Pragmatic breakdown in patients with left and right brain damage: Clinical implications

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Abstract—Formal and functional approaches to pragmatics are based upon different assumptions about the nature of the language system. This paper examines these approaches to pragmatics and considers how each approach has been applied to understand the different language disorders that emerge from left and right brain-damage. The paper explores conflicting reports in the literature about pragmatic performance and hemispheric side of lesion. Finally, clinical methods based on both the formal and functional approaches to pragmatics are discussed.

Introduction

Two paradigms in linguistics provide different assumptions about the nature of pragmatics: a formal/structural approach and a functional approach. Formalists examine pragmatics as an autonomous system with the goal of uncovering the patterns and regularities that describe language behavior in context. Functionalists study pragmatics as the overarching framework that closely influences the internal organization of the linguistic system (Owens, 1991). Both formalist and functionalist perspectives have been useful in describing how pragmatic language behavior breaks down following unilateral damage to the brain. This paper examines the formalist and functionalist approaches to pragmatics and their application to understanding language disorders in brain damaged adults. Past studies employing diverse methodologies have led to conflicting descriptions of verbal pragmatic abilities in aphasic and right-brain-damaged patients. This paper examines the evidence suggesting that pragmatic performance breaks down differentially as a function of lesion side. We include a discussion of the clinical applications that emerge from both the formal and functional paradigms.

The formal and functional perspectives are based on different assumptions about pragmatics in describing the language system. Several theorists have contrasted these two perspectives. Leech (1983) for example, noted that formalists view language as a mental event whereas functionalists consider language as a societal phenomenon. Hymes (1974) suggested that for formalists, a description of linguistic structure is prerequisite to examining how language is used in context. For functionalists, Hymes (1974) noted the description of language use pinpoints the critical features and relationships to be examined. Thus, for functionalists, analysis of language use is primary in the description of linguistic structure. According to Schiffrin (1994) the functionalist position holds that there are functions external to the linguistic system that impinge upon the internal organization of the linguistic system. Schiffrin contrasts this with the formalist position that maintains that the social and cognitive functions of language do not influence its internal organization.

Linguists tend to use either the formal or functional approaches to describe language behavior. Similarly, speech-language pathologists tend to employ one approach or the
other to analyze and treat language disorders in patients with brain-damage. The methods used to analyze pragmatics are many and vary according to the specific theoretical approach taken. With emphasis on the formal aspects of pragmatics, the analysis identifies the constituent elements that comprise discourse, describes the rules that govern the way constituents link together, and determines if organization of the constituents is well-formed or not. By contrast, with an emphasis on function, the communicative intent and actions accomplished by a speaker’s language are analyzed with the goal of uncovering the effect of the discourse on the listener. Analysis of language structure or function alone creates numerous challenges for the researcher. Both of these approaches have significant implications for the clinical management of people with brain-damage.

A formal pragmatic perspective

Research from a formal pragmatic perspective emphasizes the structure of discourse and seeks to explain its internal organization. Anecdotal clinical reports often noted that aphasic patients communicate better than they talk (Holland, 1980) and that social communication was superior to performance on linguistic tasks. Many studies have examined what structural elements contribute to the observed discrepancy between social communicative function and linguistic performance in people with aphasia (e.g., Ulatowska, Allard, & Chapman, 1990; Ulatowska, Doyel, Stern, Hayes, & North, 1983; Ulatowska, Freeman-Stern, Doyel, Macaluso-Haynes, & North, 1983; Ulatowska, North, & Macaluso-Haynes, 1981). The findings of Ulatowska and her colleagues that global discourse structure is preserved in the face of morphosyntactic and phonologic deficits in mild and moderately impaired aphasic individuals were indeed striking. It is important to note that few of these studies reported a distinction in discourse skills between patients with anterior and posterior damage to the left hemisphere (Ulatowska et al., 1981; 1983). From a formal perspective, pragmatics appears to be a relative strength for the patient with aphasia.

