Pragmatics and Adult Language Disorders: Past Achievements and Future Directions

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ABSTRACT

In this article, the current state of our knowledge of pragmatic disorders in adults with language impairment is assessed. A brief historical background of clinical pragmatics is presented, and the place of adult language pathology within the development of this field is discussed. A comprehensive review is undertaken of pragmatic deficits in adults with language impairments of diverse etiologies. Specifically, pragmatic deficits are examined in adults with left-hemisphere damage, often resulting in aphasia, and in adults with right-hemisphere damage, traumatic brain injury, schizophrenia, and neurodegenerative disorders (principally, Alzheimer's disease). Although many pragmatic phenomena have been examined in these clinical populations, studies have also tended to neglect important areas of pragmatic functioning in adults with these disorders. Several such areas are identified within a wider discussion of how researchers and clinicians can best pursue future investigations of pragmatics in adults with language impairment.

KEYWORDS: Alzheimer's disease, left- and right-hemisphere damage, pragmatics, schizophrenia, traumatic brain injury

Learning Outcomes: As a result of this activity, the reader will be able to discuss the nature of pragmatic deficits in five adult clinical populations.

The emergence of clinical pragmatics as a field of study in its own right is confirmed by several developments. Several books, which either have used the title "clinical pragmatics" or have clinical pragmatics as their central theme, have been published in the last 15 years. In the same time, academic journals have dedicated special issues to the discussion of clinical

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pragmatics. Entries on clinical pragmatics are now as likely to appear in encyclopedias and other reference texts as entries on phonetics and syntax. Symposia and conferences now routinely dedicate sessions to clinical pragmatics. A greater level of academic interest in clinical pragmatic issues is scarcely imaginable. Yet, this interest belies the fact that some clinical groups have been largely overlooked in discussions of clinical pragmatics. Also, certain pragmatic phenomena have been extensively discussed, while other pragmatic phenomena have received at best a cursory examination.

In this article, I examine the nature and extent of pragmatic deficits in adults with language disorders. Discussion of pragmatic impairments in adults has largely been subordinated in the clinical literature to discussion of pragmatic impairments in children. Even within the literature on acquired pragmatic disorders, certain clinical groups have been discussed quite extensively (e.g., clients with right-hemisphere damage) while other groups have received little, if any, systematic investigation of their pragmatic impairments (e.g., clients with neurodegenerative disorders). This neglect of clinical populations is matched only by an equally widespread neglect of certain pragmatic phenomena. While studies of speech acts, implicatures, and turn-taking in conversation are relatively common in the clinical literature, few studies have attempted to examine the use of pragmatic presuppositions and deictic forms by language-impaired adults. The result is a rapidly growing field of clinical pragmatics in which some clinical groups and pragmatic phenomena have been disproportionately represented, often at the expense of other groups and phenomena. This article attempts to identify the areas in which our knowledge of acquired pragmatic disorders is highly developed and the areas in which further investigation of pragmatics is required.

THE EMERGENCE OF CLINICAL PRAGMATICS

The impetus for a new discipline of clinical pragmatics shares certain interesting similarities with the origins of pragmatics itself. These origins are standardly taken to reside in the language philosophies of H.P. Grice, J.L. Austin, and John Searle. The work of each of these theorists can be seen as a critical reaction to the view of language that was dominant among philosophers in the early part of the 20th century. For his part, Austin challenged the idea that a declarative sentence is always used to describe, either truly or falsely, some state of affairs (what he called the descriptive fallacy). Many declarative sentences, Austin argued, do not describe or report anything. Nor can we sensibly ask if they are true or false. Rather, the act of uttering these sentences constitutes the performance of an action. These so-called performatives include examples like *I baptize this child Fred Brown* and *I pronounce you man and wife*, in which the mere utterance of these statements constitutes an act of baptism and marriage, respectively.

The view that language could be used to do things ushered in a new branch of linguistic enquiry. At the center of this new field of pragmatics was the language user, whose linguistic goals in everyday communicative situations were as likely to involve making requests and expressing promises as they were to involve describing events and other states of affairs. Linguistic phenomena that were proving problematic for the logical frameworks employed by semanticists could be more readily explained by this new field of study. In his William James lectures in 1967, Grice proposed a new and revolutionary analysis of sentences such as *Some students pass their exams*. Grice proposed a distinction between what a sentence *says* and what it may be taken conventionally to *implicate*. Although a logician and a natural language user may both *say* the same thing, it is a convention of natural language not shared by logic that sentences may also carry implications beyond what they say. In the preceding sentence, for example, a speaker may be taken to implicate that not all students pass their exams. This is the case even though there is no inconsistency in logic between the sentences *Some students pass their exams* and *All students pass their exams*. As well as conventional implicature, Grice introduced a further category of implicature that has had a profound influence on the development of pragmatic theory. It is known as conversational implicature, and we

will see subsequently that this type of implicature has been one of the most extensively investigated pragmatic phenomena in the clinical literature.

It was not long before practitioners and clinical researchers began to realize that the assessment and treatment of language disorders in children and adults required something of a pragmatic turn. In the same way that theorists such as Austin and Grice had revealed the inadequacy of semantic and logical frameworks in analyzing how speakers actually use language, clinicians and researchers set about dismantling some rather unhelpful assumptions about language that had defined for many years how language disorders should be assessed and treated. These assumptions had their origin in a semantic conception of language and meaning. Under this conception, single words and sentences were regarded as the only units of meaning (the notion of discourse was completely overlooked) and meaning was based entirely on language (words and sentences had an invariant meaning that was not influenced by how speakers used these linguistic entities). The effect of these assumptions on clinical practice was that disproportionate emphasis was placed on structural language skills, often at the expense of any consideration of how clients used their language skills in a range of communicative situations. Also, despite the fact that normal language users do not produce utterances in a linguistic vacuum, assessment and treatment of language skills proceeded by and large on the basis of single word and single sentence productions. In attempting to eliminate these assumptions, or at least reduce their significance, clinicians and researchers embraced new methods of pragmatic assessment and treatment, redefined notions of treatment efficacy in pragmatic terms, and even devised new nosological categories to reflect the clinical significance of impairments of pragmatic language skills. We discuss some of these developments subsequently.

