

DISCUSSION

Apragmatism: The renewal of a label for communication disorders associated with right hemisphere brain damage

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Abstract

Background: Right hemisphere communication disorders are neither consistently labelled nor adequately defined. Labels associated with right hemisphere brain damage (RHD) are broad and fail to capture the essence of communication challenges needed for stroke-related service provisions. Determination of rehabilitation needs and best-practice guidelines for the education, management and functional improvement of communication disorders after RHD are all predicated on an apt diagnostic label and disorder characteristics.

Aims: In this paper *apragmatism* is proposed as a potential communication-specific diagnostic label for the impairments in communication that occur after RHD. In particular, the researchers aimed: (1) to establish an operational definition of apragmatism; and (2) to describe the linguistic, paralinguistic and extralinguistic communication deficits under the umbrella term *apragmatism*.

Methods & Procedures: An international collaborative of researchers with expertise in RHD followed a multilevel approach to consider the utility of apragmatism as a diagnostic label. Adopting the relational approach to concept mapping, the researchers engaged in a series of group meetings to complete four levels of mapping: (1) identify and review, (2) define, (3) expert discussion and (4) label determination.

Main Contribution: Apragmatism was established as a suitable diagnostic label for the impairments in communication associated with RHD. The paper offers an operational definition and description of the linguistic, paralinguistic and extralinguistic features of apragmatism through evidence summaries and examples from people with RHD retrieved from the RHDBank.

Conclusions & Implications: The adoption of the term *apragmatism* offers an opportunity to capture the hallmark of RHD communication deficits. The use of the term is recommended when referencing the pragmatic language impairments in this population. Apragmatism, which may co-occur with or be exacerbated by cognitive impairments, can interfere with the ability to interpret and convey intended meaning and impact the lives of right hemisphere stroke survivors and their families.



KEYWORDS

cognitive–communication, discourse, linguistic/language disorders, pragmatics, right hemisphere brain damage

What this paper adds

What is already known on the subject

- RHD results in a heterogeneous group of deficits that range in cognitive–communicative complexity. Many of the deficits are subsumed under pragmatics. For example, adults with RHD may demonstrate tangential or verbose communication, insensitivity to others' needs and feelings, prosodic changes, minimal gesture use and facial expression, and more. While descriptions of pragmatic impairments pervade the literature, there is no consistently used diagnostic label. The clinical consequences of this absence include difficulty with inter- and intra-disciplinary communication about these patients, difficulty consolidating findings across research studies, and challenges in communicating about these pragmatic changes with patients, families and other stakeholders.

What this paper adds to existing knowledge

- The term *apraxmatism* is proposed as a diagnostic label to consistently describe pragmatic communication changes after RHD. Apraxmatism is characterized using three components of pragmatics: linguistic, paralinguistic and extralinguistic. Descriptions and examples of these three components are provided with supplemental transcripts retrieved from the RHDBank.

What are the potential or actual clinical implications of this work?

- Adoption of the term *apraxmatism* by speech and language therapists and other medical and rehabilitation professionals has the potential to provide consistency in describing the abilities and challenges experienced by people following a right hemisphere stroke. Such improvements may help drive the development of evidence-based assessments and treatments for this population.

INTRODUCTION

Right hemisphere brain damage (RHD) due to stroke can result in a wide range of receptive and expressive communication disorders. For example, adults with RHD are known to have challenges in understanding non-literal and figurative language, contextual cues and prosodic features (Ferré et al., 2012; Sheppard et al., 2021; Weed, 2011). Production may be characterized by poor discourse cohesion, disrupted topic maintenance or relevance, reduced use of questions and/or inefficient use of prosodic variation and facial expression to convey intended meaning (Minga

et al., 2021a; Stockbridge et al., 2021). Both the comprehension and production of language impact the accuracy and appropriateness of interaction in a given context (Ferré, 2012). These communication deficits can have significant long-term effects on relationships and social participation (Hewetson et al., 2017, 2021).

Deficits associated with RHD have been variously labelled as cognitive–communication disorders, right hemisphere (RH) communication disorders, RH syndrome, RH dysfunction, non-aphasic language disorders and/or high-level language disorders. These labels range in level of specificity from those describing the collective

hemisphere and what RH communication is not (aphasia), to what is thought to underlie the impairments and the complexity of the disorders. Each has served to increase knowledge of the existence of RH communication disorders amid comparisons that place them as less profound than other disorders such as aphasia. The diversity of labels is both representative of the inexplicitly defined collection of disorders and tragic for survivors, as the imprecise and inconsistent communication and education amongst professionals minimizes the seriousness and functional impact of the disorders.

