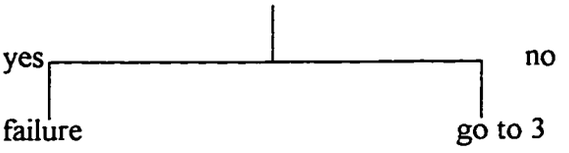
ii) If in the same example the person says "I hate oysters too", again s/he is responding to the paraphrased interpretation.



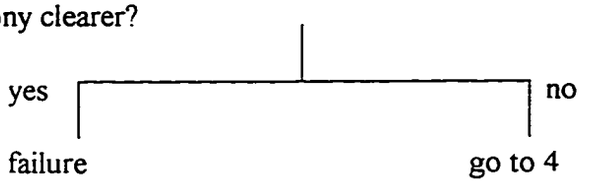
iv) If the person says "I really love oysters" meaning that s/e hates them and the other person asks him/her how s/he likes them cooked, s/he is responding to the literal meaning.



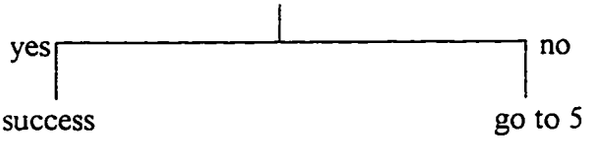
2. Does the speaker explicitly state thats/he was not serious or this was not to be taken literally or words to that effect?



3. Does the speaker expand upon what was said earlier to make the irony clearer (you may have to look a few turns ahead to decide whether this occurs) or repeats what was said, again to make the irony clearer?

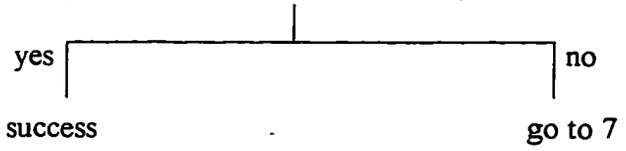


4. Does the listener smile or laugh to acknowledge undrstanding? (often both laugh or smile, i.e., it is mutual and ther is a sense of playfulness) You should be clear that the smiling/laughing is about the irony and not about something else or purely social.



5. Do either the listener or the speaker "close" the irony through such devices as discourse shift markers (e.g., "so", "back to the main point", "aah", "well", etc.)?

6. Do the listener and the speaker nod heads to acknowledge?



7. Does the listener escalate the irony by adding to it, e.g., if two people agree that they do not like organ meats, one might suggest for a menu of disliked foods to have a "big piece of kidney" and the other says "the whole kidney".

Note: If it is not a clear success by the above rules, then it is to be considered a failure.

The first instance of irony on the transcription sheet has been done for you as an example.

Appendix 9

Spontaneous Irony Scoring Form with Examples

Dyad or subject # 27 & 28

Utterance (and context if necessary): (describing one of the dresses) This would really do me justice. The horizontal bands would extend [make you look fat]

Literal meaning: The dress would look good on me. The lines going across would enlarge

Paraphrased Meaning: This dress would look awful on me. It would make me look heavier.

Type of irony: Reversal

Success or failure: Success

Why? Listener responded to paraphrase by finishing comment that it would make her look heavier

Dyad or subject # 56 & 57

Utterance (and context if necessary): (deciding to whom to serve the awful meal) I think we should give this delightful concoction to some politician.