One of the first clinical areas to reflect this growing interest in pragmatics was the classification of developmental language disorders. Even as the philosophical ideas of Austin and Grice were having an impact on linguistics, clinicians were increasingly being called upon to assess and treat children in whom the principal communicative impairment was not related to any deficit in structural language. The appearance in clinics of children who were not obviously autistic yet who shared some of the bizarre communicative patterns of autistic children led clinicians and researchers to revise classifications of developmental language disorders. To reflect the disproportionately poor use of language by these children, Rapin and Allen[1] in the United States and later Bishop and Rosenbloom[2] in the United Kingdom used the term "semantic-pragmatic disorder." Although there were differences between these researchers in the application of this term, its emergence in the clinical literature marked the transition of pragmatics from a largely neglected area of clinical enquiry to an aspect of language that was now of diagnostic significance. Despite ongoing controversy about the classification of semantic-pragmatic disorder, there is little controversy about the core pragmatic deficits of semantic-pragmatic disorder. Rapin characterizes these deficits as verbosity, inadequate conversational skills, speaking aloud to no one in particular, poor maintenance of topic, and answering besides the point of a question in the presence of comprehension deficits for connected speech, word-finding deficits, atypical word choices, and unimpaired phonology and syntax.[3]

The new clinical emphasis on pragmatics also came to be reflected in techniques of language assessment, particularly among adult clients. The emergence of pragmatics encouraged clinicians to examine how clients used language skills in communication with others. Such examination required that clinicians assess the impact of a much wider range of factors on a client's language skills than had traditionally been possible. Factors such as context could not be successfully assessed by language batteries such as the Boston Diagnostic Aphasia Examination[4] and the Western Aphasia Battery.[5] Much less were such formal language assessments able to examine the effect of social factors, such as politeness constraints, on clients' linguistic choices or how patterns of language use varied with different conversational partners. Single word and sentence testing formats began to assume less

significance in assessment alongside methods that employed the techniques of conversation analysis and discourse analysis. Today, these techniques are included as standard in assessments of the language skills of adults with acquired communication disorders. Although many such assessments are conducted informally according to procedures that are devised by clinicians, there are now several published resources that employ the methodology of conversation analysis to assess language-impaired adults. One such resource is the Conversation Analysis Profile for People with Aphasia.[6] A related profile—the Conversation Analysis Profile for People with Cognitive Impairment[7]—is designed for use with clients who have generalized cognitive impairment, such as occurs in dementia or head injury.

The position of pragmatics in clinical practice and research is now secured. Pragmatics is a standard part of the assessment and treatment protocols of developmental and acquired language disorders. Its role in communication impairment continues to be widely investigated by clinical researchers. Notwithstanding the considerable level of clinical and research activity that has been devoted to the study of pragmatic disorders, it remains the case that not all these disorders have been examined to the same extent. Among clients with acquired language disorders in particular, pragmatic impairments have been extensively examined in some clinical groups and largely neglected in other groups. In the next section, we examine the research that has been conducted into pragmatic impairment in adult language disorders.

PRAGMATIC IMPAIRMENTS IN FIVE CLINICAL POPULATIONS

Pragmatic language skills can be compromised by a large range of diseases and injuries in adults. An adult may sustain a cerebrovascular accident, which may damage centers in the language-dominant left hemisphere or regions in the brain's right hemisphere, or both. The neuropathological changes that attend Alzheimer's disease lead to significant, progressive deterioration in an individual's language and cognitive skills. Language and cognitive functioning may also be impaired by the multifocal brain injuries that occur in road traffic accidents. The psychotic episodes that are typical of schizophrenia can result in chronic language disturbances. To these conditions, we can add brain tumors, other neurodegenerative disorders (e.g., Parkinson's disease), and a range of infections (e.g., meningitis, encephalitis). Notwithstanding the large range of diseases and injuries that can cause pragmatic language disorders in adults, the impact of only a small number of these conditions on pragmatics has been extensively investigated. In this section, we examine what is known about pragmatic disorder in language-impaired adults. The adults in question belong to five etiological groups: (1) left-hemisphere damage, (2) right-hemisphere damage, (3) schizophrenia, (4) traumatic brain injury, and (5) neurodegenerative disorders, particularly Alzheimer's disease. In the later section on future directions, we indicate the areas in which further study of pragmatic impairment is required.

Left-Hemisphere Damage

The traditional view of the role of the left hemisphere in language production and comprehension has been that this hemisphere is responsible for rule-based aspects of language (e.g., syntax). Pragmatic aspects of language, it was argued, were essentially intact in adults with left-hemisphere damage (LHD) or, if present, were secondary to impairments of structural language. Recent studies of pragmatic skills in aphasic adults are beginning to reveal a more complicated picture of pragmatic impairment than is suggested by this traditional view. Specifically, studies show that pragmatic impairments in aphasic adults are not merely a consequence of deficits in structural language. In some cases, pragmatic language impairments have been shown to persist despite improvements in structural language (see Coelho and Flewellyn[8]). In other cases, pragmatic impairments have been demonstrated in the extralinguistic communication of subjects with LHD (see Cutica, Bucciarelli, and Bara[9]). In the following paragraphs, we examine these studies as part of a wider review of pragmatic impairment in adults with LHD.

Studies of discourse are a rich source of information for clinicians on the pragmatic language skills of adults with LHD. Borod et al[10] examined the verbal pragmatic aspects of discourse production in 16 subjects with left brain damage and 16 subjects with right brain damage. To rate six pragmatic features for appropriateness, monologues were transcribed and analyzed. The six features were conciseness, lexical selection, quantity, relevancy, specificity, and topic maintenance. Both groups of brain-damaged subjects were impaired in pragmatic appropriateness relative to normal controls. Subjects with left brain damage were more impaired than subjects with right brain damage on each pragmatic feature, although differences were not significant. The pragmatic performance of LBD subjects was related to discourse content, with positive emotional content facilitating performance (see section "Right-Hemisphere Damage"). Coelho and Flewellyn[8] examined coherence in the story narratives of a subject with anomic aphasia over a 12-month period. These researchers found that although microlinguistic skills improved over this period, local and global coherence failed to improve appreciably. Global coherence was more impaired than local coherence in this subject. Coelho and Flewellyn concluded that "[t]his pattern of impaired macrolinguistic abilities is consistent with that of individuals with Alzheimer's disease and closed head injuries, and suggests that difficulty with discourse organization may result from focal as well as diffuse brain pathology."[8]