In recognition of the need for a label that distinctly captures the essence of RHD communication, the International Right Hemisphere Collaborative (IRHC), a group of researchers actively involved in understanding the nature, characteristics and clinical approaches to communication disorders after RHD, sought to identify an apt label. The IRHC was formed from discussions at research and professional conferences regarding challenges within the field of speech–language pathology surrounding matters of communication after RHD. The six authors of this manuscript are the founding members of the IRHC; two clinical scientists employed at an Australian academic institution and four clinical scientists at academic institutions in the United States. All members have doctoral qualifications; dedicated research programmes in RHD; and certifications as speech–language pathologists with clinical experience across South Africa, Australia and the United States. This manuscript provides an overview of the methodology employed to arrive at the label of *apraxmatism*, the rationale for its adoption, and an operational definition that is supplemented with examples of deficits subsumed under the label. We propose that apraxmatism should be used widely for diagnosis, and provide suggestions for future work, including assessment and exploring underlying mechanisms.

Throughout, we refer to the specific consequences of RHD as *deficits or impairments*. However, we acknowledge that in some cases people with RHD may experience communication differences that do not necessarily cause a deficit. As we will discuss in this paper, there is a significant amount of heterogeneity in pragmatic skills even in people without brain damage. It is important to interview the client with RHD as well as their family members whenever possible in order to gain a full understanding of the impact of RHD. In addition, we will use the term *disorder* rather than *difference* to refer to the umbrella term of apraxmatism throughout this paper. Specifically, the term *apraxmatism* denotes the disorder, which encompasses linguistic, paralinguistic and extralinguistic deficits or impairments. We chose this term because we want to highlight that people with RHD are faced with significant difficulties, and should not be overlooked by clinicians.

This is especially important because many deficits faced by people with RHD may fall within the broad range of ‘normal’ for the population, but do not fit within their own version of ‘normal’ and can therefore have a significant negative impact on their lives.

METHOD

A multilevel approach was followed to interrogate apraxmatism as a diagnostic label for the communication impairments that can arise from RHD (Figure 1). This approach draws on principles from the relational approach to concept mapping with researcher-generated maps created at each level to integrate multiple sources of information in order to draw conclusions about a complex construct (Conceicao et al., 2017). The four levels of concept mapping were: (1) identify and review, (2) define, (3) expert discussion and (4) label determination. Concept maps were created over a period of more than 20 group video conferencing sessions between June 2020 and October 2021, each lasting 1.5–2 h. All team members participated throughout this period; all team members are acknowledged as authors of this manuscript.

In Level 1, *identify and review*, each team member independently completed a shared spreadsheet to summarize definitions for three broad concepts commonly associated with RHD communication: social communication, pragmatics and social cognition. These labels were deemed pertinent to (1) the diagnostic labels used for communication disorders after RHD and (2) the associated characteristics and impairments. Template completion was an iterative process with the visual representation of data forming the basis of videoconference discussions to create linkages between core concepts (Meagher-Stewart et al., 2012). Group discussions that followed focused on the identification of barriers to clinical understanding of communication disorders after RHD and determinations of overlap between frequently used terminology across speech and language therapy and related fields. Initial discussions prompted the need to define language and yielded key points of interest and relevant search terms. Namely, the group decided that the concept of pragmatic aspects of communication subsumed many of the RHD communication behaviours.

In Level 2, *define*, team members worked in pairs to review and characterize ‘pragmatic communication’ using existing literature with the goal of identifying a term that comprehensively captures the communication deficits after RHD. Considerable debate ensued when considering other terminology used in the literature (i.e., cognitive–communication and social cognition). While each member recognized the influence of cognition on RHD communi-

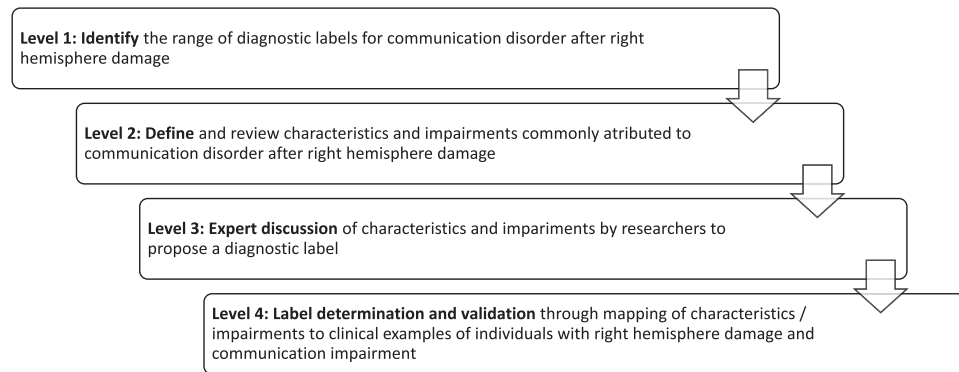


FIGURE 1 Schematic for a multilevel approach to designating apragmatism as a diagnostic label

communication behaviours, there was agreement that these labels were vague and did very little to highlight the impairments of communication that permeate the lives of survivors. The consensus was reached on the use of apragmatism as an inclusive diagnostic label.

The final video conference discussions were completed at Level 3, *expert discussion*. At this level, the IRHC reviewed the characteristics and impairments associated with the diagnostic label of apragmatism and assessed the alignment of this term with existing labels. Clinical characteristics of apragmatism after RHD were then outlined using three components of impairment: linguistic, paralinguistic and extralinguistic.