Literal meaning: I think we should give this delicious meal to a politician

Paraphrased Meaning: I think we should give this awful meal to a politician

Type of irony: Reversal

Success or failure: Success

Why? Listener laughs

Appendix 10

Summary of Data from Conversations

Control Group

	Meal		Outfits		Holiday		Total			
Dyad	Time	Irony	Time	Irony	Time	Irony	Time	Irony	Succ	Rate
5/39	3.77	4	2.57	3	7.05	10	13.39	17	15	1.27
18/19	7.95	4	4.30	1	5.65	6	17.81	11	11	.62
20/38	6.40	2	3.37	4	2.72	3	12.49	9	9	.72
23/24	3.07	2	1.73	0	4.15	2	8.95	4	4	.45
25/33	9.92	7	4.53	0	5.25	7	19.70	14	11	.71
26/29	8.00	5	3.02	2	5.15	16	16.17	23	21	1.42
27/28	2.47	2	2.90	3	4.62	3	9.99	8	8	.8
36/37	4.63	3	2.52	1	6.35	2	13.50	6	5	.44
66/69	6.57	1	5.55	4	8.50	5	20.62	10	6	.48
75/76	5.43	7	1.25	2	5.23	4	11.91	13	10	1.09
Mean	5.82	3.70	3.17	2.00	5.47	5.80	14.45	11.50	10.00	0.80
S.D.	2.39	2.11	1.31	1.49	1.59	4.37	3.98	5.56	5.06	0.35

Left Hemisphere Group

Dyad	Meal		Outfits		Holiday		Total			
11/10	5.33	1	3.23	3	5.43	0	13.99	4	4	.29
17/12	4.47	4	6.20	4	5.03	0	15.07	8	8	.53
42/22	3.32	2	2.82	5	4.93	6	11.07	13	12	1.17
45/43	5.13	1	5.37	0	4.22	1	14.72	2	2	.14
50/51	6.95	6	4.22	1	3.98	1	15.15	8	8	.53
57/56	3.83	3	2.97	1	4.12	2	10.92	6	6	.55
62/63	4.62	4	2.68	3	4.52	4	11.82	11	10	.93
72/59	3.05	1	3.45	0	5.20	4	11.70	5	3	.43
74/73	4.30	2	2.88	0	5.50	4	12.68	6	6	.47
Mean	4.56	2.67	3.76	1.89	4.77	2.44	13.01	7.00	6.56	0.56
S.D.	1.18	1.73	1.25	1.90	0.58	2.13	1.74	3.43	3.28	0.31

Right Hemisphere Group

Dyad	Meal		Outfits		Holiday		Total			
2/3	2.37	2	1.88	0	4.68	2	8.93	4	3	.45
7/1	4.85	2	2.43	1	2.08	3	9.36	6	6	.64
8/4	2.08	.0	2.40	2	4.90	0	9.38	2	1	.21
31/32	4.23	4	2.92	2	4.50	2	11.65	8	8	.69
41/40	5.07	0	2.73	0	8.57	0	16.37	0	0	0
47/21	2.58	0	4.48	2	9.82	1	16.88	3	2	.18
48/34	4.60	8	3.13	2	2.82	3	10.55	13	11	1.23
53/54	5.00	4	4.25	2	4.93	1	14.18	7	7	.49
70/71	5.45	1	2.68	2	4.52	8	12.65	11	8	.87
Mean	4.03	2.33	2.99	1.44	5.20	2.22	12.22	6.00	5.11	0.53
S.D.	1.31	2.65	0.86	0.88	2.49	2.44	3.02	4.24	3.76	0.38

Appendix 11
Rates for Conversational Tasks

Control Group

Dyad	Meal	Outfits	Holiday
5/39	1.06 -	1.17	1.42
18/19	.50	.23	1.06
20/38	.31	1.19	1.10
23/24	.65	.00	.48
25/33	.71	.00	1.33
26/29	.63	.66	3.11
27/28	.81	1.03	.65
36/37	.65	.40	.31
66/69	.15	.72	.59
75/76	1.29	1.60	.76
Mean	0.68	0.70	1.08
S.D.	0.33	0.54	0.80

Left Hemisphere Group

Dyad	Meal	Outfits	Holiday
11/10	.19	.93	.00
17/12	.89	.65	.00
42/22	.60	1.77	1.22
45/43	.19	.00	.24
50/51	.86	.24	.25
57/56	.78	.34	.49
62/63	.87	1.12	.88
72/59	.33	.00	.77
74/73	.47	.00	.73
Mean	0.58	0.56	0.51
S.D.	0.29	0.61	0.42