One element common to research from a formal perspective is that it places the source of the pragmatic disorder within the speaker’s language system. This view supports the idea that patients with aphasia are, underneath it all, competent communicators who cannot access the linguistic structures necessary to express their competence. For example, on experimental tasks the essential concepts of discourse are often recalled or stated by aphasic patients. This achievement in discourse production is made in spite of problems with sentence level formulation. This observation is consistent with the notion that aphasia is a deficit in language performance, not communicative competence. From the formalist perspective, pragmatic abilities appear to be a relative strength that helps to maintain the aphasic individuals’ communicative competence in the face of their linguistic deficits. However, clinical observation of patients with mild-severe aphasia suggests that they may have linguistic deficits that undermine their communicative competence. Thus, pragmatic problems that arise in aphasia are thought to stem directly from linguistic deficits as well as compensations made to deal with these deficits (Newhoff & Appel, 1997).

Maximizing the aphasic individual’s use of discourse macrostructure (i.e., the global organization of essential information in a discourse) is a key feature of the clinical approach suggested by Ulatowska and Chapman (1994). In this approach, the clinician controls the basic elements of story structure to parallel the level of processing demonstrated by the patient. Ulatowska and Chapman suggest that a description of an individual’s macrostructure helps define competency in using the conceptual information and linguistic form of discourse. The work of Ulatowska and colleagues (1981, 1983,
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1990, 1994) has consistently demonstrated a dissociation between a cognitive-based information system and a linguistic system that operates linguistic cohesion. For those patients whose primary difficulty is in manipulating discourse structure, systematic exposure to a range of tasks that vary in conceptual complexity from simple to more challenging is recommended. Thus, the simplest tasks would have all of the meaning explicitly stated and the more complex tasks would contain implicit information that required inferencing in order to extract the meaning. Ulatowska and Chapman (1994) further recommend exploring different modes of information presentation such as visual or verbal or both to identify what is most manageable for the patient. Treatment is then geared toward repairing the aphasic patient's impaired language processing system through measured exposure to certain cognitive-linguistic operations.

In light of the sparing of macrostructure in aphasia, the right hemisphere was a reasonable place to look for the neurological mechanism that placed the global elements of discourse into a coherent structure. This notion was supported by clinical reports suggesting patients with right-brain-damage were copious and tangential in their spontaneous language (Gardner, 1975; Perrecman, 1983). Bloom, Borod, Obler and Gerstman (1992) examined the structure of discourse information in patients with unilateral left- and right-brain-damage. Besides replicating the findings of Ulatowska et al. (1981, 1983, 1990) for aphasic patients with left-brain-damage, findings revealed that patients with right-brain-damage produced discourse that contained less information, fewer concepts and more irrelevant remarks than normal control subjects.

Several studies from a formal perspective have reported that patients with right-brain-damage produce ambiguous and poorly structured discourse (Joanette, Goulet, Ska, & Nespoulous, 1989; Myers & Brookshire, 1994). On narrative tasks, right-brain-damaged patients have often been described as listing information, rather than interpreting events and relationships between characters in the story (Brownell, Potter, Bihrl, & Gardner, 1986; Hough, 1990). The formal pragmatic approach has been useful from a clinical perspective in that it has identified a host of abstract pragmatic structures that make useful targets for clinical intervention with right-brain-damaged patients. Observing the presence or absence of certain pragmatic structures such as topic shifts, topic initiation, revisions and conversational turns in a patient's discourse helps to identify treatment goals. The implication is that competent communicators use these pragmatic behaviors proficiently, and that increasing knowledge and use of these pragmatic behaviors in patients who do not is an important clinical objective.

Myers (1994, 1995) has outlined several treatment strategies designed to enhance discourse skills specifically for right-brain-damaged patients. One approach heightens the patient's awareness of story structure. Therapy is directed at improving the patient's impaired language system at the level of discourse. In this 4-step program, the patient is given a series of instructions and tasks designed to increase the number of elements included in a narrative and improve its organizational structure. Consistent with a formal pragmatic approach, Myers' clinical method (1994) rests upon the view that focused cognitive training on particular elements of story structure develops communicative competence.