The final step, Level 4, *label determination*, sought to validate the diagnostic label by mapping the defined clinical characteristics onto a series of pre-existing open-source clinical case vignettes creating linkages between the research literature and clinical presentations (Conceicao et al., 2017). The section that follows describes key features of discussions leading to the determination of apragmatism as a diagnostic label for communication disorders after RHD.

RATIONALE FOR THE LABEL APRAGMATISM

Diagnostic labels

Many of the labels currently in use are broad or vague descriptions. For example, *RH communication disorder* and *RH dysfunction* provide no information about the characteristics of the disorders, only that they are related to the (dys)function of an entire half of the brain. *Non-aphasic language disorders* and *high-level language disorders* capture the essence of an existing language disorder and rule out basic language processes, but provide no population-specific characteristics. These labels also are dependent upon a definition of the term *language*. Within the field

of speech and language therapy, the definition of language includes phonology, morphology, syntax and pragmatics. Thus, to a speech and language therapist (SLT), RH language disorders can include deficits in interpreting or conveying intended meaning through linguistic (word and syntactic choices), paralinguistic (prosody) and extralinguistic (gesture, body language, facial expression) means. However, outside of the field (and even, we suggest, within some parts of communication sciences and disorders), the term *language* is typically interpreted as encompassing only the linguistic aspects. This is evident in the description of the left hemisphere as the dominant hemisphere for language, and the notion that the RH is the ‘silent’ hemisphere. In addition, within the United States’ governing (ASHA) and accreditation (CAA) bodies of speech and language pathology, pragmatics is defined both as a component of language and of social communication (i.e., Social Aspects of Communication).

The *cognitive–communication disorders* label has been used since the 1990s primarily to describe the communication impairments associated with traumatic brain injury (Hartley, 1995). It was adopted for RHD deficits in the 2010s. While some definitions include both cognitive (attention, memory, executive function, information processing) and language processing deficits, others narrow it to refer to communication disruptions that are caused by changes in cognition (MacDonald, 2017; Togher et al., 2014). The latter definition excludes changes specifically to language processing that can occur after RHD, and the different interpretations of the label result in misunderstanding and miscommunication between professionals.

The term *RH syndrome* appears in some papers and chapters (including some early work written by co-author Blake). This particular label is problematic for at least two reasons. First, a syndrome is defined as a set of signs and symptoms that define a disorder or disease. With RHD, there is a rather long list of cognitive and communication impairments (Table 1) that have been reported, but few repeatable patterns of co-occurrence. For example, a

TABLE 1 Impairments/deficits associated with right hemisphere brain damage (RHD)

Communication deficits	Cognitive deficits
Inference generation deficits	Executive dysfunction
Impairments of interpretation and use of non-literal language	Attention deficits (including unilateral neglect)
Discourse coherence deficits	Memory deficits
Difficulty in the use of questions	
Tangential and/or egocentric discourse	
Verbosity or paucity of speech	
Missing gist or main idea	
Aprosodia (use and interpretation of emotional prosody)	
Emotional facial expression deficits	

systematic review of prosodic deficits associated with RHD yielded only 14 studies over 50 years of research that provided enough data to examine co-occurrences, and of those, the only apparent relationships were between recognition of emotional prosody and recognition of emotional facial expression, and recognition of emotional prosody and interpersonal interactions including using and responding to humour and non-verbal cues such as making appropriate eye contact (Sheppard et al., 2022). In contrast, Ferré et al. (2012) have reported cross-linguistic clusters of communication deficits based on the *Montreal Evaluation of Communication* (Joanette et al., 2015). Regardless, these studies do not solve the problem of using the label *RH Syndrome* because they do not narrow down the specific signs or symptoms that define the overarching disorder. Second, the term has been used by different authors to describe a variety of signs/symptoms including motor impersistence (Kertesz et al., 1985), responding to stimuli addressed to others (Bogousslavsky & Regli, 1988) or hypergraphia (Yamadori et al., 1986). In these cases, it may be that the term *syndrome* was erroneously used instead of the more appropriate ‘symptom’.

In 1999, Joanette and Ansaldo proposed that since (1) pragmatics are a key area of deficit after RHD, (2) pragmatics are a domain of language and (3) the term *aphasia* refers to a language deficit, then the label *pragmatic aphasia* would be appropriate. In 2001, Myers wrote a response to Joanette and Ansaldo arguing that while pragmatics—defined as communicative intents—are a key feature of communication disorders following RHD, pragmatic aspects of communication are not inherently tied to a language symbol system (e.g., conveying intended meaning can be accomplished non-verbally, as through gestures or facial expressions). Additionally, she argued that the scientific definition of *aphasia* does not cover all language disorders but rather is specific to deficits in verbal symbolic manipulations and thus was not appropriate in the context of RHD communication. After rejecting

the label *pragmatic aphasia*, Myers proposed a new label: *apragmatism*.