Specific aspects of nonliteral language have been shown to be impaired in aphasic and LHD adults. At least some of these impairments appear to be related to language disorder. For example, Chapman et al[11] examined the processing of proverbs in fluent aphasic patients. Subjects indicated their understanding of proverbs in two presentation conditions. In the spontaneous condition, subjects were required to express verbally their interpretation of proverbs that were presented in written and verbal form. In the multiple-choice condition, subjects were required to select from four proverb interpretations the one that most accurately reflected the proverb's meaning. Familiar and unfamiliar proverbs were presented in both conditions. Compared with normal controls, aphasic subjects had difficulty formulating an interpretation of both familiar and unfamiliar proverbs in the spontaneous condition. Aphasic subjects had little difficulty interpreting proverbs in the multiple-choice condition. The greater linguistic demands of the spontaneous condition, Chapman et al argue, explain the poorer proverb performance of the aphasic subjects in this condition. Kasher et al[12] examined the processing of implicatures in 31 patients with LHD following a stroke. Implicatures of quantity, quality, relation, and manner were examined by means of two-sentence conversational vignettes that were literally problematic. Famous paintings, which were also literally problematic, were used to examine nonverbal implicatures. Subjects were also administered a test of basic speech acts, which examined verbal and nonverbal assertions, questions, requests, and commands. Subjects with LHD were significantly impaired relative to age-matched normal controls in implicature processing. Verbal and nonverbal implicatures intercorrelated highly in LHD subjects, as did performance on most implicature subtests and most subtests of basic speech acts. On the basis of these results, Kasher et al conclude that the left hemisphere includes a general "implicatures processor."

The finding that nonverbal implicatures were also impaired in the LHD subjects in the study by Kasher et al suggests that not all pragmatic deficits are related to language impairments in this population. This view is further supported by the finding that only some implicatures in the LHD subjects in the study by Kasher et al correlated significantly with only some language functions (particularly naming, reading, and writing). A study of extralinguistic communication by Cutica, Bucciarelli, and Bara[9] lends further support to the view that not all pragmatic impairments in LHD subjects can be accounted for by linguistic deficits. Subjects with LHD were presented with 15 short videotaped fictions. In each fiction, an actor performs a gesture. After viewing each fiction, subjects are presented with a large photograph of the final frame. A white balloon above the actor's head must be filled by selecting from among four photographs the one

that represents the actor's communicative intention. The performance of LHD subjects on fictions that contain nonstandard acts—those involving simple deceits and simple ironies—was considerably poorer than that of control subjects.

Conversation is an important arena for the use of pragmatic language skills. It is one of the most naturalistic means available to clinicians and researchers for examining deficits in these skills. Conversation also permits investigators to examine the interaction between pragmatics and other levels of language such as syntax and semantics. For example, the aphasic speaker may lack the requisite syntactic structures to produce certain speech acts or may make lexical selections that indicate a lack of awareness of social and politeness constraints in conversation. An ability to be an effective participant in conversation is also the benchmark by which the adequacy of a client's communication skills is assessed. Given the many advantages of studying conversation, it is unremarkable that conversation analysis should have become one of the most extensively used techniques for examining pragmatic and linguistic functioning in aphasia. Conversation analysis has been used to examine collaborative repair in aphasic conversation,[13] aphasic grammar within the context of turns at talk in conversation,[14,15] word search strategies in aphasia,[16] and the distribution of turns at talk in aphasic participants' conversations with a relative.[17] Conversation analysis is no longer an adjunct to traditional techniques of aphasia assessment and treatment. Rather, it has become an overarching pragmatic framework within which verbal and nonverbal communication skills in aphasia are assessed and treated.

Right-Hemisphere Damage

The idea that the right hemisphere is a locus of communication impairment is still relatively new in the history of the study of language disorder. The publication in 1979 of a paper by Penelope Myers[18] reported the first formal study to be undertaken of discourse-level communication disorders in adults with right-hemisphere damage (RHD). That paper rose out of the author's observation that RHD stroke patients who were receiving clinical treatment for dysarthria and who had intact language skills were nevertheless communicating inadequately. It was clear that some hitherto unknown capacity of the right hemisphere was responsible for the communication impairments of these patients. Since that time, there has been considerable investigation of the right hemisphere's role in language processing and communication in general. Pragmatic aspects of language have come under particular scrutiny. Studies have revealed deficits in the processing of nonliteral language and features of context as well as impairments of discourse and conversation. Additionally, RHD subjects have problems establishing the emotional state of speakers, have difficulties with inference, and display a range of other perceptual and cognitive deficits. Many of these problems appear to be related to pragmatic disorders in RHD subjects. In this section, we examine the findings of several studies in this area.

Nonliteral language has been extensively investigated in the RHD population. Papagno et al[19] examined the comprehension of idioms in 15 RHD subjects. Comprehension in these subjects was found to be severely impaired and was biased toward literal interpretation. The comprehension performance of these subjects was correlated with visuospatial abilities and was significantly affected by lesion site, particularly frontal lobe involvement. Brundage[20] examined the interpretation of proverbs in 10 RHD subjects. Subjects were presented with a card, which had a proverb printed on it, and were asked to say what the proverb meant. Proverb familiarity and abstractness had a significant effect on interpretation. When explaining the meaning of proverbs high in abstractness, RHD subjects tended to produce literal explanations. Cheang and Pell[21] administered tasks tapping humor appreciation and pragmatic interpretation of nonliteral language to 10 subjects with RHD. Although the ability to interpret humor from jokes was relatively intact in these subjects, they had problems understanding communicative intentions. These findings, Cheang and Pell argue, "imply that explicitly detailing communicative intentions in discourse facilitates RHD participants' comprehension of non-literal language."[21]

McDonald[22] relates problems comprehending sarcasm in RHD patients to these subjects' difficulty processing information about the emotional state, intentions, and beliefs of the speaker.