Research from the formal pragmatic perspective seems to suggest that each side of the brain makes a separate contribution to discourse processing. Evidence from the formal pragmatic perspective indicates that the right side of the brain is required to produce discourse that is elaborate, well integrated and fully descriptive. For patients with left-brain-damage, the ability to utilize the essential elements of discourse is viewed as a communicative strength. In aphasia, the mental operations required for discourse processing are essentially spared but access to them is limited by linguistic deficits and
pragmatic compensations. For patients with right-brain-damage, loss of knowledge of how to structure and organize discourse is regarded as a liability that may be hidden by proficiency with phonology and syntax. Because pragmatics is evaluated alongside linguistic form, this approach gives the impression that the language disorders that result from left-brain-damage are more severe than those that arise from damage to the right side of the brain.

A functional pragmatic perspective

The challenge for functionalists is that the abstract units of analysis are not particularly well defined and are crucially linked to the context in which they occur (Hymes, 1974). Moreover, to employ a functionalist approach, it would be critical to account for what the speaker intends to communicate, rather than to describe the pragmatic structures that are present within a speaker’s discourse. Gricean pragmatics provides a first approximation for such an approach to discourse analysis. Grice (1975) proposed that communication is governed by four maxims or general laws of communication based on the principle of cooperation between the speaker and listener. Specifically Grice addressed the participant’s Quantity (i.e., contribution should be as informative as required), Quality (i.e., contribution should not be false and should not lack evidence), Relation (i.e., contribution should be relevant) and Manner (i.e., contribution should be direct and unambiguous). Importantly, Grice noted that participants do not strictly follow these maxims in every communication situation. Rather, Grice’s claim was that listeners interpret what they hear as if it conforms to these maxims. From this perspective, language is viewed from outside of the patient’s impaired language system and inside the environment where communication occurs.

Grice’s approach provided a theoretical framework for the Pragmatic Protocol developed by Prutting and Kirchner (1987). These authors note that pragmatic features are continuous throughout discourse and are derived from the listener’s perception of a speaker’s performance in a conversation. The Pragmatic Protocol has been used as a clinical tool to identify the appropriateness of 30 pragmatic abilities thought to be integral to communicative competence in adults with neurological impairments. The Pragmatic Protocol includes observation of three interacting communication components: verbal behaviors (e.g., topic selection, initiation, maintenance, message specificity and cohesion), paralinguistic behaviors (e.g., prosody, vocal quality and intelligibility) and nonverbal behaviors (e.g., facial expression, eye gaze and proximity of the speaker to the listener). Prutting and Kirchner specify that these aspects of pragmatics are to be observed in a natural, familiar conversational setting and scoring is to focus on the interaction between the speaker and listener rather than the production and comprehension linguistic structure.

Some interesting observations about site of lesion and pragmatic performance came out of the Prutting and Kirchner (1987) study. They reported that performance in fluent, non-fluent and mixed aphasic patients was generally pragmatically appropriate. Specifically 82% of the pragmatic behaviors of the left-brain-damaged group were judged to be pragmatically appropriate. Inappropriate pauses, a reduction in informativeness of messages and ambiguous word choice were particularly problematic for the left-brain-damaged patients. When Prutting and Kirchner examined the pragmatic abilities of right-brain-damaged individuals, 84% of their pragmatic behaviors were judged appropriate. Some difficulty with topic maintenance, informativeness, eye contact and prosody were noted in the right-brain-damaged groups. The finding that fluent and non-fluent aphasic
patients were similar in the amount of pragmatic behaviors judged to be appropriate was
striking in the face of the vast literature suggesting significant differences between these
groups on purely linguistic measures. In addition, the finding that patients with right-
brain-damage had pragmatic difficulties that were equivalent to those of patients with left-
brain-damage also had major clinical implications.

The Prutting and Kirchner (1987) study indicated that patients show some strengths in
pragmatic abilities regardless of the site of lesion (i.e., anterior vs. posterior) or side of
damage (left hemisphere vs. right hemisphere). Additionally, all groups of brain-damaged
subjects showed a measurable degree of pragmatic impairment. The difficulties
demonstrated by the patients with right-brain-damage tended to cluster in the non-verbal
domain whereas pragmatic difficulties of the left-brain-damaged patients seemed to be more
verbal in nature. In contrast to the studies from the formal perspective, the Prutting and
Kirchner study revealed considerable overlap in the individual pragmatic profiles of subjects
in both groups. As no distinct profile of pragmatic impairment emerged in either group,
these results support the idea that pragmatic deficits cannot be localized to a specific area of
the brain.

