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Review Article

Understanding Right-Hemisphere Language Disorders Through a Half-Century of Research: A Systematic Review

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ABSTRACT

Purpose: Language deficits affecting multiple domains (e.g., semantics, pragmatics) have been reported after right-hemisphere (RH) stroke. The goal of the current study was to summarize the existing knowledge within the apragmatism framework.
Method: A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)–guided systematic review of 55 years of research was conducted. Data were extracted to describe study characteristics, along with linguistic and extralinguistic apragmatism components.
Results: After content and quality reviews, 233 articles were included. Data were reported for over 4,300 participants with RH stroke. Methodological weaknesses included poor participant descriptions and use of experimental versus standardized/published assessments. Linguistic comprehension deficits were apparent at the word, sentence, and discourse levels, primarily in figurative language, inferencing, use of context, and humor. Linguistic production deficits at all three levels occurred particularly with less-structured elicitation tasks. Specifically for discourse, deficits affected coherence, cohesion, intended meaning, and emotional processing. Extralinguistic deficits consistently affected comprehension and production of facial expression; few studies examined other nonverbal communication cues.
Conclusions: Language deficits at the word, sentence, and discourse levels can occur after RH stroke: Linguistic and extralinguistic apragmatism predominantly affect figurative language, inferencing, emotion, and intended meaning. Weaknesses in research methodology impede clear understanding of the language challenges experienced by this population.

The notion that the right hemisphere (RH) contributes to communication, particularly to language, arose in the 1960–1970s. Papers published during the initial decades describe deficits associated with RH damage (RHD) in comprehension and production of emotion (Critchley, 1991; Eisenson, 1962) as well as comprehension and appreciation of humor, figurative language, and denotative meaning (Wapner et al., 1981). The research in the following decades broadened in terms of the scope of language processes examined, extending to production as well as comprehension (Mackenzie et al., 1997, 1999; Myers & Brookshire, 1994; Wapner et al., 1981) and exploring inferences (Lehman-Blake & Tompkins, 2001; Van Lancker Sidtis & Postman, 2006), syntax (Schneiderman & Saddy, 1988), use of

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contextual cues (Balaban et al., 2016; Blake & Lesniewicz, 2005; Brownell et al., 1992, 1997), question use (Minga et al., 2020; Minga, Fromm, et al., 2022), and micro- versus macrostructure components of narratives (Marini et al., 2005; Stockbridge, Berube, et al., 2021). Researchers also delved deeper into the nuances of both preserved and impaired components of language processing to develop theories of underlying deficits that broadly impact discourse comprehension (Beeman, 1998; Tompkins et al., 2000). A key theme that emerged from the research is that RHD commonly affects pragmatic or contextually appropriate aspects of language (e.g., avoiding professional jargon when talking with someone unfamiliar with your profession; smiling at a happy statement spoken by your friend; Joanette & Ansaldo, 1999; Myers, 2001). Such deficits are not merely of intellectual interest; work by Hewetson et al. (2017, 2021) illuminated the negative impacts of cognitive-communication disorders associated with RHD on participation-level social and vocational outcomes as well as interpersonal relationships and social networks.

Recently, the label *apragmatism* was proposed for the language disorders associated with RHD (Minga et al., 2023). This label highlights the pragmatic nature of RHD communication disorders. It includes linguistic, paralinguistic, and extralinguistic components of context-dependent communication that encompass the deficits that have been clinically observed and reported in the literature.

The linguistic component includes selection of words and syntactic structures and the organization of sentences that best convey a speaker's intended meaning and are appropriate for a given communicative context or exchange. On the comprehension side, it involves interpreting a speaker's words, sentences, and structures in relation to the broader context to apprehend the intended meaning. Deficits in the linguistic production component are apparent in disorganized narratives; paucity or verbosity of expression; the use of fewer or less-intense emotional words; fewer metaphors, idioms, and other nonliteral language; or ambiguous pronouns or referents. Linguistic comprehension deficits include misinterpretations of nonliteral language and difficulties with inference generation or integration of contextual cues typically used to correctly interpret the intended, contextually appropriate meaning.

The paralinguistic component involves the use and interpretation of prosody—emotional, grammatical, and pragmatic. Deficits include expressive aprosodia (the reduction of prosodic manipulation to convey intended meaning and emotion) and receptive aprosodia (difficulties in understanding or interpreting prosody to determine intended meaning and emotional state).

Finally, the extralinguistic component includes nonverbal communication such as facial expression, gestures, body language, and eye contact that are appropriate to the communicative context and aid in conveying intent. Deficits of extralinguistic production include reduced use of any form of nonverbal communication. A person with extralinguistic comprehension impairments may not recognize the meaning of facial expressions, body language, or gestures, or may not be able to effectively integrate nonverbal cues with the linguistic and paralinguistic messages to understand what the speaker is trying to convey.

The definition and structure of the apragmatism label aid in conceptualizing and understanding the communicative strengths and weaknesses associated with RH stroke. It will be used as the organizing principle for the current systematic review.

Current Project

Despite over 50 years of research, RH contributions to language have been underestimated and often ignored both in research and clinical practice (Minga et al., 2024; Ramsey & Blake, 2020). The purpose of this systematic review was to determine what we currently know about RH language deficits. This knowledge will verify what we think we know (e.g., RHD primarily affects nonliteral language and discourse-level communication) and aid in determining what we still need to know to guide and inform future research and clinical practice. The scope of the project (55 years) was selected to begin in the 1970s, when interest in language contributions of the RH expanded to more than an occasional paper (Joanette et al., 1990).

The organizing structure of apragmatism is used. Since this writing group (the Right Hemisphere Brain Damage Writing Group of the Academy of Neurologic Communication Disorders and Sciences' Evidence-Based Clinical Research Committee [ANCDS RHDWG]) previously explored the paralinguistic component of apragmatism (Durfee et al., 2021; Sheppard et al., 2021; Stockbridge, Sheppard, et al., 2021; Ukaegbe et al., 2022), the current project will focus on linguistic and extralinguistic components.

This report describes broad results and conclusions from the review. Future work will analyze specific areas or questions (e.g., neglect dyslexia, task demands, characteristics of stimuli, assessment tools) to deepen our understanding of apragmatic language disorders.

Method

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)–guided (Page et al., 2021) systematic review was conducted, and a qualitative synthesis was completed. Because of substantial variability in the

measures used across studies, a meta-analysis was not feasible. The systematic review was preregistered with Prospero in 2021.

The initial search examined research published in English between 1970 and June 2022 (see Figure 1). The search was intentionally broad to identify articles on language, pragmatics, and/or cognitive-communication disorders and involved 15 databases (see Table 1). Updating searches were conducted in August 2024 (to capture articles published between July 2022 and July 2024) and August 2025 (August 2024 to July 2025). For the updating searches, the same original search terms were used; however, following the advice of the consulting research librarian, only the five databases with the highest number of hits in the original search were used (identified in Table 1). Hand searches of the authors' article databases and reference lists of recently published chapters and review papers (Cornwell et al., 2023; Hewetson & Cornwell, 2023; Johnson & Preston, 2023; Verhoeks et al., 2024; Weed, 2008) were also conducted.

All items were added to the Zotero citation management tool, and duplicates were removed. Two members of the group reviewed study titles to remove articles that were clearly not about acquired disorders in adults (e.g., papers about autism, developmental disorders, or typical human cognition) or that were not peer-reviewed experimental studies (e.g., book chapters, unpublished dissertations). The remaining articles were input into the Rayyan systematic review management platform for blind reviews.

For the abstract and full-text review stages, inclusion criteria included experimental studies with previously unpublished data on language abilities in adults with RH stroke. Etiology was limited to strokes to reduce confounds of diffuse injury or cortical reorganization possible with etiologies such as traumatic brain injury or tumors. In addition to papers clearly focusing on language, others were included if (a) data on language were reported (e.g., in participant descriptions) even if the focus of the study was not RHD language; (b) they were written in English but reported on other languages, including sign languages; (c) they described experiments with a control group without brain injury or standardized measures of language were used; and (d) they were review papers with new data. Exclusion criteria were papers that (a) were not peer reviewed, (b) reported no new data (e.g., metanalyses), (c) did not include stroke as the primary etiology (defined as over 50% of participants with RHD), (d) did not have data for RHD participants that could be isolated, (e) focused on crossed aphasia, (f) included data only for the paralinguistic (prosody) component of apragmatism, or (g) did not report language data.

During the abstract and full-text review process, two group members independently reviewed each record. In

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart.

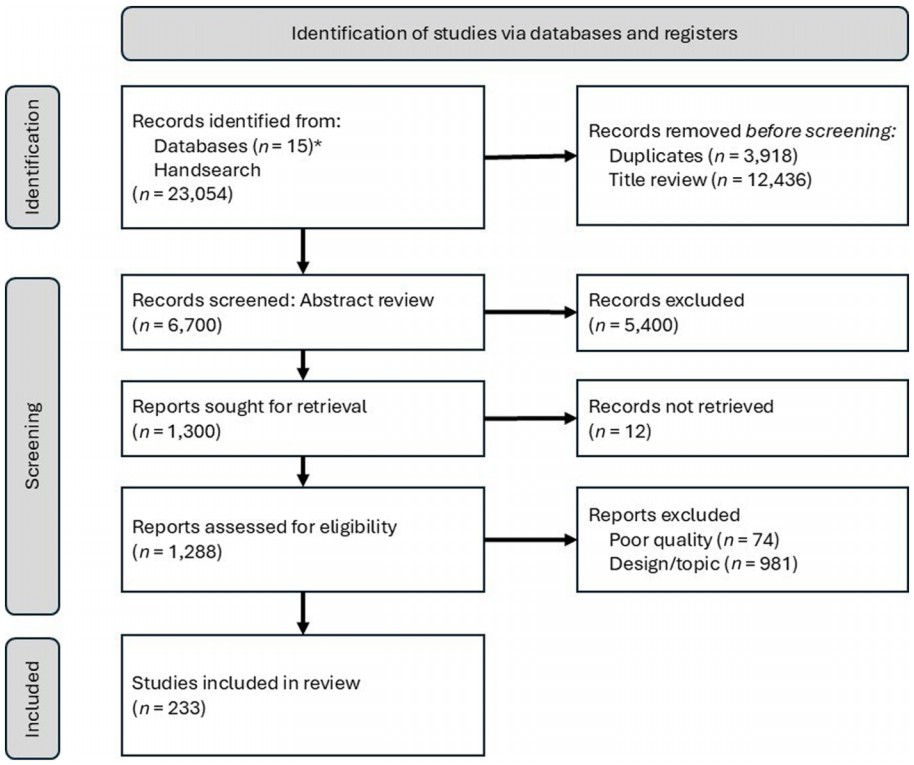


Table 1. Search strategy.

Databases	No. of items retrieved
Centre for Reviews and Dissemination Databases	168
OT Seeker	24
Neurorehab and speechBITE	270
Trip medical database	1,021
ClinicalTrials	30
CINAHL (EBSCO)[a]	1,978
Communication & Mass Media Complete (EBSCO)	218
Cochrane Library (Wiley)	120
Education Source (EBSCO)	198
Psych Info[a]	3,345
PubMed (NLM)[a]	5,715
Science Citation Index Expanded (ISI Clarivate)	327
ScienceDirect (Elsevier)[a]	2,169
Social Science Citations Index (ISI Clarivate)[a]	2,295
ComDisDome Proquest	90
Hand search	23

[a]Used in 2022–2025 updating searches.