Discourse and conversation impairments are commonly reported in the RHD population. Lehman Blake[23] elicited discourse from eight RHD subjects. Discourse transcripts were rated by speech-language pathologists on content and quantity variables. RHD subjects produced discourse that was rated as more tangential and egocentric than that produced by healthy older controls. Extreme verbosity or paucity of speech also characterized the discourse of RHD subjects. Marini et al[24] examined stories generated during two picture description tasks in 11 RHD subjects, 11 LHD subjects, and 11 neurologically intact controls. The performance of RHD subjects was poorer than that of controls in terms of information content and the coherent and cohesive aspects of narrative production (for a different view of discourse impairments in RHD, see Tompkins et al[25]). Hird and Kirsner[26] examined the ability of RHD subjects to take shared responsibility for the development of an intentional structure in conversation. Conversations between RHD subjects and normal speakers were audiotaped and analyzed. Text-level discourse processing analyses and prosodic analyses were performed. Hird and Kirsner found that RHD speakers fail to use prosody to alert listeners to changes in discourse structure. Nor do they assume equal responsibility in conversation for the development and maintenance of discourse structure. Other features of right-hemisphere brain damage that compromise the conversational performance of affected subjects include an inability to respond to violations of Gricean maxims in conversation,[27] an inability to select appropriate terms of personal reference,[28] and reduced facial expressivity during conversation.[29]

The relationship between communication impairment in RHD and the ability to generate and manipulate inferences has been extensively investigated. Tompkins, Lehman, and Baumgaertner[30] examined the suppression of inferences in RHD and control subjects. The ability to suppress initial inferences in response to subsequent information was examined at two probe intervals (850 and 1200 milliseconds). Both groups were unable to suppress initial inferences at these intervals. However, in RHD subjects suppression effectiveness was related to the comprehension of discourse stimuli that required inference revision. Myers and Brookshire[31] examined the effects of visual and inferential complexity on the picture descriptions of 24 RHD subjects. These investigators found that the communication impairments of RHD subjects on a picture description task were more strongly related to the inferential than to the visual complexity of the pictured stimuli. Purdy, Belanger, and Liles[32] examined inferences based on text and those based on general world knowledge in 15 RHD subjects and 15 neurologically normal adults. Subjects watched a 9-minute film, after which they were asked to answer a set of prerecorded inference questions. Normal adults performed significantly better than RHD adults on both types of inference. Myers[33] argues that RHD patients experience inference failure, that inference failure may occur at all levels of cognitive processing, that RHD can affect inference generation at early and late stages of cognitive processing, and that inference failure may be a central deficit. As well as inferencing difficulties, RHD subjects have been found to have theory of mind impairments. Griffin et al[34] found that RHD subjects have a functionally specific deficit in attributing intentional states, particularly those that involve second-order attributions.

Schizophrenia

Pragmatic deficits in schizophrenia have been extensively investigated over many years. Behavioral evidence indicates that schizophrenic speakers perform poorly on tests of discourse planning and comprehension; understanding humor, sarcasm, metaphors, and indirect requests; and the generation and comprehension of emotional prosody.[35] These pragmatic aspects of language "are essential to an accurate understanding of someone's communicative intent, and the deficits displayed by patients with schizophrenia may make a significant contribution to their social interaction deficits."[35] In this section, we examine some of

these deficits. We consider the findings of studies which demonstrate that schizophrenic speakers fail to process aspects of linguistic context (the ability to process context is a key component of pragmatic competence). We also discuss the relationship between impaired pragmatics and cognitive deficits in schizophrenia.

Tényi, Herold, Szili, and Trixler[36] examined the ability of schizophrenic subjects to recognize the intended meaning behind violations of Gricean implicatures. Twenty-six paranoid schizophrenic subjects and 26 normal controls were presented with four question and answer vignettes in which the maxim of relevance was violated. Subjects had to identify the speaker's intended meaning in each case. Tényi et al found that schizophrenic subjects made significantly more errors than controls in identifying the communicative intentions that lay behind violations of this maxim. Corcoran and Frith[37] examined politeness and appreciation of the Gricean maxims of quantity, quality, and relation in schizophrenic patients with different symptom profiles. Subjects had to select an appropriate final piece of speech for one of the characters in a series of stories. One piece of speech adhered to the rule under question, while the other flouted the rule. Control subjects, schizophrenic subjects with paranoid delusions, and schizophrenic subjects with negative symptoms adhered to the maxim of relation. However, all other maxims were flouted by subjects with negative symptoms. Subjects with paranoid delusions often failed to respond in a polite fashion but performed at a similar level to controls on stories involving the Gricean maxims.

Meilijson, Kasher, and Elizur[38] examined the pragmatic skills of 43 subjects with chronic schizophrenia. To attain a general profile of pragmatic abilities in these subjects, they used Prutting and Kirchner's pragmatic protocol.[39] Schizophrenic subjects displayed a high degree of inappropriate pragmatic abilities relative to a psychiatric control group (individuals with mixed anxiety-depression) and to subjects with hemispheric brain damage (data from Prutting and Kirchner[39]). Pragmatic parameters that were more than 50% inappropriate included topic selection, introduction, maintenance and change, lexical specificity/accuracy, prosody, turn-taking quantity/conciseness, and facial expressions. Much of the incoherence of schizophrenic language can be related to failures of reference, particularly reference to earlier parts of spoken discourse. Docherty, Cohen, Nienow, Dinzeo, and Dangelmaier[40] examined disturbances of referential communication in 48 schizophrenic patients. These patients scored significantly higher (more disordered) than controls on each of six types of referential disturbance. Five types of referential disturbance were stable over time in these subjects (confused reference, missing information reference, ambiguous word meaning, wrong word reference, and structural unclarity). A sixth type of reference—vague reference—was not stable over time. Referential disturbances showed little or no association with the severity of positive or negative symptoms in these patients.

Experimental studies have repeatedly shown that schizophrenic subjects are unable to process aspects of linguistic context. Bazin, Perruchet, Hardy-Bayle, and Feline[41] conducted an experiment in which 30 schizophrenic subjects and 30 control subjects were required to complete sentences using the first word(s) that came to mind. Each sentence contained an ambiguous word, the less frequent meaning of which was primed by a preceding sentence. Results showed that only control subjects were able to use the linguistic context provided by the preceding sentence to prime the less frequent meaning of the ambiguous word. Schizophrenic subjects, particularly those with thought disorder, used the most common meaning of the ambiguous word more frequently than controls. Sitnikova, Salisbury, Kuperberg, and Holcomb[42] used event related potentials to examine deficits in language comprehension in schizophrenia. Sentences that contained two clauses were read by schizophrenic and control subjects. These investigators hypothesized that the processing of target words in the second clause would be influenced by preceding linguistic context in the control subjects only. Schizophrenic subjects, by contrast, were expected to be inappropriately affected by the dominant meaning of homographs in the first

clause (e.g., the "structure" meaning of "bridge" in the sentence *The guests played bridge because the river had rocks in it*). This hypothesis was confirmed.