Myers defined apragmatism as a disorder of communicative intent. She further suggested that a full definition could include specifiers such as ‘apragmatism of the RH type’ (Myers, 2001: 917) and mechanisms underlying the disorder such as inefficiencies in accessing communicative intents or an attentional deficit (either general attention or unilateral neglect) that narrowed the focus and resulted in the loss of processing of contextual cues. The review of the existing diagnostic labels and examination of their characteristics led the IRHC team to select the label *apragmatism*¹ as the most appropriate for further operational definition and specification.

Characteristics and deficits

As described above, pragmatics are a key component of RH communication disorders. In Cognitive Pragmatic Theory, pragmatics is a domain of language that involves conveying and interpreting meaning or intent within a specific context through linguistic (word and syntactic selection), paralinguistic (vocal manipulation) and extralinguistic (posture, facial expression, gestures, eye contact) components (Bara, 2010) (Table 2). Pragmatic components of communication are not mutually exclusive. For example, effective production often involves the integration of words/syntax, prosody and non-verbal cues. When one or more are missing, as in communicating by text (linguistics) alone, miscommunication is common; hence, the reason why people use punctuation, capitalization and emojis to quickly convey their intended meaning in the absence of paralinguistic and extralinguistic components. Pragmatics also involves comprehension. Knowledge of the linguistic system, the communicative history between partners, and monitoring the communication partner’s (CP) responses, both verbal and non-verbal, are equally important to prag-

TABLE 2 Components of pragmatics

Components of pragmatics	Examples of production
<i>Linguistic components</i> involve selecting words and syntactic structures that most clearly express intended meaning and which are appropriate for the communicative context (e.g., setting, purpose, conversational partner); interpreting the words and structures within the communicative context	'angry' versus 'furious' 'help' versus 'facilitate' 'shut the window' versus 'that cold breeze is making me shiver' 'the coach, because he wanted to win the game, put his best player in' versus 'the coach wanted to win the game so he put the best player in'
<i>Paralinguistic components</i> involve the manipulation of vocal tone, prosody, and intonation to efficiently and effectively convey mood, emotion, and intended meaning; differentiating and interpreting the manipulations within the communicative context	Tanisha is pregnant? versus Tanisha is pregnant! TANISHA is pregnant? versus Tanisha is PREGNANT? You went on a date with Charles? (spoken with disgust, delight, surprise, anger)
<i>Extralinguistic components</i> include the use of non-verbal cues such as facial expression, eye contact and gestures to supplement or replace verbalizations to efficiently and effectively communicate intended meaning; the recognition and interpretation of such non-verbal cues within the communicative context	You went on a date with Charles? (facial expression conveying disgust, delight, surprise, anger) Maintaining persistent eye contact in order to convey the gravity of the verbal message; avoiding eye contact to convey shame, embarrassment, uncertainty, etc. Using gestures to emphasize a point, to enhance a description (the fish was THIS BIG), or to communicate without verbalizing

TABLE 3 Demographics of RHDBank participant vignettes

Participant ID	Age (years) at testing	Gender	Education (years)	RHD duration (years)
Minga 08	53.7	F	18	5.5
Minga 14	31.1	M	14	2.17
Minga 42	51.8	F	14	7.5
Nazareth 01	62.0	M	20	6.8
Nazareth 03	68.1	M	24	2.2

matic communication and represent documented areas of deficit after RHD.

Therefore, we define apragmatism as a disorder in conveying and/or comprehending meaning or intent through linguistic, paralinguistic and/or extralinguistic modes of context-dependent communication. The context includes (among other things) the conversational partner(s), environment, cultural considerations and goal of the interaction. Cognitive and perceptual deficits such as unilateral neglect and impairments of executive function, attention, and memory are not a part of apragmatism. However, it is likely that cognitive impairments can impact and co-occur with apragmatism.

In support of our definition of apragmatism and its characteristics, this paper will refer to video segments from RHDBank (<https://rhd.talkbank.org/>), an open-source, shared database of multimedia interactions for the study of communication in people with RHD (Minga et al., 2021b) (see Table 3 for demographics of the featured participants). Each language sample was elicited using the RHDBank Discourse Protocol, which consists of tasks spanning four

different discourse genres: descriptive, narrative, procedural, and conversational. Institutional IRB approval was received for the collection of language samples. Complete task transcripts of the RHDBank segments can be found in the [Supplemental Material](#) and the RHDBank. To access RHDBank and the RHDBank protocol, readers may elect to become a part of the RHDBank consortium (<https://rhd.talkbank.org>), which allows full access to banked language samples using a secure and HIPAA-compliant password-protected server.