Keyword Query

((“brain injur*” OR “cerebral injur*” OR “acquired brain injur*” OR “ABI” OR “acute brain injur*” OR “chronic brain injur*” OR “RHD” OR “right hemisphere injur*” OR “right brain damage” OR “RBD” OR “right brain injur*” OR “RBI” OR “right hemisphere brain damage” OR “right hemisphere brain injur*” OR “right hemispheric brain injur*”)

AND

(“cognition disorder*” OR “cognition dysfunction*” OR “cognition disabilit*” OR “cognition problem*” OR “cognition impairment*” OR “cognitive disorder*” OR “cognitive dysfunction*” OR “cognitive disabilit*” OR “cognitive problem*” OR “cognitive impairment*” OR “cognitive communication disorder*” OR “cognitive communication disabilit*” OR “cognitive communication impairment*”)

OR

(“communication disorder*” OR “communication dysfunction*” OR “communication disabilit*” OR “communication problem*” OR “communication impairment*” OR “communicative disorder*” OR “communicative dysfunction*” OR “communicative disabilit*” OR “communicative problem*” OR “communicative impairment*” OR “acquired communication disorder*” OR “acquired communication disabilit*”)

OR

(“language disorder*” OR “language dysfunction*” OR “language disabilit*” OR “language problem*” OR “language impairment*” OR “acquired language disorder*” OR “acquired language disabilit*” OR “acquired language impairment*”)

OR

(“social communication disorder*” OR “social communication disabilit*” OR “social communication deficit*” OR “social communication problem*” OR “social communication impairment*” OR “social (pragmatic) communication disorder*” OR “semantic-pragmatic disorder” OR “pragmatic language impairment*”OR “pragmatic communication disorder*” OR “pragmatic communication deficit*” OR “pragmatic language disorder*” OR “pragmatic language deficit*” OR “pragmatic language problem*” OR “pragmatic disorder*” OR “pragmatic dysfunction*” OR “pragmatic deficit*” OR “pragmatic problem*” OR “pragmatic impairment*” OR “pragmatics”))

cases of a disagreement between the two reviewers, a third group member independently reviewed the record, and the majority decision (include/exclude) was acted upon.

Following full-text screening, evaluation of methodological quality was completed on the remaining eligible articles using the Standard Quality Assessment Criteria (Kmet et al., 2004). Again, each paper was independently appraised by two group members. Based on data for robustness of plausible cut-points from the manual, a liberal cutoff of 55% out of the total possible quality points was used for including articles (i.e., articles with total quality points below this cutoff were excluded) to maximize inclusion. Discrepancies that impacted inclusion/exclusion decisions (e.g., one rater scored above the cutoff and the other rater below) were resolved by discussion between the two raters.

Data were extracted separately for production and comprehension. For the linguistic domain, these were further divided into word, sentence, and discourse levels. For the extralinguistic domain, data were separated into forms of nonverbal communication such as facial expression, gestures, and body language. Data that spanned multiple levels or forms (e.g., composite scores on a language battery or broad communication assessment, or an overall score that included two or more nonverbal cues) were put into separate “other” categories. For each paper included, one member of the group extracted demographic, clinical, methodological, and

results data, and a second member reviewed the extracted data. Discrepancies were resolved through discussion, including a review from a third group member when necessary.

In the following report, the term *article* or *paper* is used to refer to a single publication. The terms *studies*, *experiments*, or *dependent variables* (DVs) are used when there were multiple studies reported within a single article (e.g., when data were obtained from multiple tasks [e.g., phonemic and semantic verbal fluency tasks] or when multiple DVs were measured from a single task [e.g., word count, cohesion, and interpretive concepts from a single picture description task]). To illustrate the findings, instead of listing all relevant articles, a select number of representative articles are cited. The table in the Appendix includes all 233 included articles and the domain and area of language to which they contributed data.

Results

Search Results

Over 19,000 unduplicated papers were identified. As shown in the PRISMA flowchart (see Figure 1), approximately half of the papers were excluded after title review, and an additional 5,400 were excluded after abstract review. Twelve records could not be retrieved. Full-article review resulted in the removal of 981 of 1,288 articles. Articles excluded at this stage did not include a non–brain-damaged (NBD) control group, did not have enough language/pragmatic data to meaningfully contribute to our purpose (e.g., reported only that the RHD group was nonaphasic based on clinical assessment), or the only language data were paralinguistic (prosody) or crossed aphasia. An additional 74 did not meet the quality appraisal cutoff score criterion. The remaining 233 papers are the source of the results reported here. A list of all included papers and their quality appraisal score is in the Appendix.

Study Characteristics

Methodological quality was generally adequate. While we included all articles that earned at least 55% of possible quality points, 172 (74%) earned at least 70% of possible quality points (see the Appendix). Quality progressively improved over time, with 65% of studies from the 1970s excluded and less than 10% excluded from the 2010 and 2020s. The timeline of publications (see Figure 2) indicates a rapid rise in the number of articles in the mid-1980s, peaking in the first decade of the 21st century with 76 papers published between 2000 and 2009. Publications have declined in the 15 years since.

Examining the type of study, 94% of the articles (n = 218) included a group experimental design. Five were single-case studies, and another six were classified as "other." Altogether, there were only three treatment studies[1] (1.3%): one each group, case series, and single-case treatments.

For the majority of articles, the purpose was to examine language in adults with RHD (n = 190, 82%). Other purposes covered aspects of cognition, including social cognition (n = 18, 7.7%), and unilateral neglect, including neglect dyslexia and dysgraphia (n = 4, 1.7%). Six articles (3.0%) were studies of aphasia with an RHD comparison group. The remaining 14 articles (6.0%) did not fall into any of the aforementioned categories.

Most articles (n = 220, 94%) included group results; of these, 54 (23%) also reported individual patterns of performance. The remaining 5.6% of the articles reported only individual participant results.

Participant Characteristics

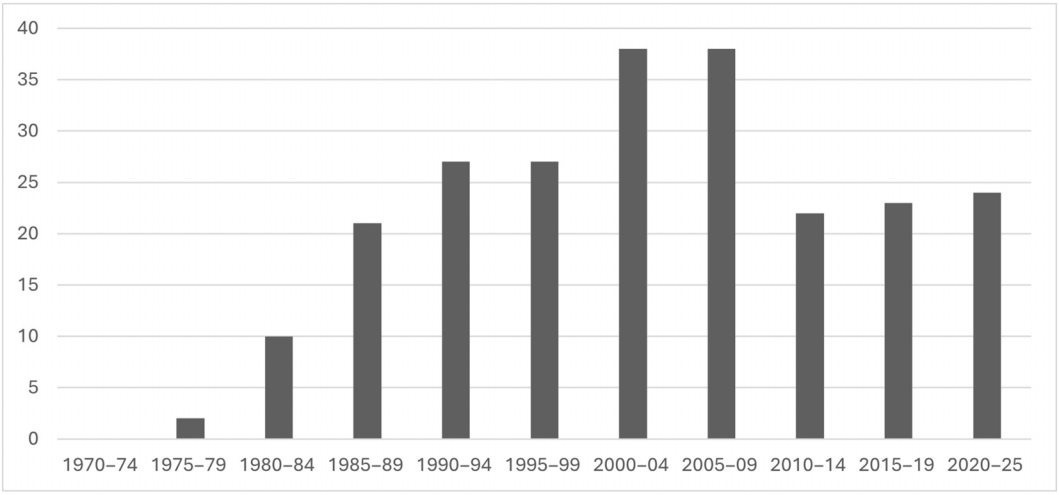
Across the 233 articles, 4,319 RHD participants were represented. The average sample size was 18.5 (SD = 15.7), ranging from one to 109, with a median of 15. Nine studies included data from two RHD groups (e.g., Fannin et al., 2023; Lecours et al., 1988; Oliveira et al., 2015) or from the same group at two or more time points (Brady et al., 2003, 2005). In some of these studies, one or more demographic variables (sex, age, or education) were reported separately for the two groups; thus, the participant data reported below represent the number of groups reported, not the number of papers. One study (Coelho Mosch et al., 2005) included a group of children with RHD; that group was excluded from these and all other analyses. Sex of participants was reported in 199 groups (85%); overall, 41% of participants were female.

Age for RHD groups was reported in 95% of studies as either means or ranges. In the remaining 5%, some reported overall means for combined groups (e.g., left-hemisphere damage [LHD] and RHD; Bryan, 1988; Bryan & Hale, 2001; Tompkins, Fassbinder, et al., 2008), some reported a minimum age only (e.g., all participants were less than 65 years; Brownell, 1983), while others did not report any age data (Gardner et al., 1978; Grossman & Habermann, 1987). The average of the reported group means was 62.0 years (range: 19–91 years).

Education levels were reported for 84% of groups (195 of 233). The average of the mean group education levels was 11.9 years (range: 0–23 years), calculated from 170 out of 233 (73%) means reported.

[1]An additional five treatment studies were excluded from analyses because there was no NBD control group or standardized language assessment. Including these five, the total number of language treatment studies since 1970 identified in this review is fewer than 10.

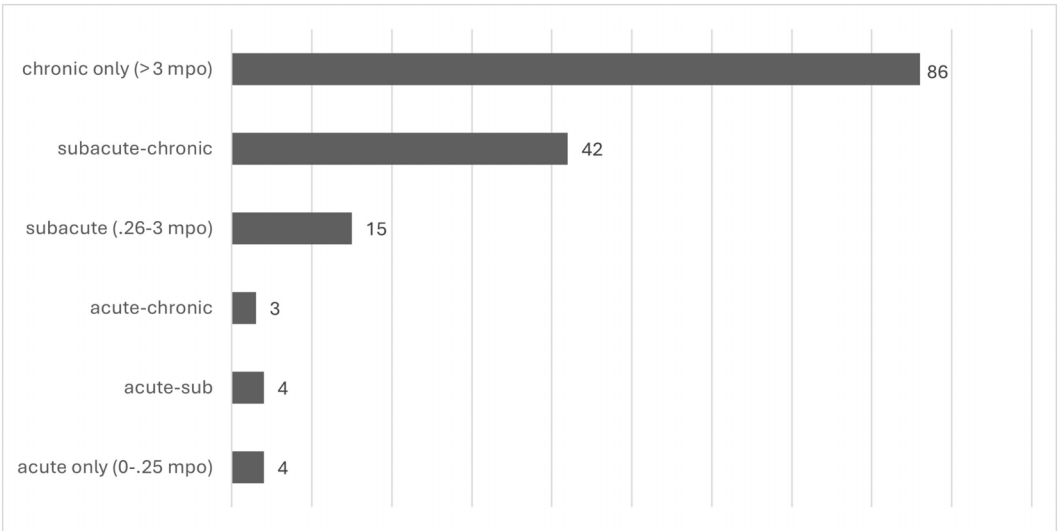
Figure 2. Number of publications over 5-year periods from 1970 to 2025.



Participants' language background was specified in only 20% (46 of 233) of articles. Of those, 37 of 46 (80%) reported that participants were monolingual and the remaining 20% were bilingual. Across all articles, experimental tasks were presented in 23 different languages (either specifically stated or confidently assumed based on the country in which the study was conducted; language could not be reliably assumed in 4.7%). The most represented language was English (61%), followed by French (6.0%), Portuguese (Brazilian and European combined 6.0%), Italian (5.6%), German (3.4%), and Hebrew (2.6%). All others made up less than 2% of studies.

Time since stroke was reported in 202 of 233 articles (87%). A variety of metrics were used including days, weeks, months, and years poststroke. Some reported only the minimum time for their participants (e.g., minimum of 6 months poststroke; Bates et al., 2001; Lecours et al., 1987; Ries et al., 2014). Six articles reported multiple time postonset data. Three of these compared different groups of participants (Bryan, 1988; Hickok et al., 1999; Oliveira et al., 2015), while the other three tested the same group longitudinally (Brady et al., 2003, 2005; MacKenzie et al., 2001). Means were reported for 148 of 242 participant groups (61%). The range of means was 0.27–131 months, with an average of 26.1 (SD = 28.24). Stroke chronicity could be computed for 152 groups and was categorized into acute (< 1 week), subacute (1 week to 3 months), or chronic (> 3 months; Durfee et al., 2021). As seen in Figure 3, over

Figure 3. Range of chronicity (months postonset [mpo]) across 154 reported RHD groups. RHD = right-hemisphere damage.



half of the participant groups (56%) were in the chronic phase of stroke recovery. Most studies included only participants who were more than 3 months poststroke, while three longitudinal studies spanned acute through chronic time frames (Cavalli et al., 1981; Cherney & Halper, 1994; Cherney et al., 2001).

As seen in Figure 4, the most commonly reported participant clinical characteristics were hearing (31%) and vision (27%), followed by hemiparesis (19%) and visual field cuts (14%). Reporting of additional characteristics was limited. Only 54% of articles (125 of 233) reported a screening or evaluation of language (including morphology, phonology, pragmatics, semantics, or syntax) in addition to the experimental tasks. When only a single area of language was assessed, semantics was the most commonly reported (n = 23); in three studies, only pragmatics was reported (Diggs & Basili, 1987; Leonard et al., 2001; Pell, 2006), and in two articles, only phonology was reported (Amorapanth et al., 2012; Tompkins, 1990). The remaining 97 studies assessed multiple language areas. Whether or not participants were receiving or had received speech-language therapy was reported in only 5.6% of articles (n = 13).