The Prutting and Kirchner study is best described as taking a functional approach
because the patient is examined in a typical conversational context and listener judgments
are used to describe pragmatic appropriateness. Paralinguistic and non-verbal aspects of
communication are considered so it is possible to examine adaptations that individuals
might use to convey a message at the expense of their verbal abilities. However, this
approach limits the investigation of verbal pragmatic abilities because it emphasizes
compensations and does not systematically explore how pragmatics interacts with different
environments or different types of contextual information.

Bloom, Borod, Obler and Gerstman (1993) took a functional approach to examine
whether distinct profiles of verbal pragmatic behaviors emerge in patients with damage to
either the left or right hemisphere. This approach differed from that of Prutting and
Kirchner because it focused solely on the verbal pragmatic aspects of language without the
benefit of contextual information or paralinguistic cues to support the listener in
interpreting the speaker’s intention. In this study, raters naïve to the hypothesis of the
investigation made judgements about the presence or absence of certain pragmatic features
of discourse. Verbatim transcripts were used to avoid cues provided by facial expression and
voice and limit the focus of the ratings to verbal pragmatic behavior. Bloom et al., (1993)
noted that “conciseness” and “relevancy” tend to be compromised in right-brain-damaged
patients whereas “lexical selection” and “quantity” tend to be impaired in left-brain-damaged
aphasic individuals. Further, Bloom et al. noted a strong relationship between semantic
content and verbal pragmatic performance in these patients. Specifically, emotional content
in discourse facilitated appropriate verbal pragmatic behavior in the left-brain-damaged
patients but suppressed pragmatic appropriateness in the right-brain-damaged patients. The
authors concluded that patients with aphasia show deficits in the verbal aspects of
pragmatics that vary with respect to semantic content and that interfere with the listeners’
interpretation of the message. From the functional perspective it is evident that emotional
content, although external to the linguistic system, influences pragmatics.

In our research, there was a measurable influence of content on both the global
organization (Bloom et al., 1992) and pragmatic appropriateness (Bloom et al., 1993) of
discourse produced by the brain-damaged subjects. In contrast, our investigation of
linguistic structure (or microstructure) alone (Bloom et al., 1995) conducted on the same
group of subjects, found no measurable influence of content. Specifically, emotional,
visuospatial or neutral content had no effect on discourse cohesion for either brain-damaged
group (Bloom et al., 1995). In this study, a structural analysis was conducted where certain
elements that contribute to discourse cohesion (e.g. connectives, anaphoric devices) were tallied and performance was compared to that of demographically matched aphasics, right-brain-damaged subjects and normal controls. While both brain-damaged groups demonstrated some problems with the use of cohesion, discourse content had no effect on this observation. Sensitivity to external influences such as emotionally loaded information may only become evident with a functional pragmatic analysis.

In contrast to the formal perspective, a strictly functional approach tends to place the source of the communication breakdown in the social context where it occurs. This is an appealing application because there is much to do clinically to modify the social context to make it more accessible to those individuals with communication disorders. There are perhaps two schools of thought among speech-language pathologists for conceptualizing functional pragmatic variables.

The first approach considers manipulation of the communicative context as the primary focus of aphasia treatment. Lubinski (1981) noted that certain environments (e.g., institutional settings, home) may present removable barriers to communication such as noise from loudspeakers or distracting lighting. Lyons (1992) emphasized working directly with a patient’s significant communication partners. People in the patient’s environment are taught to establish, accept and practice alternative modes of communication. Thus, the patient’s pragmatic limitations are accepted and people in the environment are encouraged to alter their behavior to accommodate the patient. These clinical applications are important because they place primary emphasis on the social communication environment, not the individual’s impaired language system. Several studies have identified the benefits of training the partners of aphasic adults (Lyons, 1992; Newhoff, Bugbee, & Ferreira 1981). However, when applied exclusively, these approaches to treatment neglect direct work on the patient’s verbal pragmatic abilities.