Right Hemisphere Group

Dyad	Meal	Outfits	Holiday
2/3	.84	.00	.43
7/1	.41	.41	1.44
8/4	.00	.83	.00
31/32	.95	.68	.44
41/40	.00	.00	.00
47/21	.00	.45	.10
48/34	1.74	.64	1.06
53/54	.80	.47	.20
70/71	.18	.75	1.77
Mean	0.55	0.47	0.60
S.D.	0.59	0.30	0.66

Appendix 12

Number and Rate of Ironic Instances by Each Subject:

	NHD				LHD				RHD			
	NHD		NHD		NHD		CVA		NHD		CVA	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
	5	.24	5	.24	4	.34	1	.09	0	.00	3	.18
	2	.15	4	.30	7	.59	4	.34	3	.26	5	.43
	4	.40	4	.40	0	.00	4	.29	2	.21	4	.43
	3	.24	6	.48	1	.07	7	.46	0	.00	0	.00
	2	.22	2	.22	5	.33	3	.20	4	.28	3	.21
	5	.42	8	.67	1	.09	5	.46	7	.66	6	.57
	10	.56	1	.06	0	.00	2	.14	0	.00	2	.21
	12	.74	11	.68	1	.09	12	1.08	5	.39	6	.47
	10	.51	4	.20	2	.16	4	.32	1	.11	3	.34
	8	.60	9	.67								
Total	63		59		21		42		22		32	
Mean	6.10		5.40		2.33		4.67		2.44		3.56	
S.D.	3.64		3.13		2.45		3.24		2.51		1.94	

Appendix 13
Inclusion Criteria Results

Control Group

Subj. No.	Raven's Max=36	ACTS Max=21	Pic Match Max=5
5	32	20	5
19	36	21	5
24	35	21	5
28	32	21	5
29	34	18	5
33	34	21	5
36	34	20	5
38	35	21	5
69	34	19	5
76	33	20	5
Mean	33.90	20.20	5
S.D.	1.29	1.03	0

NHD Partners of Control Group

Subj. No.	Raven's Max=36	ACTS Max=21	Pic Match Max=5
18	36	21	5
20	31	19	5
23	36	18	5
25	36	21	5
26	34	21	5
27	34	18	5
37	35	20	5
39	35	19	5
66	32	21	5
75	34	21	5
Mean	34.30	19.90	5
S.D.	1.70	1.29	0

Left Hemisphere Group

Subj. No.	Ravens Max=36	ACTS Max=21	Pic Match Max=5	WAB Max=20
11	34	20	5	19
17	29	19	5	20
42	35	21	5	20
45	32	21	5	17
50	29	20	5	20
57	32	20	5	20
62	23	19	5	18
72	25	14	5	17
74	27	16	5	17
Mean	29.56	18.89	5	18.67
S.D.	4.06	2.37	0	1.41

Right Hemisphere Group

Subj. No.	Ravens Max=36	ACTS Max=21	Pic Match Max=5
2	22	18	4
7	21	12	3
8	28	18	5
31	32	21	5
41	34	19	5
47	20	12	3
48	32	21	5
53	31	16	5
70	35	19	5
Mean	28.33	17.33	4.44
S.D.	5.85	3.39	0.88

Conversational Partners of CVA subjects (NHD)

Subj. No.	Ravens Max=36	ACTS Max=21	Pic Match Max=5
1	35	21	5
3	34	20	5
4	29	21	5
10	32	19	5
12	35	20	5
21	29	19	5
22	34	21	5
32	36	21	5
34	36	21	5
40	28	21	5
43	36	19	5
51	33	21	5
54	33	21	5
56	35	20	5
59	34	21	5
63	36	21	5
71	34	21	5
73	33	21	5
Mean	33.44	20.50	5
S.D.	2.50	0.79	0