Linguistic Apragmatism

Results specific to the linguistic component were extracted separately for comprehension and production across three levels: word, sentence, and discourse levels. To provide a benchmark for interpreting results, only articles that compared performances of the RHD participants to those of an NBD control group or employed standardized cutoff scores were included. Data from LHD or other clinical population comparison groups (e.g., schizophrenia) were not extracted.

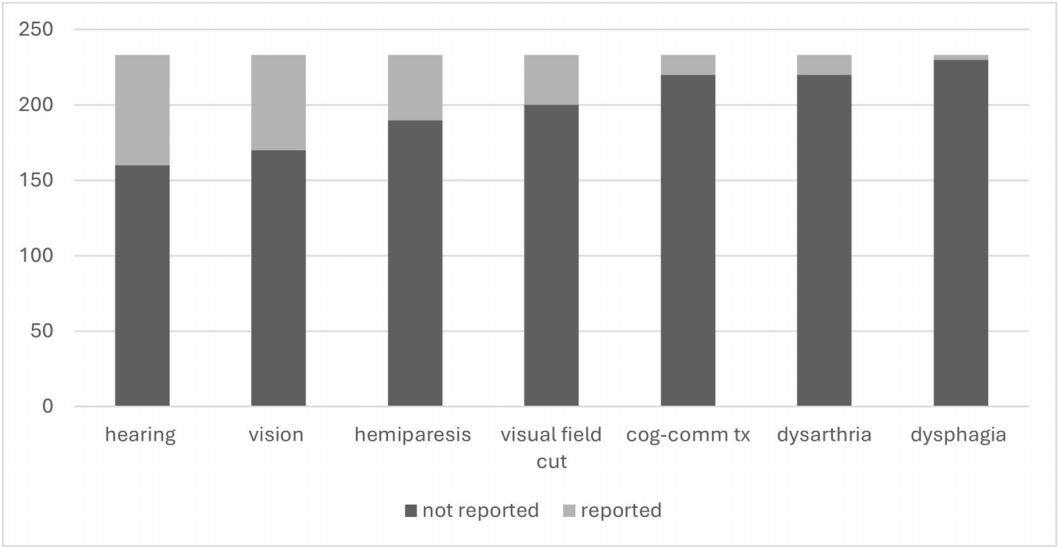
Word Comprehension

There were 52 articles that evaluated word comprehension abilities reporting a total of 69 measures/DVs. Deficits among RHD participants were identified in 62% of the articles (32 of 52) and for 61% (42 of 69) of the word comprehension DVs. Group data and statistics were reported in the vast majority of studies; only six articles (reporting on seven DVs) specified the number of RHD participants who displayed impairments. In these six articles, 12%–44% of the RHD sample displayed impairments (e.g., MacKenzie et al., 2001).

The majority of word comprehension tasks were from commercially available or standardized tests (n = 31), with 12 studies using a version of the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1997), 11 using aphasia battery subtests, six using RHD battery subtests, one using a cognitive–linguistic screening test, and one using a subtest from a neuropsychological battery. Experimental tasks (n = 27) were also used to examine word comprehension abilities. Overall, there were three types of word comprehension tasks:

1. Tasks assessing understanding of a word's literal meaning. When an aphasia battery subtest or cognitive–linguistic screening test was used, no significant differences between RHD and NBD groups were identified; in contrast, significant group differences (with RHD group performing more poorly) were identified in 33% (four of 12) of the studies using the PPVT (e.g., Tompkins, Fassbinder, et al., 2008), two of three studies

Figure 4. Number of articles that reported clinical characteristics of RHD participant groups. RHD = right-hemisphere damage.



using an RHD battery subtest (e.g., Bryan & Hale, 2001), and six of eight studies using an experimental measure (e.g., Amorapanth et al., 2012).

2. Tasks assessing understanding of the figurative or less frequent meaning of a word. All five studies (e.g., Brownell et al., 1990) using this type of task reported significantly poorer RHD versus NBD group performance.

3. Tasks requiring identifying semantically similar words. Across the 21 studies using this type of task, 12 (57%) reported RHD deficits (e.g., Barker et al., 2017).

Sentence Comprehension

There were 57 unique articles that included 130 experiments or DVs related to sentence comprehension. Overall, deficits were reported in 55% (71 of 130) of experiments/DVs. Of the commercially available or standardized assessments, 22 of 70 were from RHD batteries (the Right Hemisphere Language Battery [RHLB; Bryan, 1994] and versions of the Montreal Evaluation of Communication [MEC; Joanette et al., 2015]), 11 were from aphasia tests, and 19 used a token test. The largest single category of assessments was experimental tasks (60 of 130). Deficits were reported less often on subtests of aphasia batteries (18%) and token tests (32%) than other assessments (range: 65%–100%). Performance of individual participants was reported for only 39% of experiments/DVs (44 of 130). Within those, the proportion of participants with impaired performance ranged from 0%–100% for figurative language, 0%–79% for general comprehension, and 0%–12.5% for token test commands.

A summary of performance across specific sentence types or target interpretations is shown in Table 2. Of the 33 experiments that examined figurative language at the sentence level, 26 (79%) reported deficits in the RHD group. Inference generation and use of context were impaired in 75% of the six studies that examined them, and imagery was impaired in all three studies analyzed. Deficits were less often reported for emotional interpretation and commands.

Two task categories had equivocal results. Overall, semantic processing deficits were reported in 20 of 47 (45%) experiments representing a variety of tasks (questions or speech act interpretation, sentence comprehension not otherwise specified). No one of these tasks was systematically spared or impaired. Syntactic processing deficits were reported in 55% of the 11 studies that examined syntax.

Discourse Comprehension

Discourse comprehension was examined in 74 articles. Of those, 65 studies (88%) compared RHD participants with NBD controls, either through direct statistical comparison (n = 57) or normative data (n = 8), encompassing 159 distinct DVs or experiments.

Assessment methods varied across studies, with half utilizing commercially available or standardized assessments. The Discourse Comprehension Test (Brookshire & Nicholas, 1983) was most frequently employed (n = 12), followed by the RHLB (Bryan, 1994) and MEC (Joanette et al., 2015; n = 3 each). Of those studies that employed experimental tasks, most used direct questioning methods (closed- or open-ended questions) or structured multiple-choice tasks that focused on pragmatics and inferential abilities.

Narrative discourse was the most commonly assessed genre (34 of 65, 52%). Conversation, humor, speech acts, and theory-of-mind stories were also employed. Most experiments (102 of 159, 64%) reported differences in performance between RHD groups and controls. No significant group differences were found in the remaining 36% of experiments. Only 15 articles (reporting on 27 DVs) specified the number of RHD participants who displayed impairments in comparison with normative data of standardized tests (average = 43% [0%–100%] of participants per study).

Table 2. Summary of sentence comprehension results comparing right-hemisphere brain-damaged (RHD) and non–brain-damaged (NBD) groups.

Sentence comprehension task	No RHD deficits[a]	RHD deficits[b]	Total *n* (%) dependent variables
Semantics (questions, speech acts, not specified)	24 (55%)	20 (45%)	44 (34%)
Figurative language (idiom, metaphor, proverb)	7 (21%)	26 (79%)	33 (25%)
Commands	22 (82%)	5 (18%)	27 (21%)
Syntactic processing	5 (45%)	6 (55%)	11 (8%)
Inferencing and use of context	2 (25%)	6 (75%)	8 (6%)
Emotional interpretation	3 (75%)	1 (25%)	4 (3%)
Imagery	0	3 (100%)	3 (2%)
Grand total	63 (47%)	67 (53%)	130 (100%)

Note. Percentages are based on the number of studies assessing a specific sentence type or form.

[a]RHD group performance nonsignificantly different from comparison group or standardized cutoffs. [b]RHD group performance significantly lower than comparison group or standardized cutoffs.

As shown in Table 3, impairments in understanding nonliteral language, including humor interpretation and selection of punchlines, were most prevalent (11 of 15, 73%). Inferencing and context use, such as appreciating characters' beliefs in theory-of-mind scenarios and understanding pragmatic or logical inferences, were impaired in 69% (49 of 71) of experiments. Similarly, 69% (11 of 16) of studies reporting on both explicit and implicit comprehension found significant impairments in RHD groups.

When semantic processing was evaluated within discourse contexts, RHD groups demonstrated atypical performance patterns, with 11 of 18 (61%) reporting lower performance overall, particularly in pronoun comprehension. One article (Brownell et al., 1992) stood out as reporting the only experiments (n = 2) in which RHD group performance exceeded that of controls, making greater use of anaphoric pronouns' presence or absence in their interpretations. For two categories, the results were split: On tasks assessing emotional comprehension, deficits were reported for six of 11 (55%; Ostrove et al., 1990; Tompkins & Flowers, 1987). On explicit comprehension tasks such as story sequencing or micro–macrostructure retelling without inference, deficits were present in 11 of 24 (46%; Blake, 2009a; McDonald, 2000; Silagi et al., 2018; Tompkins et al., 2004).

Word Production

Word production was examined in 38 articles, 47% (18 of 38) of which reported significant group differences in RHD versus NBD controls or test cutoffs. The most common tasks were confrontation naming and divergent naming.

Most of the 22 studies examining single-word confrontation naming evaluated noun retrieval using picture stimuli from published assessments. The most frequently used were the Boston Naming Test (Kaplan et al., 1983; n = 5) and single-word naming subtests from aphasia batteries such as the Western Aphasia Battery (WAB; Kertesz, 1982), the Boston Diagnostic Aphasia Examination (BDAE; Kaplan et al., 1983), and the Comprehensive Aphasia Test (Swinburn et al., 2004). Statistically significant group differences, with poorer performance by the RHD group, were reported in five of 22 articles (23%). Production of verbs, antonyms, category naming, inflectional morphology (e.g. possessive pronouns and singular–plural), derivational morphology (e.g., turning a noun into a verb), and responsive naming or naming to description/definition were less frequently explored (n = 9). One article (Krishnan et al., 2015) reported a statistically significant between-groups difference across nouns, verbs, and antonyms, but not category naming nor naming to definition. The absence of a between-groups difference in responsive naming was similarly reported by Martzoukou et al. (2025). The reported ability to produce verbs in response to picture stimuli varied across papers. In a study by Phillips et al. (2025), 14% of RHD participants scored below the 5th percentile on verb naming, compared to 1.7% of NBD participants. One article reported a statistically significant

Table 3. Summary of discourse comprehension results comparing right-hemisphere brain-damaged (RHD and non–brain-damaged (NBD) groups organized by area of language measured.

Measure category	Measure examples	No RHD deficits[a]	RHD deficits[b]	Total *n* (%) dependent variables
Inferencing and context use	Accuracy in theory of mind, pragmatic inference, implied meanings, Gricean maxims, sarcasm recognition	22 (31%)	49 (69%)	71 (45%)
Explicit comprehension	Quantity and quality of factual story recall or script elements, accuracy in story sequencing	13 (54%)	11 (46%)	24 (15%)
Semantics[c]	Accuracy in pronoun, speech acts interpretation, word recognition	5 (28%)	11 (61%)	18 (11%)
Mixed explicit/implicit	Combined measures of quantity of main ideas and details, both explicit and implied	5 (31%)	11 (69%)	16 (10%)
Figurative language	Accuracy in metaphors, humor interpretation, or selection of punchlines	4 (27%)	11 (73%)	15 (9%)
Emotional interpretation	Accuracy in emotion or mood interpretation	5 (45%)	6 (55%)	11 (7%)
General measures	Written discourse reading time, observation of spontaneous behaviors	1 (25%)	3 (75%)	4 (3%)
Grand total		55 (34%)	102 (65%)	159 (100%)

[a]RHD group performance nonsignificantly different from comparison group or standardized cutoffs. [b]RHD group performance significantly lower than comparison group or standardized cutoffs. [c]Two experiments (11%) reported that RHD participants performed better than the NBD control group (Brownell et al., 1992).

between-groups difference with the RHD group scoring lower than NBD controls (Krishnan et al., 2015), while Pagliarin et al. (2015) found a nonsignificant group difference in verb naming. In the Greek language, RHD participants performed significantly worse than NBD controls on inflectional morphology tasks, with comparable performance on derivational morphology (Martzoukou et al., 2025).