Deficits under the label apragmatism

Linguistic comprehension and production

Linguistic deficits of apragmatism are those that involve an impaired ability to comprehend and produce language that is appropriate for the communicative context. Deficits in linguistic comprehension historically associated with RHD include the oft-cited deficit in generating inferences

(Brownell et al., 1986; Hatta et al., 2004), interpreting non-literal languages such as idioms, metaphors and sarcasm (Giora et al., 2000; Van Lancker-Sidtis & Yang, 2017), and interpreting jokes (Heath & Blonder, 2005). A key feature of the communication impairment is associated with RHD is the interruption of the expression or comprehension of the intended meaning. These are most easily seen in contexts in which the intent clearly differs from the linguistic content, such as in sarcasm or some forms of humour. When planning for an outing, the phrase 'it's a perfect day for a picnic' might be interpreted literally if the sun is shining and it is warm. However, if it is pouring with rain, then the intended meaning (it's a terrible day for a picnic) is the opposite of the literal meaning. Effective communication extends beyond correct comprehension of the syntax and the words; it necessitates the integration of contextually relevant cues. For example, the following interaction took place between an adult with RHD and a CP during a telepractice session:

CP: /SAN/ is coming in [facing window, sun shining directly on the face of the CP].
 RHD: How old is your son?
 CP: I was referring to the sun that's coming in through the window.
 RHD: Oh.

Impairments in inference generation and the integration of information may hamper the ability to use contextually based information (i.e., hearing a young person's voice in the background; seeing the light change on the face of the screen of the CP; noticing that the CP adjusted his screen position, etc.). Integrating and using contextually based information is necessary to appropriately comprehend the intended meaning ('sunlight' versus 'male child') as a basis for producing a linguistic response that is specific to a communicative context (e.g., 'lighting during virtual meetings can be tricky').

Linguistic production deficits of apragmatism may be labelled as verbose, loquacious, tangential, egocentric or characterized by a paucity of expression. Such characteristics may render the linguistic production of language as socially odd, difficult to follow and in some instances wholly inappropriate for the context. The spectrum of characterizations hinges on the quantity (loquacious and paucity) and quality (tangential, egocentric, literal) of the discourse produced. Although these characterisations are helpful in developing a tacit understanding of the range of communication behaviours, they may not aptly capture clinically relevant features that may warrant therapeutic considerations. Investigations of production also vary so widely in the types of elicitation tasks and measures that it can be challenging for the clinician to quantify

the stereotypic characterizations for diagnostic and therapeutic purposes. The functional impact of the generally recognized pragmatically based impairments of language production after RHD warrants particular attention if only to provide a sound basis for the existence of production-related impairments in the presence of relatively preserved elements of speech and language production (i.e., vocabulary, intelligibility, syntax and morphology). To this end, the remainder of this section will consist of requisite examples of linguistic production deficits of apragmatism after RHD.

Studies suggest that adults with RHD have difficulty producing indirect requests for information (Brownell & Stringfellow, 1999), and produce fewer core propositions (Joanette et al., 1996) and formulaic expressions (Van Lancker Sidtis & Postman, 2006). They can have challenges conveying the main points of narratives and images (Bartels-Tobin & Hinckley, 2005), include tangential or irrelevant information (Marini, 2012) and omit structural elements important to the organization of the story (Karaduman et al., 2017; Stockbridge et al., 2019). Together these production deficits result in narratives that are disorganized and devoid of the global message that is at the core of the discourse task (see Minga, 2016, for a review). Consider the following excerpt from Minga42 (Timestamp: 13:16–15:0) completing the Cat Rescue task of the RHDBank protocol. In this task, the participant is asked to view an image and to tell a story about what is happening in the image with a beginning, middle and end.

The participant in the example appears to have some expected elements of a story; namely a middle and end, but the linguistic elements that tie the story together are reduced (Table 4). She does not use narrative starters (e.g., once upon a time; one day; there once was a little girl, etc.) to signal the beginning of a story, nor are there temporal markers for timing of events described. Vocabulary used may be characterized as exhibiting qualities of literal content rather than inferred content (Myers, 1979). For example, the terms *girl*, *dog*, *cat*, *fireman* and *bird singing* are used to label items specifically depicted in the image. There are very few instances of possessive pronoun use which aligns with the infrequency of inferred content offered during narrative generation. Note that the literal content is not absolute, as the participant did use 'father' and 'daddy' to refer to the man in the tree. Lexical use in this instance demonstrates the use of ambiguous pronouns or referents after RHD (Balaban et al., 2016) as in the statement, 'so **they** had to call the fire department to come with the ladder so **they** could get the daddy out of the tree'. This communicative behaviour is consistent with recent work indicating that adults with RHD are less successful at resolving pronoun ambiguities during narrative discourse production (Stockbridge et al., 2021). It is also

TABLE 4 Excerpt of transcript from RHDBank Minga42 cat rescue

[Minga42 Cat Rescue Timestamp 13:16–15:00]

INV: I want you to look at everything that's happening in the picture.

INV: and, then tell me a story about what you see.

INV: make sure the story has a beginning, middle, and end.

PAR: so, the little girl wants to get her cat out of the tree.

PAR: and the father got up in the tree to get the cat out of the tree but the ladder fell.

PAR: and the dog is barking at the daddy cause he's in the tree.

PAR: so they had to call the fire department to come with the ladder so they could get the daddy out of the tree.

PAR: but the cat is still in the tree.

PAR: and the bird is in the tree singing.

PAR: and, here comes the firemen to get the daddy out of the tree.

INV: is that it?

PAR: yep, that's it.