Pragmatic impairments have been linked to cognitive deficits in schizophrenia. Linscott[43] examined the relationship between pragmatic language impairment (PLI), thought disorder, and generalized cognitive decline in 20 schizophrenic subjects. The Profile of Pragmatic Impairment in Communication[44,45] was used to score subjects for PLI. Significant PLI and generalized cognitive decline were found in the schizophrenic subjects. Furthermore, generalized cognitive decline predicted PLI. Linscott[43] remarks that PLI in schizophrenia is secondary to generalized cognitive decline. Brüne and Bodenstein[46] investigated the relation of proverb understanding in schizophrenia to the cognitive ability to engage in mindreading ("theory of mind"). Thirty-one schizophrenic patients completed a proverb test, a theory of mind (TOM) test battery, and a variety of executive functioning and verbal intelligence tests. These patients' psychopathology was also assessed. TOM performance, intelligence, and executive functioning correlated strongly with the patients' ability to interpret proverbs correctly. Approximately 39% of the variance of proverb comprehension in the schizophrenic patients was predicted by TOM performance. Brüne and Bodenstein concluded that "[t]he ability to interpret such metaphorical speech that is typical of many proverbs crucially depends on schizophrenic patients' ability to infer mental states."[46]

Traumatic Brain Injury

Cognitive deficits are also a common feature of individuals who have sustained a traumatic brain injury (TBI). These deficits include problems in memory, attention and concentration, speed of information processing, executive functioning (planning, organization, and problem solving), and visuospatial perception. They also include problems in inferencing, which are increasingly being linked to TOM deficits and PLIs in this clinical population (see Bibby and McDonald,[47] and Ferstl, Guthke, and von Cramon[48]). The multifocal brain pathology in TBI has allowed researchers to map pragmatic language skills to certain neuroanatomical regions. The study of this clinical population is thus making a significant contribution to a growing subdiscipline in pragmatics called neuropragmatics. In this section, we review several studies that suggest a link between cognitive deficits and brain lesions in TBI on the one hand and pragmatic impairments on the other hand. We also consider the findings of studies that have examined discourse and conversation skills in TBI.

McDonald[49] takes the view that certain pragmatic impairments in head-injured subjects can be related to frontal lobe cognitive deficits. Subjects with closed head injury (CHI) and matched control subjects were asked to perform several tasks that were designed to assess their expressive and receptive pragmatic skills. Tasks in which subjects had to issue requests in the form of hints and adhere to the conversational maxim of manner were used to test expressive pragmatic skills. Receptive pragmatic skills were assessed by asking subjects to perform a task that required them to understand indirect language. CHI subjects displayed various cognitive deficits related to frontal lobe pathology. Results revealed that CHI subjects had depressed performance compared with control subjects on all pragmatic skills. Within a more thorough analysis of the performance of these subjects, McDonald relates the impaired pragmatic skills of CHI subjects to their underlying cognitive skills. Specifically, a CHI subject who failed to adhere to Grice's maxim of manner in his instructions to a blindfolded listener on how to play a novel game exhibited frontal lobe cognitive deficits such as rigidity, perseveration, and poor planning and problem-solving skills. Also, two CHI subjects who were unable to use indirect means (e.g., hints) of making requests exhibited considerable frontal lobe pathology. One subject was particularly concrete and perseverative. The other subject had less impaired abstraction skills but exhibited severe problems of impulse control. McDonald's findings would seem to provide at least tentative support for the view that pragmatic impairments in head injury are related to the underlying cognitive deficits of head-injured subjects.

Further evidence (admittedly tentative) to support the role of frontal lobe pathology in the pragmatic deficits of TBI subjects comes from a study by Ferstl, Guthke, and von Cramon.[48] These investigators examined inferencing abilities in 25 nonaphasic patients who sustained a brain injury, 11 due to TBI. These subjects performed a coherence judgment task in which they were required to indicate a pragmatic connection between two successively presented sentences. The most severe deficits on this task were found among brain-injured subjects with left- and bifrontal lesions. These results, Ferstl et al argue, confirm the role of the left-frontal lobe in pragmatic inference processes. The similarities between the cognitive ability to draw TOM inferences and the type of mental state attribution that is integral to pragmatic language functions such as the recovery of implicatures have led investigators to examine TOM deficits in the TBI population. In a study by Bibby and McDonald,[47] severe TBI subjects and healthy controls performed a range of verbal and nonverbal TOM tasks and verbal and nonverbal tasks that required them to draw general (nonmental) inferences. The TBI group performed more poorly than healthy subjects on TOM and general inference tasks. Further analysis suggested that TBI subjects have a general deficit in inferencing which, when combined with working memory and language impairments, adversely affects their performance on nonverbal and second-order TOM tasks. However, they may also have a specific TOM deficit that may impair their performance on verbal first-order TOM tasks. The exact relationship of these TOM impairments to the pragmatic deficits of TBI subjects requires further investigation.

Conversational discourse has also been found to be impaired in TBI subjects. Coelho, Youse, and Le[50] reported that impairments include difficulties with topic management and expressing information in a logical manner. The conversations of TBI subjects have also been found to be less interesting, less appropriate, and more effortful. Coelho, Youse, and Le examined response appropriateness and topic initiation in the conversations of 32 CHI subjects. These investigators found that head-injured subjects depended on their conversational partner (the examiner) to maintain the flow of the conversation and that they often contributed information that did not facilitate the interaction. To compensate for these conversational impairments, the examiner asked more questions and introduced more topics than he did in conversations with non–brain-injured subjects. Togher and Hand[51] examined the use of politeness markers during the telephone interactions of five TBI subjects with four different interlocutors. These interlocutors—a bus service employee, the police, a therapist, and the client's mother—varied according to relationships of power, status, and contact with the TBI subject. The five politeness markers examined were finite modal verbs (e.g., could), modal adjuncts (e.g., possibly), comment adjuncts (e.g., I think), yes/no tags, and incongruent realizations of the interrogative form (e.g., You don't know what time they go or anything?). In the therapist, bus, and police interactions, TBI subjects used significantly less politeness markers per clause than control subjects (TBI subjects also used less politeness than controls in the mother interaction, although this only approached significance). Unlike controls, TBI subjects were unable to vary the number of politeness markers used according to the tenor of the social relationship in each interaction.