Divergent naming was assessed with verbal fluency tasks including semantic constraint (n = 15), orthographic/phonemic constraint (n = 15), and without constraint (n = 7). Both standardized/published and experimental tasks were used. Task criteria varied in terms of the time provided to retrieve words (e.g., 1 vs. 2.5 min) and the constraint used for semantic verbal fluency (e.g. animals, clothes, sport, furniture, things that roll) and phonemic/orthographic verbal fluency (words starting with F, A, S, P, L, C, etc.).

Eight of 15 studies (53%) reported a significant group difference on semantic fluency tasks, with the RHD group performing worse than NBD controls. Five studies reported individual participant results with prevalence of RHD semantic verbal fluency impairment ranging from 2.8% (Gajardo-Vidal et al., 2018) to 42.9% (Zimmermann et al., 2011) of samples.

Orthographic/phonemic fluency was assessed in 15 studies, nine of which (60%) reported significantly lower performance of RHD groups. Of the four articles that examined individual data, the proportion of RHD participants with deficits ranged from 14% (Zimmermann et al., 2011) to 25% (Marangolo & Piras, 2010) of the samples. Ten articles reported scores obtained on both orthographic and semantic verbal fluency tasks. Performance comparisons across these papers have yielded varied findings; for example, Zimmermann et al. (2014) found greater impairments in semantic constraint tasks, while Goulet et al. (1997) reported similar performance in semantic and orthographic task performance.

Performance on a divergent naming without constraint task, where participants name as many words as they can within a specified period of time, was reported in seven articles. RHD deficits were identified in four of seven (57%) of them.

Sentence Production

Across the 19 articles that evaluated sentence production, four reported two DVs while the remaining reported only one. Deficits were identified within 67% of the articles (13 of 19) and 68% (15 of 22) of the DVs. Almost all articles reported group data only, with just two articles (for two DVs) indicating the number of RHD participants who exhibited impairments: Murteira and Santos (2013) reported that 14 of 27 RHD participants displayed deficits on a sentence construction task, and Meyers et al. (2000) reported that six of 34 RHD participants displayed sentence repetition deficits.

Experimental tasks were commonly used to assess sentence production abilities, with only seven articles (39%) using a task from a commercially available or standardized test. Across articles, no version of a task or measure was used more than once, and there was substantial variation in task demands and DVs (e.g., copying a written sentence vs. generating a response of a cartoon character). Accordingly, identifying performance patterns was challenging. Nonetheless, all four studies that used an anagram task (i.e., reordering words to form a grammatical sentence) reported that the RHD group performed significantly more poorly than the NBD group. Likewise, all four studies that required participants to produce a sentence in response to a scenario found significant RHD deficits compared to NBD groups. Other types of measures on which the sentence production abilities of the RHD group were found to be significantly impaired in at least one experiment included sentence repetition or dictation (two of four), written sentence production (one of one spontaneous, one of one copying), asking questions about an unfamiliar object (one of one), and creating a sentence when given some target words (one of three).

Discourse Production

There were 58 studies reporting on 226 DVs that compared RHD participants with NBD controls, either through direct statistical comparison (n = 193) or normative data (n = 33 DVs). Discourse was primarily elicited through structured tasks, particularly picture or picture sequence description and story retelling/recalling tasks (n = 81). Forty-seven used semi-structured interviews or conversational contexts. Experimental tasks predominated, comprising 161 of 226 (73%). In the 67 experiments that employed commercially available or standardized assessments, the Cookie Theft picture was most frequently used (22 of 67, 33%), followed by Cinderella story retelling (11 of 67, 16%) and a mix of narrative, descriptive, and procedural tasks (10 of 67, 15%).

RHD deficits were reported in 135 of 226 experiments (see Table 4). Narrative discourse was the genre most studied (74 of 226, 33%), followed by descriptive discourse (63 of 212, 28%), with more naturalistic contexts such as conversational (34 of 236, 15%) and autobiographical (27 of 226, 12%) discourse appearing less frequently. Whereas performance deficits were reported in most genres, RHD deficits were less frequent (38%) in procedural discourse tasks. There were distinct outcomes patterns based on type of discourse task (see Table 5). RHD-related impairments were most commonly reported in story retelling (40 of 57, 70%) and picture-based descriptive production (53 of 76, 70%) followed by unstructured interaction (30 of 52, 58%). Conversely, RHD group deficits were infrequently reported for more structured production tasks such as

Table 4. Summary of discourse production results comparing right-hemisphere brain-damaged (RHD) and non–brain-damaged (NBD) groups organized by discourse genre.

Discourse genre	No RHD deficits[a]	RHD deficits[b]	Total *n* (%) dependent variables
Narrative	31 (42%)	43 (58%)	74 (33%)
Descriptive[c]	20 (32%)	43 (68%)	63 (28%)
Conversation	14 (41%)	20 (59%)	34 (15%)
Autobiographical	9 (33%)	18 (67%)	27 (12%)
Procedural	13 (62%)	8 (38%)	21 (9%)
Other (e.g., social scenario, humor, mixed)	4 (57%)	3 (43%)	7 (3%)
Grand total	91 (40%)	135 (60%)	226 (100%)

[a]RHD group performance nonsignificantly different from comparison group or standardized cutoffs. [b]RHD group performance significantly lower than comparison group or standardized cutoffs. [c]In two experiments, RHD participants scored higher than the NBD control group (Rodriguez et al., 2022).

procedure explanation or instruction production (12 of 28, 43%), and deficits were never identified when composite scores were reported (zero of 13, 0%).

Outcome measures varied widely across discourse production studies. To facilitate analysis, measures were grouped into broad conceptual categories. The most affected categories involve "higher level" language functions: Discourse coherence and cohesion impairments were reported in 18 of 22 (82%) studies, while content and informativeness were impaired in 29 of 41 (71%) experiments. Similarly, pragmatic and interactive communication skills were affected in 14 of 22 (64%) studies, and four of six (67%) reported deficits in emotion production. In contrast, quantitative discourse analysis measures (e.g., number of words, morphemes, utterances) were relatively intact: Across 41 studies, deficits were reported in only 14 (34%). Of the 12 studies that assessed grammatical measures in discursive context (e.g. sentence completeness, complex sentence types), deficits were reported in only three (25%). When linguistic error patterns (e.g., paraphasias, morphological, paragrammatic errors) were analyzed, the findings were equivocal (four of nine, 44% deficits).

Composite or Multilevel Comprehension and Production Findings

Fifty articles reported on language tasks or variables that crossed more than one language level (e.g., a composite lexical retrieval score that reflected performance on word- as well as discourse-level tasks). For comprehension, 28 articles with 38 unique experiments/DVs combined multiple levels. RHD groups demonstrated an impairment on roughly 40% (15 of 38) of the language comprehension experiments/DVs. Impairments were identified most often on comprehension tasks that focused on multiple meanings, inferencing, and/or metalinguistics (e.g., figurative language, humor, inference, theory of mind, indirect comments/requests, irony/deceit comprehension). A recent paper by Martzoukou et al. (2025) reported impaired performance on the Comprehension subtest

Table 5. Summary of discourse production results comparing right-hemisphere brain-damaged (RHD) and non–brain-damaged (NBD) groups organized by elicitation task.

Type of elicitation task	Task examples	No RHD deficits[a]	RHD deficits[b]	Total *n* (%) dependent variables
Picture based[c]	Picture description, picture sequence description, video retelling	23 (30%)	53 (70%)	76 (34%)
Auditory story	Story recall, storytelling, narrative sequencing, divergent narrative	17 (30%)	40 (70%)	57 (25%)
Spontaneous or semistructured interaction	Semistructured, structured interview, spontaneous conversation, semistructured emotional vs. nonemotional	22 (40%)	30 (58%)	52 (23%)
Structured production	Produce explanation/instruction, role-play scenario, think-out-loud	16 (57%)	12 (43%)	28 (12%)
Mixed elicitation	Composite scores: storytelling, story sequence, autobiographical	13 (100%)	0 (0%)	13 (6%)
Grand total		91 (40%)	135 (60%)	226 (100%)

[a]RHD group performance nonsignificantly different from comparison group or standardized cutoffs. [b]RHD group performance significantly lower than comparison group or standardized cutoffs. [c]In two experiments (2.7%), RHD participants scored higher than the NBD control group (Rodriguez et al., 2022).

of the Adults' Language Ability Test (Martzoukou & Nousia, 2020) compared to the NBD control group. In contrast, scores from tasks that did not introduce linguistic ambiguity or that focused on more basic language comprehension abilities (e.g., concrete vs. abstract vocabulary), such as composite scores from aphasia or neuropsychological test batteries (e.g., WAB [Kertesz, 1982], BDAE [Goodglass et al., 2001], Birmingham Cognitive Screen [Humphreys et al., 2012]), were infrequently associated with differences between RHD and NBD groups.

In terms of language production, 25 articles included a measure or DV that captured more than one level of language output. RHD impairments were identified in 52% of these articles (13 of 25). The majority of articles (19 of 25, 76%) utilized a language production composite score from an acquired language disorder test battery (e.g., WAB [Kertesz, 1982], MEC [Joanette et al., 2015]), with little overlap of test battery or composite score across these articles. Of the five articles that reported a composite score from the WAB, only one (Ross & Monnot, 2008) identified impaired RHD performance and in only two of the 21 RHD participants. Across the 25 articles, impairments were most often reported when the composite score included scores/ratings from more complex or demanding language production tasks (e.g., conversation, written discourse).

Extralinguistic Apragmatism

Forty-seven studies reported on extralinguistic (nonverbal) aspects of communication. Of these, most (n = 28, 60%) examined facial expression (see Figure 5). Summaries of results for comprehension and production are provided in Tables 6 and 7, respectively.

Facial Expression

Facial expression was examined in 28 experiments. Twenty-four assessed comprehension through either discrimination (seven of 24) or identification (17 of 24) tasks. RHD groups were impaired in all but two studies (Borod et al., 1990; Cicone et al., 1980). A variety of tasks were used; these spanned informal (e.g., black and white photographs) and formal (e.g., Benton Facial Recognition Test; A. L. Benton et al., 1983) assessments.

In the 10 studies examining facial expression production, emotional expressions were elicited through conversation, picture description, recount of a personal emotional experience, or imitation of a facial expression. Regardless of the task, all assessed expressions with rating scales (e.g., intensity, accuracy, or quantity of expression). RHD deficits were reported in 80% (eight of 10) of studies. For the remaining two studies, split results were reported by C. C. Martin et al. (1990), with the RHD group producing less positive but more negative facial expressions than the control group; the other study (Caltagirone et al., 1989) found no significant group differences.

Gesture

Of the 10 articles (18 DVs) that examined gesture comprehension and/or production, the types of tasks and measures used varied widely, limiting the ability to draw clear conclusions. For the three studies examining gesture comprehension, RHD groups performed more poorly than NBD groups regardless of the task: standardized assessment (Chakrabarty et al., 2022), responding to gesture use in videos

Figure 5. Distribution of studies of nonverbal communication.

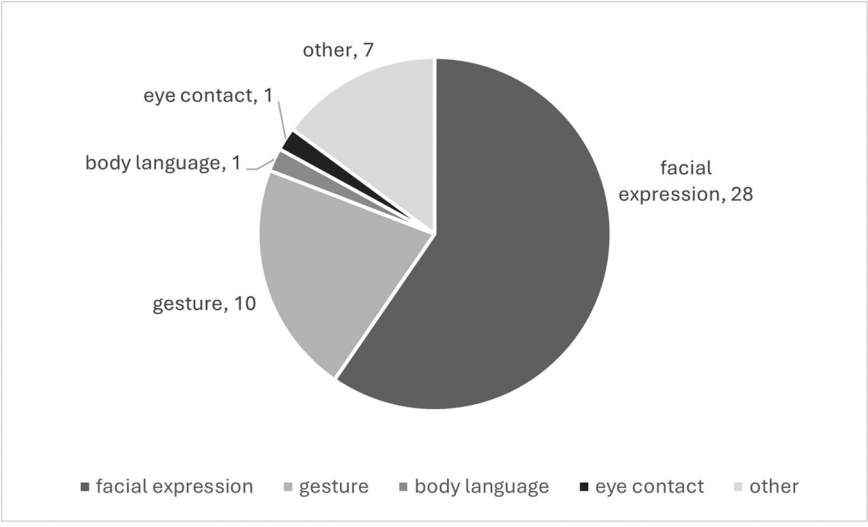


Table 6. Summary of nonverbal comprehension results comparing right-hemisphere brain-damaged (RHD) and non–brain-damaged (NBD) groups.