INV: thank you.

PAR: mm hm.

Note: INV, investigator; PAR, participant.

TABLE 5 Excerpt of transcript from Minga14 procedural discourse

[Minga14 Procedural Discourse Timestamp 23:13 – 23:31]

INV: let's move on to something a little different

INV: tell me how you would make a peanut butter and jelly sandwich

PAR: &-um take bread and put on one slice the peanut butter

PAR: and then on another slice put the jelly and put (th)em together

INV: (o)kay

Note: INV, investigator; PAR, participant.

interesting that the utterances were frequently connected using the conjunction *and*, and contained few predicates, both of which are also consistent with prior work (conjunctions: Cherney, 1990; Sherratt & Penn, 1990; predicates: Davis et al., 1997). The absence of these linguistic features may be related to the relative paucity of expression for this participant on this particular task.

The amount of language produced may vary by discourse type and linguistic features for any survivor of RHD. Thus, cross-genre considerations are needed to gain a complete picture of the linguistic aspects of apragmatism. For example, the language produced by the participant in Minga14 during a procedural discourse task (Table 5) is significantly reduced when compared with that produced during his conversational discourse task (Table 6, discussed below).

In this procedural discourse sample, the language produced can be described as impoverished and lacking concepts that are typically included (Richardson & Dalton, 2016) and necessary for an unfamiliar individual to make the sandwich. For example, the participant in Minga14 did not provide information related to first getting the items needed to make the sandwich; namely, the peanut butter, jelly, plate and a knife. The paucity of expression during this task may be attributed to his inference that the listener has knowledge of the procedure, materials and specific

steps needed to make the sandwich, and therefore resulted in failure to meet the expectations of the tasks, which were set in the context of a language examination. In contrast to both the picture description in Minga42 and the procedural discourse in Minga14, the amount of language produced in the conversational discourse task excerpt in the Minga14 in Table 6 may fall within the expected range for adults without brain damage for language quantity. However, as with story narratives, conversational interactions between people meeting for the first time have expected content and topics. In this case, the goal was to get to know an unfamiliar person.

The 'jet ski' story is an elaboration on a topic of 'going to the beach' which is an enjoyable activity for the participant. The quantity of the young man's linguistic production may appear sufficient. Closer inspection, however, shows that he, too, frequently connects utterances with the conjunction *and* while having a relative absence of temporal markers that might typically aid in the organization of the story. Use of *finally* is an exception that occurs with an utterance with what appears to be incorrect pronoun use in the production of, '*finally the next thing she knew she looked back and I wasn't there*'. An instance of pronoun misuse occurs with the use of *she* in the utterance, '*she [*] uh fell off and she just kept going*'. Since the participant did the falling and identified as a man, the use of '*I*' as the

TABLE 6 Excerpt of transcript from Minga14 First-encounter conversation

[Minga14 First-encounter Conversation timestamp 13:35–14:43]

PAR: and I would hang off the back of it

INV: oh_no

PAR: & = laughs my wife allows you to drive (th)em once in

PAR: I was I would always hang off the back

PAR: (be)cause I would just be crazy and stuff

PAR: and I would do like 484

PAR: (be)cause I was always had the mindset of what's the worst that could happen it's water

INV: yeah ‡ I don't know about that mindset

PAR: yeah ‡ just xx hang off the back

PAR: and since she couldn't see me and everything I'd hang out yeah

PAR: and *she* [*] &-uh fell off and she just kept going

PAR: finally the next thing *she* knew *she* looked back and I wasn't there

INV: yeah & = laughs

PAR: yeah ‡ I just watched her keep going

PAR: and I'm like yellin(g)

PAR: she couldn't hear me of_course 496

PAR: so she just kept going 497

PAR: and &-um & = laughs I just watched her disappear 498

PAR: and next think I know finally this boat with a dad and <his like> [//] a bunch of like his daughter and all of her friends, like &-um probably about like thirteen or so, comes driving by

PAR: and I'm just floating there

PAR: and he drives by and turns around

PAR: and he's like

PAR: hey you [//] &+go you need help ?

PAR: I'm like

PAR: yeah ‡ my wife just drove off and everything

Note: INV, investigator; PAR, participant.

first pronoun and '*she*' as the second, to refer to his wife, is appropriate for this utterance.

Perhaps the most glaring pragmatic aspect of this discourse task rests in the light of the goal of the conversation: to get to know an unfamiliar person. The participant in Minga14 produced a copious amount of language during the conversation. However, while he responded to questions and talked about himself, he did not ask questions to learn more about the investigator. Reduced question-asking within this discourse context is consistent with recent study findings that some adults with RHD ask questions less frequently with frequency of production varying by type and task (Minga et al., 2021a). The propensity for differences in question-asking after RHD are seen in other samples in the RHDBank (for additional examples see the conversations in Nazareth03 and Minga08). Such behaviours contribute to stereotypic perspectives of communication after RHD; namely, egocentric, tangential and disorganized discourse that fails to convey the intended message or meet a goal (Bartels-Tobin & Hinckley, 2005; Blake, 2006). The examples above illustrate the multifaceted nature of communication and apragmatism: appropriate quantity alone is not sufficient for effective communication.