Appendix 14
Neuropsychological Test Results

Control Group

Subj. No.	SDMT	VERT (Total) Max=192	VERT (Aud) Max=24	VERT (Vis) Max=24	VERT (Aud/Vis) Max=24	Met-pic Max=10
5	43	115	20	19	16	10
19	48	114	16	16	14	10
24	62	118	17	17	20	10
28	45	108	15	17	17	7
29	49	116	16	15	13	9
33	38	108	14	17	14	10
36	44	107	14	15	15	9
38	45	110	15	16	13	9
69	37	121	16	20	19	9
76	43	126	17	20	18	9
Mean	45.4	114.3	16.0	17.2	15.9	9.2
S.D.	6.95	6.24	1.76	1.87	2.51	0.92

NHD Partners of Control Group

Subj. No.	SDMT	VERT (Total) Max=192	VERT (Aud) Max=24	VERT (Vis) Max=24	VERT (Aud/Vis) Max=24	Met-pic Max=10
18	47	124	19	19	16	10
20	48	108	15	17	15	8
23	52	114	15	16	7	10
25	49	118	14	18	16	10
26	50	102	14	14	14	10
27	61	126	17	18	17	10
37	55	123	18	19	15	10
39	53	118	17	21	18	10
66	60	127	16	18	15	10
75	60	104	17	15	18	9
Mean	53.5	116.40	16.2	17.5	15.1	9.70
S.D.	5.28	9.12	1.69	2.068	3.14	0.68

Left Hemisphere Group

Subj. No.	SDMT	VERT (Total) Max=192	VERT (Aud) Max=24	VERT (Vis) Max=24	VERT (Aud/Vis) Max=24	Met-pic Max=10
11	41	120	13	18	18	10
17	33	107	10	16	19	5
42	61	127	18	20	16	10
45	23	106	13	18	14	8
50	35	110	15	14	13	8
57	34	118	16	17	17	10
62	40	102	16	15	12	10
72	17	74	7	12	9	2
74	37	95	8	15	11	9
Mean	35.67	106.56	12.89	16.11	14.33	8.00
S.D.	12.30	15.64	3.82	2.42	3.39	2.78

Right Hemisphere Group

Subj. No.	SDMT	VERT (Total) Max=192	VERT (Aud) Max=24	VERT (Vis) Max=24	VERT (Aud/Vis) Max=24	Met-pic Max=10
2	29	94	10	19	10	10
7	16	90	10	11	18	5
8	41	111	13	17	18	9
31	36	112	11	17	13	2
41	35	99	10	15	11	3
47	22	107	14	15	16	4
48	20	107	11	18	11	9
53	33	79	9	14	8	8
70	63	125	14	21	19	10
Mean	32.78	102.67	11.33	16.33	13.78	6.67
S.D.	14.02	13.70	1.87	2.96	4.06	3.16

Conversational Partners of CVA Subjects (NHD)

Subj. No.	SDMT	VERT (Total) Max=192	VERT (Aud) Max=24	VERT (Vis) Max=24	VERT (Aud/Vis) Max=24	Met-pic Max=10
1	65	125	16	16	19	10
3	57	114	18	18	11	9
4	61	119	20	15	18	9
10	49	122	14	17	18	10
12	52	114	17	15	17	10
21	34	114	15	19	17	9
22	49	117	16	19	16	10
32	48	104	14	15	13	10
34	49	117	19	18	15	9
40	44	131	20	17	19	10
43	44	104	12	13	15	9
51	39	130	19	18	18	10
54	47	120	17	21	17	10
56	47	122	14	18	15	10
59	49	122	16	17	18	10
63	64	117	15	17	19	10
71	63	109	17	14	17	10
73	43	125	17	18	20	10
Mean	50.22	118.11	16.44	16.94	16.78	9.72
S.D.	8.70	7.62	2.23	1.98	2.29	0.46

Appendix 15

Test Measures Not Included in Statistical Analyses (from Right Hemisphere Language Battery)