Nonverbal cue	No RHD deficits[a]	RHD deficits[b]	Total *n* (%) dependent variables
Facial expression	2 (0.8%)	22 (92%)	24 (86%)
Gesture	0	3 (100%)	3 (11%)
Body language	0	1 (100%)	1 (4%)
Grand total	2 (7%)	26 (93%)	28 (100%)

[a]RHD group performance nonsignificantly different from comparison group or standardized cutoffs. [b]RHD group performance significantly lower than comparison group or standardized cutoffs.

(Cutica et al., 2006), and matching emotions to gestures (Wertz et al., 1998).

Production tasks included spontaneous gesture use during conversation or semistructured interviews, responding to a video, imitation, pantomiming object use, storytelling, procedural discourse, and gestures used while describing object positioning. Of the few studies that examined spontaneous gesture use, two of six (33%) found that those with RHD used fewer gestures than NBD controls (Cocks et al., 2007; Hogrefe et al., 2016). Three out of six studies (50%) found no significant group differences in gesture production (Akbıyık et al., 2018; Göksun et al., 2013; Wertz et al., 1998). One study (17%) reported more frequent gesture use in those with RHD (Blonder et al., 1995), but this was related only to noncommunicative grooming gestures (e.g., smoothing hair). An increased use of grooming or other self-touching behaviors was also reported by Hogrefe et al. (2016), in conjunction with fewer communicative gestures.

The only other article related to gestures examined imitation of transitive (objects in use) and intransitive gestures with a focus on ideomotor apraxia (Bonivento et al., 2014). Six of the 11 RHD participants were impaired in both gesture types, while two had deficits of one or the other. Further analyses indicated that strokes involving the right frontal lobe were associated with poorer imitation of meaningless versus meaningful gestures.

Other Nonverbal Communication

Body language and eye contact were each examined in only one study that compared RHD with NBD groups. In the first, the RHD group was significantly less able to comprehend emotions expressed through body language (Leiva et al., 2022). In the second, while watching videos of people telling emotional stories, the RHD group showed visual bias away from the eyes, looking at the eyes for less time (Jospe et al., 2022).

Several studies examined nonverbal communication in ways that could not be easily categorized. Mackenzie's research group (Mackenzie et al., 1999, 2001; Mackenzie & Brady, 2004) combined data for prosody, eye contact, and facial expression during production of conversation. The majority of RHD participants (28 of 35, 80%) scored below the 10th percentile on this combined measure (Mackenzie et al., 2001). In another study (de Oliveira et al., 2016), participants with RHD exhibited deficits on the nonverbal score of the MEC B (Casarin et al., 2020), in which behavior is observed during conversation about a specified topic.

Discussion

The discussion integrates and summarizes the findings of this systematic review related to language comprehension and then language production. In each, linguistic and extralinguistic results are considered.

Comprehension

At the word level, deficits were most likely to be observed in RHD participants when interpreting figurative meanings or identifying semantically related words or uncommon literal meanings of words. Word-level deficits among

Table 7. Summary of nonverbal production results comparing right-hemisphere brain-damaged (RHD) and non–brain-damaged (NBD) groups.

Nonverbal cue	No RHD deficits[a]	RHD deficits[b]	Total *n* (%) dependent variables
Facial expression[c]	1 (10%)	8 (80%)	10 (56%)
Gesture: spontaneous[d]	3 (50%)	2 (33%)	6 (33%)
Gesture: imitative	0	1 (100%)	1 (5%)
Eye contact	0	1 (100%)	1 (5%)
Grand total	4 (22%)	12 (67%)	18 (100%)

[a]RHD group performance nonsignificantly different from comparison group or standardized cutoffs. [b]RHD group performance significantly lower than comparison group or standardized cutoffs. [c]One study (10%) reported RHD deficits for positive emotions but better performance than the NBD control group for negative emotions (C. C. Martin et al., 1990). [d]One study (17%) reported RHD participants produced more gestures (primarily grooming gestures) than the NBD control group (Blonder et al., 1995).

RHD groups were rarely detected using tasks from aphasia test batteries (such as WAB subtests, e.g., Ho et al., 2018). Similarly, sentence-level comprehension deficits were more commonly identified among RHD groups when they were completing figurative language tasks or tasks requiring inference generation, use of contextual cues, or imagery. Semantic and syntactic processing deficits were reported in approximately half of the respective studies, indicating additional work is needed to determine the task, stimulus, or response conditions that contribute to successful processing. Again, sentence-level deficits were infrequently detected with tasks designed to identify or characterize aphasia.

Deficits were reported in 66% of studies that examined discourse-level comprehension. Across all discourse genres (narratives, conversation, speech acts, humor), a minimum of 60% of studies reported an RHD group deficit compared to the NBD comparison group or standardized cutoffs. Deficits were commonly reported for tasks that involved interpreting intended meaning including figurative language and humor, inferencing/context use, and tasks requiring interpretation of both explicit and implicit information. Given the split results found, more work is needed to understand conditions that facilitate versus impede comprehension of emotion, story sequencing, and micro–macrostructure organization.

Deficits in comprehension of extralinguistic cues related to facial expressions were commonly documented. Gesture and body language comprehension are also negatively affected by RHD but have been nominally examined in the literature and thus need to be further explored.

Collectively, the interpretation of intended meaning and use of context are commonly impacted after RHD. This was evident at the word (e.g., Brownell et al., 1990; Tompkins, Scharp, et al., 2008), sentence (e.g., Grindrod & Baum, 2003; Klepousniotou & Baum, 2005a; Papagno et al., 2006), and discourse levels (e.g., Champagne-Lavau et al., 2018; Hatta et al., 2004; Mackenzie et al., 1999) across a breadth of genres. Test batteries designed to identify the presence of aphasia, particularly when subtests of those batteries were used in isolation, were generally less effective at identifying language comprehension issues subsequent to RHD.

Production

RHD word-level production deficits occur more often in divergent (both semantic and phonemic) than confrontation naming tasks. However, in the few studies that reported individual data for verbal fluency tasks, there was a very wide range of deficits (at most 43% of any one RHD group), indicating inconsistent difficulties on these tasks after RHD. Additional work examining word retrieval beyond naming nouns and examining conditions and stimuli that facilitate or impede performance will broaden our understanding of word production abilities subsequent to RHD.

Sentence production deficits are difficult to characterize as there are only 22 experiments reported in the literature, and all use unique tasks and/or measures. Deficits are present in anagram tasks and when sentences are produced in response to a scenario. Other reported deficits are based on only a single study, so replications and further research are necessary to fully understand how RHD may affect sentence-level production.

Results for discourse production can be summarized in relation to the elicitation task (e.g., story retell, conversation) as well as the general language area evaluated (e.g., organization, content, grammar). This classification scheme has obvious confounds, and future studies are needed to determine the impact of task versus language process on assessment of discourse production. However, there are some general conclusions that can be drawn. In relation to elicitation tasks, RHD group impairments were most commonly reported in less-structured tasks such as story retelling, picture-based production, and conversation. In relation to the language processes affected, deficits were pronounced in "higher level" language functions such as discourse coherence and cohesion, information processing, emotional/evaluative content processing, and pragmatic and interactive communication skills. More basic aspects of language, including structural, quantitative, and grammatical, were less commonly impaired but also less frequently examined in this literature.

Production of facial expressions is impaired after RHD. Gesture production and eye contact have been examined in only a handful of studies reporting a range of results, preventing conclusions about the impact of RHD on these latter two forms of extralinguistic communication production.

Across all levels, linguistic production deficits are more common in divergent or unstructured elicitation tasks and primarily affect "higher level" language functions. Given these findings, clinical assessment should focus on integration and interaction elicited through semistructured or unstructured tasks.

Theoretical Accounts

The authors cannot position themselves with respect to existing theoretical accounts in the RHD literature, such as coarse coding deficits (Burgess & Simpson, 1988; Jung-Beeman, 2005), suppression deficits (Tompkins et al., 2000, 2001b), theory-of-mind/social cognition deficits (Balaban et al., 2016; Champagne-Lavau & Joanette, 2009; Winner et al., 1998), context processing accounts (Grindrod & Baum, 2003; Tompkins & Lehman, 1998), or cognitive resource limitations (Monetta et al., 2006; Tompkins

et al., 2001a). That is, this review cannot confirm any single model, as only a small subset of the 233 studies examined underlying processing mechanisms within an information-processing framework; instead, most studies were descriptive. Nevertheless, the convergence of findings demonstrates robust and persistent communication deficits following RHD, supporting the need for a dedicated terminology, such as the recent introduction of apragmatism in the International Classification of Diseases, Tenth Revision (R47.83) and apragmatism following cerebrovascular disease (I69.xx; effective October 2027).

Methodology Issues in the Literature

There are several limitations of the existing literature that constrain the interpretation of the results from this systematic review. Despite most of these being identified as weaknesses in the past, they continue to appear in contemporary research.

Researchers (Blake, 2018; Myers & Blake, 2008; Pilepić & Roje Bedeković, 2025; Tompkins, 1995) have repeatedly highlighted the need for clear participant inclusion criteria that are more specific and discriminating than simply a lesion in the RH: Understanding the consequences of RHD on language requires rich descriptions of participants that include relevant demographic and clinical characteristics and analysis of individual performance in addition to reporting group results. It is particularly concerning that in these studies of language, nearly half (46%) failed to assess participants' language abilities outside of their experimental tasks and only 20% reported participants' language background. Researchers also need to clearly report participants included in multiple studies. To determine the prevalence and fully characterize the presentation of language deficits, the RHD literature must provide enough information to determine the representativeness of the participants to the population.

In relation to tasks and assessments, the use of standardized tasks enhances the ability to interpret results and compare results across studies (Tompkins, 1995). This of course requires that standardized instructions, elicitation procedures, and analyses are used. The RHDBank protocol (Minga, Stockbridge, et al., 2022) is one readily available source for discourse tasks with standardized instructions. Additionally, while standardized and validated assessment tools exist for the RHD population (e.g., Joanette et al., 2015), there has been persistent use of tests designed to identify aphasia that are not suited to detecting apragmatic deficits. Articles included in this systematic review overwhelmingly used experimental tasks that hinder cross-study comparisons and summary of results. For example, there were no overlapping tasks or measures across the studies examining sentence production abilities. The use of nonstandardized tasks has also had an outsized effect on treatment research, which is already astonishingly rare (Blake et al., 2013): In 55 years, only eight language treatment studies related to RH stroke have been published and captured in this extensive review. Five of those were excluded from the present review because they did not use standardized assessments or report criteria (cutoffs) used to diagnose deficits or measure effects of treatment.

Limitations of Review Methodology

It is important to acknowledge the limitations of our systematic review. One relates to the variety of terms and labels used to describe language, particularly pragmatic abilities, in the RHD literature throughout the past half century. The search strategy was necessarily extremely broad to attempt to capture all relevant articles. Data extraction and analysis were challenging because they required identifying and interpreting the various terms and labels used for the same concepts. For example, indirect requests have been classified both as nonliteral language and as speech acts. The category "speech acts" commonly includes both direct intents such as questions, statements, and commands as well as indirect requests (e.g., "It's hot in here" to convey that an action to reduce the temperature is requested; Joanette et al., 2015; Parola et al., 2016). However, it has also been used more broadly to include both verbal and nonverbal communication (Kasher et al., 1999) and as synonymous with illocutionary force that express underlying intentions such as thanking, apologizing, warning, begging, promising, or reminding (Holtgraves, 2012). Especially for interpretation of discourse-level findings, such challenges resulted in somewhat arbitrary categories of findings and the use of relatively vague descriptors such as "higher level" language.

The choice to use a liberal cutoff for inclusion after critical appraisal allowed us to review a broad scope of articles. The consequence of this decision was the inclusion of data from studies with methodological weaknesses.