Paralinguistic production and comprehension

Paralinguistics involve the manipulation of prosody to convey intended meaning. Prosody refers to manipulations speakers make to the volume, pitch, rate and rhythm of their speech to express the intended meaning of an utterance. There are several main forms of prosody: grammatical, pragmatic and affective/emotional. Grammatical prosody conveys information about syntactic structure, and also distinguishes statements from questions, and nouns from verbs (e.g., the noun PERmit versus the verb perMIT) (Peppé, 2009; Raithel & Hielscher-Fastabend, 2004). Pragmatic prosody conveys contrast (e.g., 'I DON'T want to go to the party' where the emphasis on the word 'don't' indicates it contrasts with a previously encountered piece of information), focus, and turn-taking cues. In the RHD literature, grammatical and pragmatic prosody typically are grouped together under the label linguistic prosody. Affective/emotional prosody communicates the attitude or emotion of the speaker. For example, using a high pitch and a fast rate indicates the speaker is happy or engaged whereas using a low pitch and a slow rate indicates the speaker is sad or disinterested (Sheppard et al., 2021).



Manipulation of linguistic prosody is not consistently impaired after RHD (Stockbridge et al., 2021). However, a great deal of evidence demonstrates that the ability to convey emotion or mood using prosody can be impaired following RHD (Ferré et al., 2012; Stockbridge et al., 2021; Walker et al., 2004). Similarly, interpreting linguistic prosody has been associated with RHD (Blonder et al., 2005; Leiva et al., 2017; Parola et al., 2016), but this is not a consistent finding (Stockbridge et al., 2021). In contrast, RHD is often associated with impaired receptive emotional prosody (Pell et al., 2011; Ross, 1981; Sheppard et al., 2021).

Deficits of production and interpretation of prosody are called *aprosodias*. Expressive aprosodia refers to production deficits and receptive aprosodia refers to interpretation deficits. Aprosodia impacts relationships and social interactions. Additionally, caregivers of individuals with RHD rate impaired emotion recognition as the most difficult residual consequence of stroke (Hillis & Tippett, 2014), of which emotional prosody is one component. Given that paralinguistic components of language are part of pragmatics, aprosodias fall under the disorder of apragmatism.

As an example of expressive aprosodia, the reader is referred to Minga14 (Timestamp: 21:02–22:07) in the RHD-Bank. The man was instructed to tell the examiner as much of the Cinderella story as he could, using provided picture prompts if needed. The segment may be described as predominantly flat in affect as he does not use much intonation resulting in a monotone production which does not match the linguistic content or meaning of the story that is being told. A further example of expressive aprosodia can be seen in the Nazareth03 (Timestamp: 50:48–52:28 and 58:21–59:07) recording of a man who is completing the First Encounter task of the RHDBank protocol. His prosody is characterized by a rising pitch on each sentence. The individual is aware of the prosodic impairment and can describe the change in his use of prosody clearly; however, he is not able to alter it in the moment. This particular example highlights the importance of assessing the whole person and working with the client and family to identify changes related to stroke. ‘Upspeak,’ the use of rising intonation on statements that are not intended as questions, has become common in New Zealand, Australia, Canada and across the United States (Levon, 2020). In the United States, this prosodic pattern is predominantly found in young adult females; however, it is also a traditional feature of some dialects represented in the United Kingdom. Consideration of a person’s cultural and linguistic background thus is critical for determining the difference between a stroke-related impairment and a communication difference. For Nazareth 03, the pattern was not characteristic of his pre-stroke speech, and he was

bothered by the change and the misinterpretation of intent that the prosodic impairment created.

The RHDBank tasks are not designed to assess or illustrate receptive aprosodia as this would require capturing a participant’s response to a CP expressing emotions. It may be difficult for clinicians to recognize receptive aprosodia without assessing emotion recognition or recognition of linguistic prosody. However, as mentioned previously, receptive aprosodia can lead to communication breakdowns and have serious consequences for relationship satisfaction and quality of life following RHD (Blonder et al., 2012; Hillis & Tippett, 2014). It is therefore important for clinicians to educate patients and their families about receptive aprosodia and include relevant questions in patient/family interviews. If patients and caregivers do not realize this is a consequence of RHD, they may attribute receptive aprosodia symptoms to the patient being aloof or disinterested in their friends and families rather than recognising it as a symptom of stroke.

Extralinguistic production and comprehension

Extralinguistic aspects of communication include non-verbal cues such as body language, emotional facial expression, eye contact and gestures. Extralinguistic deficits may be evidenced by inappropriate or inefficient use or comprehension of non-verbal cues within a given communication context. This may result in a misalignment between the non-verbal aspect of communication and the purpose of the interaction; the relationship between the CPs; the setting; or cultural norms (e.g., the use of physical contact such as a hand on the arm, culturally restricted to close social contacts, with an acquaintance or a workplace superior). Non-verbal communication impairment is a frequent and persistent consequence of RH stroke. For example, Mackenzie et al. (1997) reported facial expression, eye contact and intonation were impaired in almost 76% of participants ($n = 70$) at 3 months and persisted to 1 year into recovery in 65% of participants with a single RH stroke.