Neurodegenerative Disorders

The group of neurodegenerative disorders is extensive and includes, among others, Alzheimer's disease, Parkinson's disease, motor neuron disease, and multiple sclerosis. With the exception of Alzheimer's disease, there has been little investigation of PLIs in this clinical population. This is related to the widespread belief that motor speech problems are the only communication disturbance in disorders such as motor neuron disease. However, there is now growing recognition that language impairments do occur in neurodegenerative disorders such as multiple sclerosis. Also, the first signs are emerging that pragmatic deficits may also be present in conditions such as Parkinson's disease. In this section, we examine the findings of several studies among what is still a very small body of literature.

There is evidence of substantial discourse impairments in subjects with Alzheimer's disease (AD). Chapman et al[52] examined the discourse coherence of picture-based stories produced by three groups of subjects: individuals with early stage AD, normal old-elderly (OE) individuals, and normal control subjects. Significant differences were found between the AD subjects and the OE and normal control subjects on content and form aspects of discourse coherence. Specifically, AD subjects supplied a typical frame of interpretation only 50% of the time. Atypical frames were often applied, or they failed to interpret presented pictures within any frame. AD subjects also produced significantly fewer core and elaborative propositions and responses that were organized according to a narrative structure than other groups. Cherney and Canter[53] elicited three types of discourse from patients with AD: descriptive, procedural, and narrative. AD subjects produced more irrelevancies, redundancies, and incorrect utterances than either healthy, elderly controls or subjects with right brain damage. They also produced less essential utterances than either of these two groups and less elaborations than control subjects. Carlomagno et al[54] examined the factors that underlie the lack of reference and reduced informative content in the discourse of AD patients. These subjects displayed reduced lexical encoding of information on both a referential communication task and a picture description task. AD subjects were less efficient than aphasic subjects in establishing reference during the referential communication task as they presented more misunderstandings and needed more explicit prompts from the listener. Also, the language used by AD subjects during this task contained confounding and irrelevant information. The number of these errors correlated negatively with the referring abilities of AD subjects.

One other neurodegenerative population in which PLIs are beginning to be investigated is Parkinson's disease (PD). McNamara and Durso[55] examined the pragmatic communication abilities of 20 patients with PD. Prutting and Kirchner's pragmatic protocol was used to assess the pragmatic abilities of these patients.[39] These investigators found that PD patients had significantly impaired pragmatic abilities, particularly in the areas of turn-taking, conversational appropriateness, prosodics, and proxemics. Moreover, impaired pragmatic functioning was found to be significantly related to measures of frontal lobe function in these subjects. Another finding from this study that has implications for intervention is that PD subjects were unaware of the extent of their pragmatic communication problems. Monetta and Pell[56] examined the comprehension of metaphorical language in 17 subjects with PD. PD subjects who had impaired working memory on a measure of verbal working memory span were also impaired in the processing of metaphorical language. Monetta and Pell concluded that metaphor comprehension is dependent on frontostriatal systems for working memory, which are often compromised in the early course of PD.

PAST ACHIEVEMENTS AND FUTURE DIRECTIONS

As the survey of pragmatic impairments in the preceding section indicates, past and current research into acquired pragmatic disorders has been both broad in scope and revealing in its findings. In this section, the main achievements of this research are outlined and discussed. It is also instructive to consider the implications of this research for the future direction of clinical pragmatic studies. As the preceding survey of pragmatic impairments demonstrates, some aspects of pragmatics and some clinical populations have received disproportionately little attention in clinical research. It is important to give emphasis to these neglected areas if the field is to move forward in an interesting and clinically relevant way. Some of these areas are the focus of discussion later in this section.

The main achievement of practitioners and researchers in the area of acquired pragmatic disorders has been the decision to put the pragmatic emphasis on the *use* of language at the very center of how these disorders are assessed and treated. In this view, pragmatics is not merely another language level like syntax and semantics. Rather, pragmatic insights about language have been allowed to shape the very frameworks that we use to assess and

treat adults with language impairment. In this way, conversation and discourse analytic approaches are now a standard part of the assessment protocols and treatment programs of all language-disordered adults and not simply of those with evident pragmatic failure. The Clinical Guidelines of the Royal College of Speech and Language Therapists[57] stipulate not only that assessments of aphasia should include "functional and pragmatic aspects of communication"[57] but also that an assessment of the conversation/interaction patterns of the person with aphasia and their conversation partner "may include conversation analysis (CA)."[57] From today's pragmatically informed standpoint, it may seem unremarkable to say that the techniques that we employ to assess and treat pragmatic disorders should themselves be constructed according to pragmatic principles. But what seems like a platitude in today's terms would never have been realized if practitioners and researchers had not moved beyond merely viewing pragmatics as a theoretical stance on language toward embracing it as an organizing principle of assessment and treatment.

Another significant achievement of research into acquired pragmatic disorders has been the attempt to explore the cognitive substrates of pragmatic phenomena. For some time, practitioners and researchers have been aware of the link between cognitive deficits and general language and communication impairments in certain clinical populations, such as adults with TBI. Only recently, however, have investigators begun to explore the relationship between cognitive deficits and particular pragmatic and discourse difficulties. The ability to generate and manipulate inferences has been widely investigated in relation to pragmatic and discourse abilities, particularly in the context of right-hemisphere brain damage. TOM skills, which have been extensively investigated in relation to autistic spectrum disorders, are just beginning to be examined in the clinical populations that were discussed in the preceding section. Findings of TOM deficits in these populations and correlations between these deficits and pragmatic impairments provide the first signs that TOM skills may prove to have greater clinical relevance for speech-language pathologists than has hitherto been realized. In Cummings,[58] I argued that the ability to attribute mental states to the minds of others (TOM) was the central cognitive operation in any act of pragmatic interpretation and that understanding this ability would contribute to our knowledge of the communication-cognition interface. With the role of TOM deficits in pragmatic impairments now looking increasingly likely, it is clear that this key cognitive skill should be the focus of future research studies into acquired pragmatic disorders.

As well as future research taking an increasing interest in the cognitive substrates of pragmatic phenomena, it also needs to be more informed by theoretical frameworks in pragmatics. Significant theories and approaches in pragmatics such as relevance theory[59] and cognitive pragmatics theory[60] are still largely peripheral to work in acquired pragmatic disorders. To date, studies of pragmatic disorders have been undertaken in a rather ad hoc fashion. The result of this ad hoc approach has been a substantial number of studies of pragmatic impairments in adults, the findings of which are contradictory in parts or otherwise fail to shed light on the real nature of these impairments. A more systematic approach to the study of acquired pragmatic disorders, one that is guided in its particular direction by models and theories of pragmatic phenomena, represents our best hope for moving forward in a productive manner. Many theorists in pragmatics are using the types of clinical populations that have been examined in this article to test the claims of their theories. It is now time for more practitioners and clinical researchers to use these theories to guide the types of questions that they are asking.