Our report uses traditional "levels" of language analysis (word, sentence, and discourse) that may not best reflect the apragmatic nature of RHD deficits, which highly depend on the context. In consequence, a skill assessed at word and sentence levels may lead to different outcomes when assessed at the discourse level that require more context use (e.g., emotion interpretation was less often impaired at the sentence than the discourse level). Future studies may use more "functional" (in contrast to "mechanical") categories of language or attempt to disentangle the impact of the task/context versus the specific, particularly pragmatic, language processes.

Lastly, we only included articles published in English. We acknowledge both that relevant research published in other languages has been missed, and that such work is

important for understanding pragmatic language from a global perspective.

Conclusions

The findings from this extensive systematic review do provide the following insights and understanding about language following RH stroke:

1. Both the interpretation and production of intended meaning, specifically in relation to figurative language, inferencing, use of context, speech acts, humor, and emotional facial expression, are vulnerable following RHD. This confirms the prevailing understanding while illuminating that these processes can be affected at the word, sentence, and discourse levels.
2. People with RH stroke are more likely to exhibit linguistic apragmatic deficits at the discourse level than at word or sentence levels. Few conclusions can be made about word- and sentence-level production due to the reliance on experimental tasks and the absence of replications.
3. Assessment of language following RH stroke should not rely on test batteries designed to identify aphasia, as these tests focus on evaluating more basic linguistic abilities and include few extralinguistic assessment items. For discourse assessment, semi- or unstructured discourse tasks are more sensitive to deficits than structured tasks.
4. The findings support the use of intraoperative mapping for RH brain surgeries, a practice that has only begun to be investigated in the past 18 years (Martín-Monzón et al., 2024). While we applaud the assessment of critical abilities of the RH including language, attention, executive function, and social cognition, we hope conclusions from our systematic review and other research encourage the monitoring of more than just basic language abilities to capture those that are clearly associated with RH contributions to communication.
5. There is a dire need for treatment studies to inform and guide clinical practice. While it is known that there are few treatment studies, the identification of fewer than 10 over 55 years of research provides startling data to show how extreme the situation is within the field.
6. Gaps identified in this review provide a list of topics for future research, including areas that show equivocal results (e.g., sentence-level syntactic processing, comprehension of emotion at the discourse level) and areas that have been examined in very few studies (e.g., sentence-level production abilities, gesture and other extralinguistic behaviors).
7. Overall, the field would benefit from research that includes rich participant description with inclusion criteria related to language abilities, reporting and analysis of individual performance as well as group results, and use of standardized assessments with standardized instructions and analyses when feasible.

Subprojects of this systematic review are underway within the ANCDS RHDWG to explore specific questions including (a) review and psychometric quality appraisal of formal language/pragmatic assessments with recommendations for clinical and research practice, (b) exploration of co-occurrence of language and cognitive deficits to determine whether there are patterns of deficits or impacts of cognition on language, and (c) a thorough evaluation of neglect dyslexia including assessments and characteristics of language stimuli that facilitate or impede reading. Further illumination of our understanding of RHD and recommendations for clinical practice will arise from these and other projects.

Data Availability Statement

Data are available upon request from the corresponding author.

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Appendix

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
The perception of positive and negative facial expressions by unilateral stroke patients	Abbott	2014	–	–	–	–	–	–	+	–	80
The relationship between co-speech gesture production and macrolinguistic discourse abilities in people with focal brain injury	Akbıyık	2018	–	–	–	–	–	+	+	–	75
Language, perception, and the schematic representation of spatial relations	Amorapanth	2012	+	–	–	–	–	–	–	–	64
The Screening Test for Aphasia and Dysarthria (STAD) for patients with neurological communicative disorders: A large-scale, multicenter validation study in Japan	Araki	2022	–	–	–	–	–	–	–	+	86
Testing comprehension abilities in users of British Sign Language following CVA	Atkinson	2005	+	+	–	–	–	–	–	–	82
Understanding 'not': neuropsychological dissociations between hand and head markers of negation in BSL	Atkinson	2004	+	+	–	+	–	–	–	–	75
Comprehension of idioms in Turkish aphasic participants	Aydin	2017	–	+	–	–	–	–	–	–	68
Is Theory of Mind the basis for exhaustivity in wh-questions? Evidence from TOM impairment after right hemisphere damage	Balaban	2019	–	+	+	–	+	–	–	–	75
The effect of theory of mind impairment on language: Referring after right-hemisphere damage	Balaban	2016	–	+	+	–	–	+	–	–	84
Theory of mind impairment after right-hemisphere damage	Balaban	2016	–	–	+	–	–	–	–	–	82
You may now kiss the bride: Interpretation of social situations by individuals with right or left hemisphere injury	Baldo	2016	–	–	–	–	+	–	–	–	75
Cohesive and coherent connected speech deficits in mild stroke	Barker	2017	+	–	–	–	+	+	–	–	77
How is right hemisphere communication disorder disabling? Evidence from response mobilizing actions in conversation.	Barnes	2022	+	–	–	–	–	–	–	–	83
Cognition and discourse production in right hemisphere disorder	Bartels-Tobin	2005	–	–	–	–	–	+	–	–	66
Auditory processing of brain-damaged adults under competitive listening conditions	Basili	1980	–	+	–	–	–	–	–	–	80
Differential effects of unilateral lesions on language production in children and adults.	Bates	2001	–	–	–	–	–	+	–	–	70

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Automatic versus strategic effects of phonology and orthography on auditory lexical access in brain-damaged patients as a function of inter-stimulus interval	Baum	1999	–	–	–	–	–	–	–	+	68
Unconstrained oral naming performance in right- and left-hemisphere-damaged individuals: When education overrides the lesion	Beausoleil	2003	–	–	–	+	–	–	–	–	66
Identification of target tones and speech sounds studied with event-related potentials: Language-related changes in aphasia	Becker	2013	–	+	–	+	–	–	–	+	75
Semantic processing in the right hemisphere may contribute to drawing inferences from discourse	Beeman	1993	–	–	+	+	–	–	–	–	86
Impaired verbal reasoning and constructional apraxia in subjects with right hemisphere damage	Benowitz	1990	–	–	+	–	–	–	–	–	77
Right cerebral hemisphere damage: incidence of language problems	E. Benton	1996	+	+	+	–	–	+	–	–	73
An analysis of right hemisphere stroke discourse in the modern cookie theft picture	Berube	2022	–	–	–	–	–	+	–	–	86
Clinical relevance of discourse characteristics after right hemisphere brain damage.	Blake	2006	+	–	+	–	–	+	–	–	82
Contextual bias and predictive inferencing in adults with and without right hemisphere brain damage	Blake	2005	+	–	+	–	–	–	–	–	77
Inferencing processes after right hemisphere brain damage: Maintenance of inferences	Blake	2009a	+	–	+	–	–	–	–	+	86
Inferencing processes after right hemisphere brain damage: Effects of contextual bias	Blake	2009b	–	–	+	–	–	–	–	–	95
Right hemisphere facial expressivity during natural conversation	Blonder	1993	–	–	–	–	–	+	+	–	89
Spontaneous gestures following right hemisphere infarct	Blonder	1995	–	–	–	–	–	–	+	–	80
Impact of emotional content on discourse production in patients with unilateral brain damage	Bloom	1992	–	–	–	–	–	+	–	–	84
Left and right hemispheric contributions to discourse coherence and cohesion.	Bloom	1996	–	–	–	–	–	+	–	–	75
Suppression and facilitation of pragmatic performance: Effects of emotional content on discourse following right and left brain damage	Bloom	1993	–	–	–	–	–	+	–	–	84
Neural correlates of transitive and intransitive action imitation: An investigation using voxel-based morphometry	Bonivento	2014	–	–	–	–	–	–	+	–	68

(*table continues*)

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Hemispheric specialization for discourse reports of emotional experiences: Relationships to demographic, neurological, and perceptual variables	Borod	1996	–	–	–	–	–	+	–	–	82
Parameters of emotional processing in neuropsychiatric disorders: Conceptual issues and a battery of tests	Borod	1990	–	–	–	–	–	–	+	–	73
Right hemisphere specialization for the identification of emotional words and sentences: Evidence from stroke patients	Borod	1992	+	–	–	–	–	–	–	–	80
The expression and perception of facial emotion in brain-damaged patients	Borod	1986	–	–	–	–	–	–	+	–	64
Verbal pragmatics following unilateral stroke: Emotional content and valence	Borod	2000	–	–	–	–	–	+	–	–	64
Processing of faces by patients with unilateral hemisphere lesions: I. Dissociation between judgments of facial affect and facial identity	Bowers	1985	–	–	–	–	–	–	+	–	70
Further evidence on topic use following right hemisphere brain damage: Procedural and descriptive discourse	Brady	2005	–	–	–	–	–	+	–	–	84
Topic use following right hemisphere brain damage during three semi-structured conversational discourse samples	Brady	2003	–	–	–	–	–	+	–	–	89
Emotion recognition in stroke patients with left and right hemispheric lesion: results with a new instrument—the FEEL Test.	Braun	2005	–	–	–	–	–	–	+	–	82
Appreciation of metaphoric alternative word meanings by left and right brain-damaged patients	Brownell	1990	+	–	–	–	–	–	–	–	64
Making requests: Illustrations of how right-hemisphere brain damage can affect discourse production	Brownell	1999	–	–	–	–	–	+	–	–	73
Sensitivity to lexical denotation and connotation in brain-damaged patients: A double dissociation?	Brownell	1984	+	–	–	–	–	–	–	–	77
Surprise but not coherence: Sensitivity to verbal humor in right-hemisphere patients	Brownell	1983	–	–	+	–	–	–	–	–	57
The effects of right-hemisphere brain damage on patients' use of terms of personal reference	Brownell	1997	–	–	+	–	–	–	–	–	59
The use of pronoun anaphora and speaker mood in the interpretation of conversational utterances by right hemisphere brain-damaged patients.	Brownell	1992	–	–	+	–	–	–	–	–	66

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Assessment of language disorders after right hemisphere damage.	Bryan	1988	+	–	+	–	–	+	–	–	77
Differential effects of left and right cerebral vascular accidents on language competency	Bryan	2001	+	+	+	–	–	–	–	+	80
Nonverbal communication of affect in brain-damaged patients	Buck	1980	–	–	–	–	–	–	+	–	59
Posed Emotional Expression in Unilateral Brain Damaged Patients	Caltagirone	1989	–	–	–	–	–	–	+	–	59
Lesion localization in acquired deficits of emotional expression and comprehension	Cancelliere	1990	–	–	–	–	–	–	+	–	68
Language and verbal memory after right hemispheric stroke: A clinical-CT scan study.	Cappa	1990	–	+	–	+	–	–	–	–	73
Impairment of right brain-damaged patients on a linguistic cognitive task	Cavalli	1981	–	+	–	+	+	–	–	–	70
Pragmatic deficits in patients with schizophrenia and right hemisphere damage: A pilot study	Chakrabarty	2022	+	–	+	–	–	+	+	+	89
Impact of right hemispheric damage on a hierarchy of complexity evidenced in young normal subjects	Champagne	2003	–	–	+	–	–	–	–	–	68
Context processing during irony comprehension in right-frontal brain-damaged individuals	Champagne-Lavau	2018	–	–	+	–	–	–	–	–	82
Pragmatics, theory of mind and executive functions after a right-hemisphere lesion: Different patterns of deficits	Champagne-Lavau	2009	–	–	+	–	–	–	–	+	75
Perception and production of facial and prosodic emotions by chronic CVA patients	Charbonneau	2003	–	–	–	–	–	–	+	–	80
A study of humour and communicative intention following right hemisphere stroke	Cheang	2006	–	–	+	–	–	–	–	–	84
Recovery of functional status after right hemisphere stroke: Relationship with unilateral neglect	Cherney	2001	–	–	–	–	–	–	–	+	73
An assessment tool for evaluating cognitive-communicative problems in patients with right hemisphere damage: Preliminary findings	Cherney	1994	–	–	–	–	–	+	+	+	70
Lexical judgements after right- or left-hemisphere injury	Chiarello	1986	+	–	–	–	–	–	–	–	73
Emotional versus nonemotional lexical perception in patients with right and left brain damage.	Cicero	1999	+	+	–	–	–	–	–	+	70
Sensitivity to emotional expressions and situations in organic patients	Cicone	1980	–	+	–	–	–	–	+	–	82