Control Group

Subj. No.	Met-Wr Max=10	Infer Max=12	Humour Max=10
5	10	11	9
19	10	11	10
24	10	12	10
28	10	11	6
29	10	10	10
33	9	12	8
36	9	10	10
38	10	12	9
69	10	6	7
76	10	11	10
Mean	9.80	10.60	8.90
S.D.	0.42	1.78	1.45

NHD Partners of Control Group

Subj. No.	Met-Wr Max=10	Infer Max=12	Humour Max=10
18	10	12	10
20	10	9	5
23	9	11	5
25	9	11	6
26	10	11	8
27	10	12	8
37	10	12	9
39	10	12	9
66	10	12	8
75	9	11	10
Mean	9.70	11.30	7.80
S.D.	0.48	0.95	1.87

Left Hemisphere Group

Subj. No.	Met-Wr Max=10	Infer Max=12	Humour Max=10
11	10	10	10
17	9	6	7
42	10	7	10
45	10	11	6
50	10	12	4
57	10	9	9
62	10	9	8
72	4	5	2
74	10	11	10
Mean	9.22	8.89	7.33
S.D.	1.99	2.42	2.87

Right Hemisphere Group

Subj. No.	Met-Wr Max=10	Infer Max=12	Humour Max=10
2	9	9	7
7	7	9	1
8	10	9	6
31	9	9	8
41	9	11	6
47	9	8	8
48	10	11	7
53	9	10	5
70	10	9	9
Mean	9.11	9.44	6.33
S.D.	0.93	1.01	2.35

Conversational Partners of CVA Subjects (NHD)

Subj. No.	Met-Wr Max=10	Infer Max=12	Humour Max=10
1	10	12	10
3	10	12	9
4	9	10	8
10	10	8	8
12	10	12	7
21	9	10	7
22	10	9	8
32	9	11	9
34	10	12	10
40	10	12	10
43	10	11	7
51	10	11	8
54	10	12	8
56	10	11	7
59	9	11	8
63	10	12	9
71	10	12	10
73	10	11	9
Mean	9.78	11.06	8.44
S.D.	0.43	1.16	1.10

Appendix 16

Correlation Matrix of Demographic and Test Scores for NHD, LHD, and RHD Subjects (n = 28)

CORRELATION MATRIX CORRELATION (PROBABILITY LEVEL)											
	AGE	EDUC	RCPM	ACTS	SDMT	VERT TOT	VERT AUD	VERT VIS	VERT A/V	MET PIC	IRNY
AGE	1.000	0.0081 (0.967)	-0.250 (0.200)	-0.174 (0.375)	-0.472 (0.011)	-0.366 (0.055)	-0.431 (0.022)	-0.169 (0.390)	0.0940 (0.634)	-0.321 (0.095)	-0.392 (0.039)
EDUC	0.0081 (0.967)	1.000	0.5018 (0.007)	0.4693 (0.012)	0.5343 (0.003)	0.4767 (0.010)	0.4368 (0.020)	0.4084 (0.031)	-0.415 (0.028)	0.5517 (0.002)	0.2332 (0.232)
RCPM	-0.250 (0.200)	0.5018 (0.007)	1.000	0.7673 (0.000)	0.6466 (0.000)	0.5899 (0.001)	0.4388 (0.020)	0.4834 (0.009)	-0.206 (0.294)	0.3665 (0.055)	0.2406 (0.218)
ACTS	-0.174 (0.375)	0.4693 (0.012)	0.7673 (0.000)	1.000	0.5406 (0.003)	0.6103 (0.001)	0.5082 (0.006)	0.5977 (0.001)	-0.228 (0.244)	0.4707 (0.011)	0.2734 (0.159)
SDMT	-0.472 (0.011)	0.5343 (0.003)	0.6466 (0.000)	0.5406 (0.003)	1.000	0.6659 (0.000)	0.6200 (0.000)	0.5003 (0.007)	-0.179 (0.363)	0.5395 (0.003)	0.3412 (0.076)
VERT TOT	-0.366 (0.055)	0.4767 (0.010)	0.5899 (0.001)	0.6103 (0.001)	0.6659 (0.000)	1.000	0.7808 (0.000)	0.7322 (0.000)	-0.264 (0.175)	0.4866 (0.009)	0.3531 (0.065)
VERT AUD	-0.431 (0.022)	0.4368 (0.020)	0.4388 (0.020)	0.5082 (0.006)	0.6200 (0.000)	0.7808 (0.000)	1.000	0.4986 (0.007)	-0.291 (0.132)	0.5736 (0.001)	0.4719 (0.011)
VERT VIS	-0.169 (0.390)	0.4084 (0.031)	0.4834 (0.009)	0.5977 (0.001)	0.5003 (0.007)	0.7322 (0.000)	0.4986 (0.007)	1.000	-0.265 (0.173)	0.5211 (0.004)	0.2865 (0.139)
VERT A/V	0.0940 (0.634)	-0.415 (0.028)	-0.206 (0.294)	-0.228 (0.244)	-0.179 (0.363)	-0.264 (0.175)	-0.291 (0.132)	-0.265 (0.173)	1.000	-0.324 (0.093)	-0.254 (0.191)
MET PIC	-0.321 (0.095)	0.5517 (0.002)	0.3665 (0.055)	0.4707 (0.011)	0.5395 (0.003)	0.4866 (0.009)	0.5736 (0.001)	0.5211 (0.004)	-0.324 (0.093)	1.000	0.3580 (0.061)
IRNY	-0.391 (0.039)	0.2332 (0.232)	0.2406 (0.218)	0.2734 (0.159)	0.3412 (0.076)	0.3531 (0.065)	0.4719 (0.011)	0.2865 (0.139)	-0.254 (0.191)	0.3580 (0.061)	1.000