As the discussion of the preceding section demonstrates, investigators have examined a wide range of pragmatic phenomena in several adult populations. Yet it remains the case that although pragmatic impairments in schizophrenic adults and RHD subjects have been extensively studied, other adult populations have received relatively little study of their impairments in this area. Neurodegenerative disorders are a case in point. Initial studies on Parkinson's disease reveal that the pragmatic language skills of these subjects may not be

intact, as had simply been assumed. Given the growing significance of the neurodegenerative population, by 2050, it is estimated that there will be almost 13.2 million people in the United State with Alzheimer's disese.[61] It is clear that investigators can ill afford to neglect the pragmatic impairments of these individuals. Also, whereas some pragmatic phenomena have been extensively investigated, others have been largely left to languish. It is at least as important to our understanding of clients' pragmatic abilities that we know if they are able to represent shared background knowledge as presuppositions of statements as it is to know if they are able to use and comprehend a range of speech acts. Yet the former ability is almost never examined, whereas studies of speech acts are now commonplace in the clinical literature. This can be explained in part by the ease with which certain pragmatic aspects of language can be examined. Although the comprehension and use of speech acts can be relatively easily examined during conversation, or at least naturally elicited in conversation when they occur infrequently, it is altogether less easy to achieve a naturalistic situation in which a client can demonstrate proficiency in the use of presuppositions or appreciation of the presuppositions of other speakers' utterances. Clearly, new research techniques will have to be developed if aspects of pragmatics that are less amenable to study are also to be investigated.

As well as developing new techniques for the study of pragmatic phenomena, future researchers should be critical about the techniques that are currently being used to study pragmatic impairments. It is unlikely that studies that attempt to examine conversational implicatures by presenting subjects with question and answer vignettes or by encouraging subjects to select a final piece of speech for one of the characters in a story are testing any of the pragmatic skills that are used in the recovery of implicatures in everyday communicative situations. If anything, these rather contrived situations are more likely to be testing a range of other language and cognitive skills that are unrelated to pragmatics as such. It is an irony that the discipline which emphasizes speakers' *use* of language must now control its own impulse to extract notions such as implicature from the communicative situations that are their natural home. Whatever studies of pragmatics in language-impaired adults are undertaken in future, these studies should ensure strict selection of subjects according to clear etiological criteria. Studies that have made claims about the pragmatic deficits of entire clinical populations based on studies of their most impaired members (for further discussion, see Tompkins et al[25]) or that have grouped together subjects from quite distinct etiological groups (see Ferstl et al[48]) are unlikely to be particularly revealing of the pragmatic deficits of the adults in these groups.

REFERENCES

1. Rapin I, Allen D. Developmental language disorders: nosologic considerations. In: Kirk U, ed. Neuropsychology of Language, Reading, and Spelling. New York: Academic Press; 1983:155–184
2. Bishop D, Rosenbloom L.Classification of childhood language disorders. In: Yule W, Rutter M, eds. Language Development and Disorders. London: MacKeith Press; 1987:16–41
3. Rapin I. Developmental language disorders: a clinical update. J Child Psychol Psychiatry 1996; 37:643–655
4. Goodglass H, Kaplan E, Barresi B. Boston Diagnostic Aphasia Examination. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2001
5. Kertesz A. Western Aphasia Battery–Revised. San Antonio, TX: Harcourt Assessment; 2006
6. Whitworth A, Perkins L, Lesser R. Conversation Analysis Profile for People with Aphasia. London: Whurr Publishers; 1997
7. Whitworth A, Perkins L, Lesser R. Conversation Analysis Profile for People with Cognitive Impairment. London: Whurr Publishers; 1997
8. Coelho C, Flewellyn L. Longitudinal assessment of coherence in an adult with fluent aphasia. Aphasiology 2003;17:173–182
9. Cutica I, Bucciarelli M, Bara B. Neuropragmatics: extralinguistic pragmatic ability is better preserved in left-hemisphere-damaged patients than in right-hemisphere-damaged patients. Brain Lang 2006; 98:12–25
10. Borod J, Rorie K, Pick L, et al. Verbal pragmatics following unilateral stroke: emotional content and valence. Neuropsychology 2000;14: 112–124