(*table continues*)

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Autobiographical memory: Influence of right hemisphere damage on emotionality and specificity	Cimino	1991	–	–	–	–	–	+	–	–	64
The relationship between right hemisphere damage and gesture in spontaneous discourse	Cocks	2007	+	–	–	–	–	–	+	–	64
Perceptual biases in processing facial identity and emotion	Coolican	2008	–	–	–	–	–	–	+	–	75
Towards a description of clinical communication impairment profiles following right-hemisphere damage	Côté	2007	–	–	–	–	–	–	–	+	73
Neuropragmatics: Extralinguistic pragmatic ability is better preserved in left-hemisphere-damaged patients than in right-hemisphere-damaged patients	Cutica	2006	–	–	–	–	–	–	+	–	73
Referential cohesion and logical coherence of narration after right hemisphere stroke	Davis	1997	–	–	–	–	–	+	–	–	68
Communicative processing in adults with unilateral right hemisphere stroke: Assessment by means of a short battery	de Oliveira	2016	–	+	+	+	+	+	+	+	89
Depressive signs and cognitive performance in patients with a right hemisphere stroke.	de Oliveira	2015	+	+	–	+	+	–	–	+	84
The impairment of right brain-damaged patients on a sentence anagram test	De Renzi	1991	–	–	–	+	+	–	–	–	57
Recognition and discrimination of emotional faces and pictures	DeKosky	1980	–	–	–	–	–	–	+	–	64
The contribution of the right hemisphere to the organization of paragraphs	Delis	1983	–	–	+	–	–	–	–	–	55
Bihemispheric language disorders in early-stage dementia of the Alzheimer type: Evidence from a novel metalinguistic task	De Vreese	1996	+	+	–	+	–	–	–	–	77
Format distortion and word reading: The role of multiletter units	Dickerson	1999	–	–	–	+	–	–	–	–	79
Verbal expression of right cerebrovascular accident patients: Convergent and divergent language	Diggs	1987	–	–	–	+	–	+	–	+	77
Textpragmatic impairments of figure-ground distinction in right-brain damaged stroke patients compared with aphasics and healthy controls	Dressler	2004	–	–	–	–	–	+	–	+	64
Lesion analysis of the brain areas involved in language comprehension.	Dronkers	2004	–	–	–	–	–	–	–	+	57

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Hemisphere stroke: impact on the semantic lexical aspects of language.	Duque	2021	+	+	–	+	–	–	–	–	70
In search for the meaning of illness: Content of narrative discourse is related to cognitive deficits in stroke patients	Egbert	2021	+	+	+	–	–	–	–	–	77
Perceptual and conceptual organization of facial emotions: Hemispheric differences	Etcoff	1984a	–	–	–	–	–	–	+	–	66
Selective attention to facial identity and facial emotion	Etcoff	1984b	–	–	–	–	–	–	+	–	73
Intersectionality of race and question-asking in women after right hemisphere brain damage	Fannin	2023	–	–	–	–	–	+	–	–	77
Assessment of story comprehension deficits after brain damage	Ferstl	2005	–	–	+	–	–	–	–	–	86
Deficit in feature-based attention following a left thalamic lesion	Finsterwalder	2017	–	–	–	+	+	–	–	+	88
Appreciation of pragmatic interpretations of indirect commands: Comparison of right and left hemisphere brain-damaged patients	Foldi	1987	–	–	–	–	–	–	–	+	66
Right hemisphere damage: Communication processing in adults evaluated by the Brazilian Protocole MEC—Bateria MAC	Fonseca	2007	–	+	+	+	–	+	–	–	100
Perceptual and anatomic patterns of selective deficits in facial identity and expression processing	Fox	2011	–	–	–	–	–	–	+	–	82
Processing of metaphoric and non-metaphoric alternative meanings of words after right- and left-hemispheric lesion	Gagnon	2003	+	–	–	–	–	–	–	–	68
How right hemisphere damage after stroke can impair speech comprehension	Gajardo-Vidal	2018	+	–	–	+	–	–	–	–	82
The appreciation of antonymic contrasts in aphasia	Gardner	1978	–	–	–	+	–	–	–	–	68
Naming and gesturing spatial relations: Evidence from focal brain-injured individuals	Göksun	2013	–	–	–	–	–	–	+	–	68
Perceptual remediation in patients with right brain damage: A comprehensive program	Gordon	1985	–	–	+	–	–	–	–	–	73
Sentence Completion Task in Right-Brain-Damaged Right-Handers: Eisenson's Study Revisited	Goulet	1994	–	–	–	+	–	–	–	–	75
Word fluency after a right-hemisphere lesion	Goulet	1997	–	–	–	+	–	–	–	–	55
Theory of mind and the right cerebral hemisphere: Refining the scope of impairment	Griffin	2006	–	–	–	–	–	–	+	+	70
Sensitivity to local sentence context information in lexical ambiguity resolution: evidence from left- and right-hemisphere-damaged individuals	Grindrod	2003	–	+	–	–	–	–	–	–	95

(*table continues*)

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
The brain network for self-feeling: A symptom-lesion mapping study	Grossi	2014	–	–	–	–	–	–	+	–	84
The detection of errors in sentences after right hemisphere brain damage	Grossman	1987	–	+	–	–	–	–	–	–	68
Imageability effects on sentence judgement by right-brain-damaged adults	Guttentag Lederer	2009	–	+	–	–	–	–	–	–	86
The role of the hemispheres in closed loop movements	Haaland	1989	–	+	–	–	+	–	–	+	59
Acquired 'theory of mind' impairments following stroke	Happe	1999	–	–	+	–	–	–	–	–	73
Defective comprehension of emotional faces and prosody as a result of right hemisphere stroke: Modality versus emotion-type specificity	Harciarek	2006	–	–	–	–	–	–	+	–	89
Inferential abilities of normal and right hemisphere damaged adults	Harden	1995	–	–	+	–	–	–	–	–	70
Differential processing of implicature in individuals with left and right brain damage	Hatta	2004	–	–	+	–	–	–	–	+	77
Spontaneous humor among right hemisphere stroke survivors	Heath	2005	–	–	–	–	–	–	–	+	95
Discourse deficits following right hemisphere damage in deaf signers	Hickok	1999	–	–	–	–	–	+	–	+	83
Role of the left hemisphere in sign language comprehension	Hickok	2002	+	+	–	–	–	–	–	–	84
Comprehension of emotional information in patients with aphasia	Hielscher	2004	+	–	+	–	–	–	+	–	75
Spared access to idiomatic and literal meanings: A single-case approach	Hillert	2004	–	+	+	–	–	–	–	+	83
Paucity vs. verbosity: Another analysis of right hemisphere communication deficits	Hillis Trupe	1985	–	–	–	–	–	+	–	–	68
Verbal short-term memory and language impairments in Cantonese speakers after stroke	Ho	2018	+	–	–	–	–	–	–	–	77
Application and validation of the Barrow Neurological Institute Screen for Higher Cerebral Functions in a control population and in patient groups commonly seen in neurorehabilitation	Hofgren	2007	–	–	–	–	–	–	–	+	75
Co-speech hand movements during narrations: What is the impact of right vs. left hemisphere brain damage?	Hogrefe	2016	–	–	–	–	–	–	+	–	82

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Behavioural and electrophysiological measures of auditory attention in right hemisphere brain damage	Hough	2007	–	+	–	–	–	–	–	+	75
Narrative comprehension in adults with right and left hemisphere brain-damage: Theme organization	Hough	1990	–	–	+	–	–	–	–	–	68
Flying under the radar: Figurative language impairments in focal lesion patients	Ianni	2014	–	+	–	–	–	–	–	–	75
Impaired word naming in right-brain-damaged right-handers: Error types and time-course analyses	Joanette	1988	–	–	–	+	–	–	–	–	61
Informative content of narrative discourse in right-brain-damaged right-handers	Joanette	1986	–	–	–	–	–	+	–	–	70
Impaired empathic accuracy following damage to the left hemisphere	Jospe	2022	–	–	+	–	–	–	+	–	89
The processing of negative sentences in fluent aphasics: semantic and pragmatic aspects	Juncos-Rabadan	1992	–	+	–	–	–	–	–	–	61
Narratives of focal brain injured individuals: A macro-level analysis	Karaduman	2017	–	–	–	+	–	–	–	+	73
Effects of right- and left-hemisphere damage on understanding conversational implicatures	Kasher	1999	–	–	+	–	–	+	–	–	75
Analysis of first-encounter conversations of right-hemisphere-damaged adults	Kennedy	1994	–	–	–	–	–	+	–	–	89
Topic scenes in conversations with adults with right-hemisphere brain damage	Kennedy	2000	–	–	–	–	–	+	–	–	73
Effect of right hemispheric damage on structured spoken conversation	Kim	2022	–	–	–	–	–	+	–	–	89
Processing homonymy and polysemy: effects of sentential context and time-course following unilateral brain damage	Klepousniotou	2005a	–	+	–	–	–	–	–	–	75
Unilateral brain damage effects on processing homonymous and polysemous words.	Klepousniotou	2005b	+	–	–	–	–	–	–	–	55
Lexico-semantic deficits in people with right hemisphere damage: Evidence from convergent naming tasks	Krishnan	2015	–	–	–	+	–	–	–	–	84
Perception of emotions from faces and voices following unilateral brain damage	Kucharska-Pietura	2003	–	–	–	–	–	–	+	–	84
Effects of right and left hemisphere cerebrovascular lesions on discrimination of prosodic and semantic aspects of affect in sentences	Lalande	1992	–	+	–	–	–	–	–	–	73

(*table continues*)

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Channel-consistency following unilateral stroke: An examination of patient communications across verbal and nonverbal domains	Langer	2000	–	–	–	–	–	–	+	–	86
Illiteracy and brain damage: 2. Manifestations of unilateral neglect in testing "auditory comprehension" with iconographic materials	Lecours	1987	–	+	–	–	–	–	–	–	59
Illiteracy and brain damage 3: A contribution to the study of speech and language disorders in illiterates with unilateral brain damage	Lecours	1988	–	–	–	+	–	–	–	–	57
Predictive inferencing in adults with right hemisphere brain damage	Lehman-Blake	2001	+	–	+	–	–	–	–	–	84
Impaired recognition of dynamic body expressions after right hemisphere damage	Leiva	2022	–	–	–	–	–	–	+	–	77
Research note: The ability of individuals with right-hemisphere damage to use context under conditions of focused and divided attention	Leonard	2005	–	+	–	–	–	–	–	–	70
The effect of compressed speech on the ability of right-hemisphere-damaged patients to use context	Leonard	2001	–	+	–	–	–	–	–	–	64
The use of contextual information by right brain-damaged individuals in the resolution of ambiguous pronouns	Leonard	1997a	+	+	+	–	–	–	–	–	59
The use of contextual information related to general world knowledge by right brain-damaged individuals in pronoun resolution	Leonard	1997b	+	–	+	–	–	–	–	–	59
Hemispheric asymmetries in the perceptual representations of words	Lincoln	2008	–	+	–	–	–	–	–	–	89
Knowledge of scripts reflected in discourse of aphasics and right-brain-damaged patients	Łojek-Osiejuk	1996	–	–	–	–	–	+	–	–	82
Facial emotion perception and recognition deficits in acute ischemic stroke	Luo	2022	–	–	–	–	–	–	+	–	93
Communication ability following right brain damage: the family perspective.	Mackenzie	2001	+	+	+	–	–	+	+	–	73
Communication ability in non-right handers following right hemisphere stroke	Mackenzie	2004	+	+	+	–	–	+	+	–	70
The communication effects of right brain damage on the very old and the not so old	Mackenzie	1999	+	+	+	–	–	+	+	–	84
Dissociations in processing derivational morphology: The right basal ganglia involvement	Marangolo	2008	–	+	–	+	–	–	–	–	80
Language and its interacting components: The right hemisphere hypothesis in derivational morphology	Marangolo	2010	–	+	–	–	–	–	–	–	61