In the second clinical application of functional pragmatics, the communicative context provides the background for the aphasic patient’s active participation in it. The primary effort here is to empower the patient to increase the number and accuracy of the communicative intentions they produce. For example, Davis and Wilcox (1985) recommend that pragmatic treatment for aphasia be conducted within a therapeutic setting and utilize information from horizontal contexts (i.e. current people and events) and vertical contexts (i.e., settings events and people from the past) that are most meaningful to the patient. Further, they recommend that the speech-language pathologist gather information to maximize shared knowledge with the patient in order to increase the opportunity for successful communication. An important feature of this approach is that the patient and therapist participate equally as senders and receivers of new information. Information may be conveyed verbally, through the use of gesture or writing, or any combination of strategies. Only recently have the benefits of such an approach been investigated. Wilcox (1983) and Doyle, Oleyar and Goldstein (1989) implemented a behavioral method for improving speech acts in patients with aphasia. Preliminary case reports indicate that treatment of pragmatic difficulties may produce significant changes in a patient’s communicative function (Doyle et al., 1989.)

A preliminary problem with applying the verbal pragmatic approach to group studies with larger numbers of subjects is that at first glance, verbal pragmatic measurement seems highly subjective. For example, one rater’s judgement that a discourse is relevant may vary greatly from another rater’s impression of relevancy. Thus, problems in reliability and the psychometric construction of such a scale might limit its clinical application.

To address this problem, Bloom, Borod, Rorie, Pick, Andelman, Campbell, Obler, Welkowitz and Tweedy (1995) investigated pragmatic performance in discourse that varied
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with respect to condition (i.e., emotionality) and valence (i.e., pleasantness) in patients with right-hemisphere and left-hemisphere pathology. The purpose of this study was threefold. First, to reexamine the impact of negative and positive emotional content on pragmatic discourse performance. Second, to implement some methodological improvements to the pragmatic rating scale used in the Bloom et al. (1992) study and third, to carefully examine the psychometric aspects of the verbal pragmatic rating scale. Specifically, the internal consistency of the scale was determined and a factor analysis was conducted to evaluate theoretical relationship among the different pragmatic features.

In this study narratives about recollected emotional and nonemotional experiences were elicited. Both positive and negative emotional narratives were obtained in order to examine hemispheric specialization as a function of valence. Each narrative was evaluated for appropriateness on the following six pragmatic features: Conciseness, Relevancy, Specificity, Topic Maintenance, Quantity, and Lexical Selection (Bloom et al., 1993; Grice, 1975). Three graduate students, naive to the study’s hypotheses, rated each narrative via a 6-point Likert scale, where “1” = inappropriate and “6” = appropriate. Order of subjects, narratives, and pragmatic features were thoroughly randomized. Interrater reliability was 80.2% so ratings from the three judges were averaged for statistical analysis. Overall, LBDs and RBDs demonstrated deficits in verbal pragmatic performance relative to the NCs. There were also differences among the subjects’ performance with respect to the individual pragmatic features, with Relevancy being the most appropriately produced feature and Lexical Selection being the least appropriately produced feature. There was also an interaction between Group and Condition, such that NCs and LBDs performed slightly better in the Emotional than in the Nonemotional condition, and RBDs performed worse in the Emotional than Nonemotional condition. This was especially the case for the pragmatic features of Quantity, Relevancy, Topic Maintenance, and Conciseness when the narratives were positive in valence. Results are consistent with findings in the literature that emotional context can facilitate performance in LBDs with aphasia. When intraclass correlations were computed, findings revealed that the pragmatic rating scale has substantial internal consistency. This was the case across individual narratives and for Emotional, Nonemotional, and mean Total rating scores. Further, there were consistently high item-total correlations for each of the pragmatic features, suggesting that these features are strongly related to one another. Consistent with the findings involving internal consistency, when a factor analysis was conducted, there was a substantial general factor before rotation that accounted for 83% of the variance which contained factor loadings ranging from .85 - .95 for all of the pragmatic features. Following rotation, the 5 factors indexed different aspects of pragmatic performance. Interestingly, the three factors that relate most to linguistic content loaded most highly on the first factor and were differentiated from factors indexing conceptual unity and conciseness. When evaluating pragmatic performance, raters apparently base their judgements on three major elements: presence of information, relatedness of concepts and amount of information. These three constructs are substantially represented in the Gricean model of pragmatics. Findings from this study strongly suggest that the measures of verbal pragmatic performance have substantial internal consistency and may be useful as a clinical measure of discourse production.