Educ = Education level; RCPM = Raven's Coloured Progressive Matrices; ACTS = Auditory Comprehension Test for Sentences; SDMT = Symbol Digit Modalities Test; VERT TOT = Victoria Emotion Recognition Test (Total Score); VERT AUD = Vert (Auditory Emotion subtest); VERT VIS = VERT (Visual Emotion Subtest); VERT A/V = VERT (Auditory/Visual Emotion subtest); MetPic = Metaphor Picture subtest from Right Hemisphere Language Battery; IRNY= Rate of Irony

Appendix 17

Dyad Composition

Composition of Dyads (Subject Number, Gender, Age, Education (years))					
NHD Dyads		LHD Dyads		RHD Dyads	
NHD	NHD	NHD	LHD	NHD	RHD
#18 M 58yr 16	#19 F 68yr 18	#10 F 63yr 14	#11 M 72yr 16	#1 F 52yr 12	#7 M 60yr 9
#23 F 57yr 14	#24 F 63yr 13	#12 F 67yr 14	#17 F 64yr 11	#3 F 68yr ?	#2 F 64yr 12
#27 F 63yr 16	#28 M 62yr 17	#22 F 69yr 14	#42 M 58yr 14	#4 F 54yr 15	#8 F 64yr 12
#36 M 65yr 16	#37 F 71yr 18	#43 M 71yr 13	#45 M 70yr 10	#21 F 68yr 11	#47 F 69yr 13
#20 M 75yr 12	#38 M 63yr 16	#51 M 73yr 21	#50 M 69yr 14	#32 M 70yr 16	#31 F 73yr 13
# 25 F 67yr 14	#33 F 69yr 17	#56 F 59yr 13	#57 M 66yr 16	#34 M 65yr 16	#48 F 70yr 15
#26 M 70yr 16	#29 F 54yr 13	#59 M 56yr 18	#72 M 85yr 11	#40 F 67yr 16	#41 M 65yr 12
#5 F 52yr 14	#39 F 58yr 12	#63 F 50yr 16	#62 F 68yr 14	#54 M 65yr 13	#53 M 64yr 12
#66 F 52yr 14	#69 M 70yr 16	#73 F 62yr 13	#74 M 77yr 16	#71 F 66yr 17	#70 F 62yr 18
#75 F 53yr 14	#76 F 67yr 12				