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Characteristics of narrative discourse processing after damage to the right hemisphere	Marini	2012	–	–	–	–	–	+	–	–	91
The role played by the right hemisphere in the organization of complex textual structures.	Marini	2005	–	–	–	+	+	+	–	–	64
Spontaneous expression of facial emotion in schizophrenic and right-brain-damaged patients	C. C. Martin	1990	–	–	–	–	–	–	+	–	80
That can't be right! What causes pragmatic language impairment following right hemisphere damage?	I. Martin	2006	–	–	+	–	–	–	–	–	84
Undetected language deficits in left or right hemisphere post-stroke patients	Martzoukou	2025	+	+	+	+	+	–	–	+	86
Exploring the cognitive basis of right-hemisphere pragmatic language disorders	McDonald	2000	–	–	+	–	+	+	–	–	77
Anatomical and spatial matching in imitation: Evidence from left and right brain-damaged patients	Mengotti	2015	–	–	–	–	–	–	+	–	82
Sentence repetition test: Updated norms and clinical utility	Meyers	2000	–	–	–	–	+	–	–	–	86
Question use in adults with right-hemisphere brain damage	Minga	2020	–	–	–	–	+	–	–	–	64
The effects of right hemisphere brain damage on question-asking in conversation	Minga	2022	–	–	–	–	–	+	–	–	77
A preliminary evaluation of emotional experience and expression following unilateral brain damage.	Montreys	1998	–	–	–	–	–	–	+	–	61
A matched lesion analysis of childhood versus adult-onset brain injury due to unilateral stroke: Another perspective on neural plasticity and recovery of social functioning	Mosch	2005	–	–	–	–	–	–	–	+	73
Covariant defects in visuospatial abilities and recall of verbal narrative after right hemisphere stroke	Moya	1986	–	–	+	–	–	+	–	–	82
Impaired performance of right-brain-damaged patients on a sentence anagram task	Murasugi	2005	–	–	–	–	+	–	–	–	73
Design fluency subsequent to onset of aphasia: A distinct pattern of executive function difficulties?	Murray	2017	–	–	–	+	–	–	–	+	91
The effects of varying attentional demands on the word retrieval skills of adults with aphasia, right hemisphere brain damage, or no brain damage	Murray	2000	–	–	–	+	–	–	–	+	77
Language processing in right hemisphere stroke patients: Response speed and quality	Murteira	2013	+	+	–	–	+	–	–	–	86
Effect of visual and inferential variables on scene descriptions by right-hemisphere-damaged and non-brain-damaged adults	Myers	1996	–	–	–	–	–	+	–	–	75

(*table continues*)

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Profiles of communication deficits in patients with right cerebral hemisphere damage: Implications for diagnosis and treatment	Myers	1979	–	–	–	–	–	+	–	–	57
Hemispheric processing of vocal emblem sounds.	Neumann-Werth	2013	–	–	–	–	–	–	–	+	77
The effects of left- versus right-hemisphere lesions on the sensitivity to intra- and interconceptual semantic relationships	Nocentini	2001	+	–	–	–	–	–	–	–	77
Beyond scripts: A note on the capacity of right hemisphere-damaged patients to process social and emotional content	Ostrove	1990	–	–	+	–	–	–	–	–	61
Montreal–Toulouse Language Assessment Battery: Evidence of criterion validity from patients with aphasia	Pagliarin	2015	+	+	–	+	+	+	–	–	77
Is the right hemisphere involved in idiom comprehension? A neuropsychological study.	Papagno	2006	–	+	–	–	–	–	–	–	86
Circadian preference and facial emotion recognition among rehabilitation inpatients	Paradee	2008	–	–	–	–	–	–	+	–	82
Altered neural activity and emotions following right middle cerebral artery stroke	Paradiso	2011	–	+	–	+	–	–	–	–	80
Assessment of pragmatic impairment in right hemisphere damage	Parola	2016	–	–	+	–	+	–	–	+	91
Cerebral mechanisms for understanding emotional prosody in speech	Pell	2006	–	–	+	–	–	–	+	–	91
Language recovery and evidence of residual deficits after nonthalamic subcortical stroke: A 1 year follow-up study	Peñaloza	2014	–	+	–	–	–	–	–	–	95
The brief executive language screen: sensitivity and specificity in acute to early sub-acute stroke	Phillips	2025	+	+	–	+	–	+	–	–	89
Recognition of musical emotions and their perceived intensity after unilateral brain damage	Pralus	2020	–	–	–	+	–	–	–	–	80
Clinical utility of the Neuropsychological Assessment Battery (NAB) after unilateral stroke.	Pulsipher	2013	–	+	–	+	–	+	–	–	91
Neurophysiological correlates of word and pseudo-word processing in well-recovered aphasics and patients with right-hemispheric stroke	Pulvermüller	2004	–	+	–	–	–	–	–	–	68
Script knowledge following stroke	Purdy	2002	–	–	–	–	–	+	–	–	82
Sensitivity to conversational deviance in right-hemisphere-damaged patients	Rehak	1992	–	–	+	–	–	–	–	–	86

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Story processing in right-hemisphere brain-damaged patients	Rehak	1992	–	–	+	–	–	+	–	–	75
Impairment of inferential abilities based on pictorial stimuli in patients with right-hemisphere damage.	Ribeiro	2015	–	–	+	–	–	–	–	–	86
Category-selective deficits are the exception and not the rule: Evidence from a case-series of 64 patients with ventral occipito-temporal cortex damage	Rice	2021	–	–	–	+	–	–	–	–	89
Apparent shift in visual field preference after unilateral stroke	Riege	1988	+	–	–	–	–	–	–	–	64
Metaphor comprehension in right brain-damaged patients with visuo-verbal and verbal material: A dissociation (re)considered	Rinaldi	2004	–	+	–	–	–	–	–	–	64
Cognitive-communication disorder following right hemisphere damage: Narrative production	Rodriguez	2022	–	–	–	–	–	+	–	–	89
Cognitive impairment after unilateral hemispheric injury of congenital or adult origin.	Rogers	2002	–	–	–	+	–	–	–	–	82
Script knowledge in right hemisphere-damaged and in normal elderly adults	Roman	1987	–	–	+	–	–	–	–	–	66
Neurology of affective prosody and its functional-anatomic organization in right hemisphere	Ross	2008	–	–	–	–	–	–	+	–	73
Inference in right hemisphere damaged individuals' comprehension: The role of sustained attention	Saldert	2007	–	–	+	–	–	–	–	–	89
Successful cognitive rehabilitation for acute right frontal aslant tract injury with impaired working memory and inattention using diffusion tensor tractography	Sawaki	2025	–	–	–	+	–	–	–	+	64
Suppression and narrative time shifts in adults with right-hemisphere brain damage	Scharp	2013	+	–	+	–	–	–	–	–	89
Not all analogies are created equal: Associative and categorical analogy processing following brain damage	Schmidt	2012	+	–	–	–	–	–	–	–	91
Neuroanatomical correlates of macrolinguistic aspects in narrative discourse in unilateral left and right hemisphere stroke: A voxel-based morphometry study	Schneider	2021	–	–	–	+	–	+	–	–	80
A linguistic deficit resulting from right-hemisphere damage	Schneiderman	1988	–	+	–	–	–	–	–	–	61
Story arrangement ability in right brain-damaged patients.	Schneiderman	1992	–	–	+	+	–	–	–	–	70

(*table continues*)

Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Effects of unilateral spatial neglect on spatial agraphia of Kana and Kanji letters	Seki	1998	–	–	–	–	–	–	–	+	80
Characterizing subtypes and neural correlates of receptive aprosodia in acute right hemisphere stroke	Sheppard	2021	+	–	–	–	–	–	+	–	68
Discourse in a right-hemisphere brain-damaged subject	Sherratt	1990	–	–	–	–	–	+	–	–	75
Inference comprehension in text reading: Performance of individuals with right- versus left-hemisphere lesions and the influence of cognitive functions	Silagi	2018	–	–	+	–	–	–	–	–	82
Production and evaluation of requests by right hemisphere brain-damaged individuals	Stemmer	1994	–	–	–	–	+	–	–	–	73
Acute temporal lesions are associated with phonological word verification errors	Stockbridge	2025	+	–	–	–	–	–	–	–	84
Sources of performance on theory of mind tasks in right hemisphere-damaged patients	Surian	2001	–	–	+	–	–	–	–	–	77
Spoken sentence comprehension in aphasia: Event-related potential evidence for a lexical integration deficit	Swaab	1997	–	+	–	–	–	–	–	–	59
A different story on 'Theory of Mind' deficit in adults with right hemisphere brain damage.	Tompkins	2008	+	–	+	–	–	–	–	–	95
Coarse coding and discourse comprehension in adults with right hemisphere brain damage	Tompkins	2008	+	+	+	–	–	–	–	–	93
Generalization of a novel implicit treatment for coarse coding deficit in right hemisphere brain damage: A single subject experiment	Tompkins	2012	–	+	–	–	–	–	–	–	92
Inference generation during text comprehension by adults with right hemisphere brain damage: activation failure versus multiple activation	Tompkins	2004	+	–	+	–	–	–	–	–	93
Knowledge and strategies for processing lexical metaphor after right or left hemisphere brain damage	Tompkins	1990	+	–	–	–	–	–	–	+	86
Mechanisms of discourse comprehension impairment after right hemisphere brain damage: suppression in lexical ambiguity resolution	Tompkins	2000	+	–	–	–	–	–	–	–	86
Working memory and inference revision in brain-damaged and normally aging adults	Tompkins	1994	–	–	+	–	–	–	–	–	98
Contextual mood priming following left and right hemisphere damage	Tompkins	1987	–	–	+	–	–	–	–	–	91

(*table continues*)

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Quality Rating and Language Level Data Extracted for All Papers Included in this Review

Title	First author	Year	Comprehension (word, sentence, discourse levels)			Production (word, sentence, discourse levels)			Extralinguistic	Other	Quality rating score[d]
			W[a]	S[b]	D[c]	W	S	D			
Formulaic expressions in spontaneous speech of left- and right-hemisphere-damaged subjects	Van Lancker Sidtis	2006	–	–	–	–	–	+	–	–	73
Processing of speech acts by right hemisphere brain-damaged patients: An ecological approach	Vanhalle	2000	–	–	+	–	–	–	–	–	66
Lexical-semantic deficits following right hemisphere damage: Evidence from verbal fluency tasks	Varley	1995	–	–	–	+	–	–	–	–	66
Theory of Mind in adults with right hemisphere damage: What's the story?	Weed	2010	–	–	–	–	–	–	–	+	80
Affective prosodic disturbance subsequent to right hemisphere stroke: A clinical application	Wertz	1998	–	–	–	–	–	–	+	–	80
Exploring the viability of NARNIA with cognitive–communication difficulties: A pilot study	Whitworth	2020	–	–	–	–	–	–	–	+	83
Distinguishing lies from jokes: theory of mind deficits and discourse interpretation in right hemisphere brain-damaged patients	Winner	1998	–	–	+	–	–	–	–	–	77
The ear craves the familiar: Pragmatic repetition in left and right cerebral damage	Wolf	2014	–	–	–	–	–	+	–	–	68
Voxel-based lesion symptom mapping of coarse coding and suppression deficits in patients with right hemisphere damage	Y. Yang	2015	+	–	–	–	–	–	–	–	91
Production of different types of familiar expressions by individuals with left- and right-hemisphere damage across discourse elicitation tasks	S.-Y. Yang	2026	–	–	–	–	–	+	–	–	66
Effects of right and left hemisphere damage on performance of the "Right Hemisphere Communication Battery"	Zaidel	2002	+	+	+	–	–	+	–	+	84
Negative word production in adults with right hemisphere brain damage: Effects of implicit assessment and contextual bias	Zezinka	2015	+	+	+	–	–	+	–	–	80
Verbal fluency in right brain damage: dissociations among production criteria and duration.	Zimmerman	2014	–	–	–	+	–	–	–	–	77
Pragmatic and executive functions in traumatic brain injury and right brain damage: An exploratory comparative study	Zimmermann	2011	–	–	–	+	–	–	–	–	64

Note. + indicates manuscripts that included data relevant to the parameter; – indicates manuscripts that did not contain data relevant to the parameter.

[a]Word level. [b]Sentence level. [c]Discourse level. [d]Percentage of possible quality points from the Standard Quality Assessment Criteria Score (Kmet, 2004). Each article was evaluated by two independent raters; the average of those two scores is reported here.