Future studies of pragmatic behavior from the functional perspective have the potential of exploring the way context influences the structure of discourse in brain-damaged patients. The notion of a facilitation effect is intriguing because it suggests that some aspect of context may be manipulated to produce a compensation or improvement in the language system. Several studies have suggested that in aphasic individuals, emotional content can facilitate pragmatic performance (Bloom, Borod, Obler, & Gerstman, 1993), as
well as performance in auditory comprehension (Reuterskiold, 1991), reading, writing (Landis, Graves, & Goodglass, 1982) and oral-facial movement (Borod, Lorch, Koff, & Nicholas, 1987). Bloom et al. (1993) also reported a double dissociation whereby emotional content facilitated pragmatic performance in left-brain-damaged patients but suppressed it in right-brain-damaged patients. Acknowledging the role of emotional content on the communication of right-brain-damaged patients, Bloom (1994) advocated the use of role-playing to create challenging communicative interactions in treatment. A hierarchy of difficult situations, beginning with emotionally neutral ones and ending with highly emotional situations, could be used to increase a patient's communicative participation. Future studies should examine the extent to which pragmatic behaviors can be modified with clinical instruction and practice.

Functional approaches to pragmatics place emphasis on the patient's environment and how s/he interacts within it. Research from the functional perspective seems to suggest that pragmatic abilities may not easily be localized to either side of the brain. Patients with left- and right- brain-damage demonstrate both pragmatic abilities and deficiencies that vary according to the context where they are examined. From this vantage point patients with right-brain-damage have communication impairments (e.g., problems with detailed telephone messages, and recalling the gist of a favorite short story or movie) that may be as significant as those that arise from aphasia.

Conclusion

Models from theoretical linguistics continue to provide rich ground for application in Speech Language Pathology. The formal and functional approaches to pragmatics are similar because they view discourse as the critical unit of language analysis. However, in the analysis these approaches emphasize different variables and different interactions among the variables. Both theoretical approaches provide challenging questions for researchers. An integrated neurological theory of language will require unifying the findings of both approaches.

There is conflicting evidence suggesting that pragmatic performance breaks down differentially as a function of lesion side. Based on formal studies of pragmatics in brain-damaged subjects, patients with aphasia demonstrate linguistic deficits that interfere with overall communicative competence. Many right-brain-damaged patients demonstrate a breakdown on discourse tasks but these impairments seem minor in comparison to the linguistic and pragmatic deficits associated with aphasia. These formal pragmatic studies suggest that the mental operations required to process language in context require the specialized contribution of both cerebral hemispheres. By contrast, functional studies suggest that pragmatic abilities may be insensitive to neurological localization. In these studies, subjects with brain-damage demonstrate pragmatic abilities that vary according to the specific communication context or language task. Functional pragmatic studies have begun to elucidate the impact of semantic and environmental variables on communication in patients with aphasia and right-brain-damage.

Clinical intervention will also require an integration of both approaches. Speech-language pathologists have adopted structural and functional approaches to describing the discourse of adults with brain-damage and are beginning to measure the clinical utility of these instruments. Recall that among the goals of research in Speech-Language Pathology are: to provide a strong rationale for clinical treatment, to measure the powerful impact of language disorder on a patient's social function, to objectively document communication behavior over time and, to infer preserved neurological structure from function in order to
propose mechanisms of recovery. Clearly both the formal and functional paradigms play a central role in reaching these goals.

With emphasis on the formal aspects of pragmatics, treatment promotes the patient's successful use of the rules that characterize well-formed discourse structure. In the functional pragmatic approach, the patient's environment, communication partners and pragmatic communicative strategies are the primary focus of intervention. Patients with left-brain-damage and right-brain-damage are good candidates for a combination of approaches designed to alter limitations that are faced when communication abilities are compromised. In clinical practice, a combination of both approaches can create linguistic and pragmatic targets for intervention and provide the opportunity to practice these skills in a variety of environments.

Studies on the outcome of formal and functional approaches to language improvement are critical. Facilitation effects show promise for treatment as they suggest new avenues for language rehabilitation. Case reports and small-group longitudinal studies may be the best vehicle for examining the influence of context on information structure in brain-damaged patients. At the same time analytic discourse techniques continue to provide interesting ways to measure the relationship of language form and use.

References