11. Chapman S, Ulatowska H, Franklin L, Shobe A, Thompson J, McIntire D. Proverb interpretation in fluent aphasia and Alzheimer's disease: implications beyond abstract thinking. Aphasiology 1997; 11:337–350
12. Kasher A, Batori G, Soroker N, Graves D, Zaidel E. Effects of right- and left-hemisphere damage on understanding conversational implicatures. Brain Lang 1999;68:566–590
13. Perkins L, Crisp J, Walshaw D. Exploring conversation analysis as an assessment tool for aphasia. Aphasiology 1999;13:259–281
14. Beeke S. 'I suppose' as a resource for the construction of turns at talk in agrammatic aphasia. Clin Linguist Phon 2003;17:291–298
15. Beeke S, Wilkinson R, Maxim J. Exploring aphasic grammar. 1: A single case analysis of conversation. Clin Linguist Phon 2003;17:81–107
16. Oelschlaeger M, Damico J. Partnership in conversation: a study of word search strategies. J Commun Disord 2000;33:205–223
17. Perkins L. Applying conversation analysis to aphasia: clinical implications and analytic issues. Eur J Disord Commun 1995;30:372–383
18. Myers P. Profiles of communication deficits in patients with right cerebral hemisphere damage: implications for diagnosis and treatment. In: Clinical Aphasiology Conference Minneapolis, MN: BRK Publishers; 1979:38–46
19. Papagno C, Curti R, Rizzo S, Crippa F, Colombo M. Is the right hemisphere involved in idiom comprehension? A neuropsychological study. Neuropsychology 2006;20:598–606
20. Brundage S. Comparison of proverb interpretations provided by right-hemisphere-damaged adults and adults with probable dementia of the Alzheimer type. Clin Aphasiol 1996;24:215–231
21. Cheang H, Pell M. A study of humor and communicative intention following right hemisphere stroke. Clin Linguist Phon 2006;20:447–462
22. McDonald S. Neuropsychological studies of sarcasm. Metaphor and Symbol 2000;15:85–98
23. Lehman Blake M. Clinical relevance of discourse characteristics after right hemisphere brain damage. Am J Speech Lang Pathol 2006;15:255–267
24. Marini A, Carlomagno S, Caltagirone C, Nocentini U. The role played by the right hemisphere in the organization of complex textual structures. Brain Lang 2005;93:46–54
25. Tompkins C, Boada R, McGarry K, Jones J, Rahn A, Ranier S. Connected speech characteristics of right-hemisphere-damaged adults: a re-examination. Clin Aphasiol 1992;21:113–122
26. Hird K, Kirsner K. The effect of right cerebral hemisphere damage on collaborative planning in conversation: an analysis of intentional structure. Clin Linguist Phon 2003;17:309–315
27. Rehak A, Kaplan J, Gardner H. Sensitivity to conversational deviance in right-hemisphere-damaged patients. Brain Lang 1992;42:203–217
28. Brownell H, Pincus D, Blum A, Rehak A, Winner E. The effects of right-hemisphere brain damage on patients' use of terms of personal reference. Brain Lang 1997;57:60–79
29. Blonder L, Burns A, Bowers D, Moore R, Heilman K. Right hemisphere facial expressivity during natural conversation. Brain Cogn 1993; 21:44–56
30. Tompkins C, Lehman M, Baumgaertner A. Suppression and inference revision in right brain-damaged and non-brain-damaged adults. Aphasiology 1999;13:725–742
31. Myers P, Brookshire R. The effects of visual and inferential complexity on the picture descriptions of non-brain-damaged and right-hemisphere-damaged adults. Clin Aphasiol 1994;22:25–34
32. Purdy M, Belanger S, Liles B. Right-hemisphere-damaged subjects' ability to use context in inferencing. Clin Aphasiol 1992;21:135–143
33. Myers P. Inference failure: the underlying impairment in right-hemisphere communication disorders. In: Clinical Aphasiology Conference. Austin, TX: Pro-Ed; 1991:167–180
34. Griffin R, Friedman O, Ween J, Winner E, Happe F, Brownell H. Theory of mind and the right cerebral hemisphere: refining the scope of impairment. Laterality 2006;11:195–225
35. Mitchell R, Crow T. Right hemisphere language functions and schizophrenia: the forgotten hemisphere. Brain 2005;128:963–978
36. Tényi T, Herold R, Szili I, Trixler M. Schizophrenics show a failure in the decoding of violations of conversational implicatures. Psychopathology 2002;35:25–27
37. Corcoran K, Frith C. Conversational conduct and the symptoms of schizophrenia. Cognit Neuropsychiatry 1996;1:305–318
38. Meilijson S, Kasher A, Elizur A. Language performance in chronic schizophrenia: a pragmatic approach. J Speech Lang Hear Res 2004;47:695–713
39. Prutting C, Kirchner D. A clinical appraisal of the pragmatic aspects of language. J Speech Hear Disord 1987;52:105–119
40. Docherty N, Cohen A, Nienow T, Dinzeo T, Dangelmaier R. Stability of formal thought disorder and referential communication disturbances in schizophrenia. J Abnorm Psychol 2003; 112:469–475
41. Bazin N, Perruchet P, Hardy-Bayle M, Feline A. Context-dependent information processing in patients with schizophrenia. Schizophr Res 2000; 45:93–101

42. Sitnikova T, Salisbury D, Kuperberg G, Holcomb P. Electrophysiological insights into language processing in schizophrenia. Psychophysiology 2002;39:851–860
43. Linscott R. Thought disorder, pragmatic language impairment, and generalized cognitive decline in schizophrenia. Schizophr Res 2005;75:225–232
44. Hays S, Niven B, Godfrey H, Linscott R. Clinical assessment of pragmatic language impairment: a generalizability study of older people with Alzheimer's disease. Aphasiology 2004;18:693–714
45. Linscott R. The profile of functional impairment in communication (PFIC): a measure of communication impairment for clinical use. Brain Inj 1996; 10:397–412
46. Brüne M, Bodenstein L. Proverb comprehension reconsidered—'theory of mind' and the pragmatic use of language in schizophrenia. Schizophr Res 2005;75:233–239
47. Bibby H, McDonald S. Theory of mind after traumatic brain injury. Neuropsychologia 2005;43: 99–114
48. Ferstl E, Guthke T, von Cramon D. Text comprehension after brain injury: left prefrontal lesions affect inference processes. Neuropsychology 2002;16:292–308
49. McDonald S. Communication disorders following closed head injury: new approaches to assessment and rehabilitation. Brain Inj 1992;6:293–298
50. Coelho C, Youse K, Le K. Conversational discourse in closed-head-injured and non- brain-injured adults. Aphasiology 2002;16:659–672
51. Togher L, Hand L. Use of politeness markers with different communication partners: an investigation of five subjects with traumatic brain injury. Aphasiology 1998;12:755–770
52. Chapman S, Ulatowska H, King K, Johnson J, McIntire D. Discourse in early Alzheimer's disease versus normal advanced aging. Am J Speech Lang Pathol 1995;4:124–129
53. Cherney L, Canter G. Informational content in the discourse of patients with probable Alzheimer's disease and patients with right brain damage. Clin Aphasiol 1992;21:123–134
54. Carlomagno S, Santoro A, Menditti A, Pandolfi M, Marini A. Referential communication in Alzheimer's type dementia. Cortex 2005;41:520–534
55. McNamara P, Durso R. Pragmatic communication skills in patients with Parkinson's disease. Brain Lang 2003;84:414–423
56. Monetta L, Pell M. Effects of verbal working memory deficits on metaphor comprehension in patients with Parkinson's disease. Brain Lang 2007; In press
57. Royal College of Speech and Language Therapists. Clinical Guidelines. Bicester, Oxfordshire, UK: Speechmark Publishing; 2005
58. Cummings L. Pragmatics: A Multidisciplinary Perspective. Edinburgh: Edinburgh University Press; 2005
59. Sperber D, Wilson D.Relevance: Communication and CognitionOxford: Blackwell; 1995
60. Bara B. Cognitive Pragmatics. Cambridge, MA: MIT Press; 2005
61. Hebert L, Scherr P, Bienias J, Bennett D, Evans D. Alzheimer disease in the US population: prevalence estimates using the 2000 census. Arch Neurol 2003;60:1119–1122