Most of the work related to RHD in these areas has focused on the interpretation of emotional facial expression. The ability to use and interpret facial expressions of emotion is an important component of communicative competence as it contributes to accurate inference of a CP’s thoughts, feelings and probable next actions (Weed, 2011). Adults with RHD can have difficulty both producing and interpreting facial emotions (Abbott et al., 2014; Blonder et al., 2005; Kucharska-Pietura et al., 2003). Facial emotion perception is now understood to involve a bilaterally distributed neural network (Adolphs, 2002; Nakamura et al., 2014). Contrary to suppositions from early research,



the RH may not be preferentially involved in processing all emotions at all levels, but appears to be particularly important for coarse or unconscious processing of emotional information (Abbott et al., 2014; Gainotti, 2012; Najt et al., 2013). Compared with healthy controls, individuals with RHD are less accurate in the perception of both positive and negative facial expressions. Fewer studies have considered production of facial emotion expression following RHD, but reports suggest that individuals with RHD show reduced facial expressivity during both spontaneous and voluntary expressed emotions compared with normal controls and individuals with LHD (Blonder et al., 1993; Nijboer & Jellema, 2012). Furthermore, hemispheric differences are present in expressing positive and negative spontaneous facial emotions (Borod et al., 1986). Blonder et al. (2005) reported that individuals with RHD smiled and laughed significantly less than individuals with LHD during recorded interviews. The Cinderella Story retell by Minga14, discussed previously, is an example of reduced facial expression. The limited facial emotion expression, added to the limited emotional prosody, results in a flat affect (Minga14a, Timestamp 21:02–22:07).

Gestures, together with other extralinguistic, linguistic and paralinguistic cues are automatically integrated when we are observing and/or interacting with others to aid pragmatic understanding (Kelly et al., 1999). A few studies suggest that use of gestures following RHD is reduced (Cocks et al., 2007; Parola et al., 2016). Compared with non-brain-damaged controls and people with aphasia, people with RHD produce fewer iconic gestures (Göksun et al., 2013; Hogrefe et al., 2016), use few gestures while conveying information with high emotional content and may present with an increase in self-touching gestures of grooming and/or scratching (Cocks et al., 2007). An example is offered from Minga14 (Timestamp 11:00–12:00) who appears unaware that he is continually rubbing and scratching his arm and leg during the first encounter task. Clough and Duff (2020) highlight that individuals with RHD may experience difficulties with the perception of gestures, especially when visuospatial neglect is also present. An example of reduced awareness of and/or interpretation of non-verbal cues can be seen in Nazareth01 (Timestamp 1:02:15–1:04:10). During the conversational discourse, the man is recounting his stroke story and the conversational partner offers little to no encouragement for him to continue through gestures, facial expression or verbal cues and at times is looking down at her documentation. Such non-verbal cues may signal that a CP is ready to move on to the next topic, or next task in the context of this speech and language assessment protocol. However, these non-verbal gesture cues were either not detected or incorrectly interpreted by Nazareth 01, and as a result he produced a lengthy monologue.

Eye gaze is a non-linguistic contextual cue that is used to convey or determine the social intention of others. A mutually held (eye contact) or averted social gaze as two people approach each other requires accurate interpretation to ensure that a response in the moment is aligned with the intention of the approaching person. The use of eye gaze to convey intent either in isolation or as a supplement to linguistics has not been studied much in the RHD literature. One functional magnetic resonance imaging study reported that evoked activity in the superior temporal sulcus is strongly right lateralised during both a mutual gaze and averted gaze condition giving support to the role played by the RH (Pelphrey et al., 2004). Two examples of impairments in the use of eye contact are offered from RHDBank. First, Minga08 (Timestamp 12:35–13:19) has fleeting and/or absent eye contact during a conversation about things that she enjoys doing; and in contrast Minga14 (Timestamp 0:05–3:20) has prolonged or fixed eye contact while recounting his stroke story.

There has been limited work exploring the functional impact of deficits of extralinguistic communication. However, Blonder et al. (2012) found an association between facial emotion interpretation and marital satisfaction. Broadly speaking, difficulties with social cognition (e.g., interpreting emotions and social inferences) negatively impact interpersonal interactions (Hewetson et al., 2021). More work is needed to identify the unique contribution of deficits of extralinguistic production and comprehension on effective communication.

DISCUSSION

Effective communication necessitates pragmatic competence, which includes the ability to use contextual information (e.g., conversational partner(s), environment, cultural considerations, goal of the interaction) and communication ‘rules’ to guide decisions about what is appropriate to say when and how to say it. These are cognitively based decisions, as evidenced by linguistic theories that suggest multilevel computations and cognitive resource allocation for discourse processing (Peach & Hanna, 2021; Sherratt & Bryan, 2012). The term *apragmatism* captures the core of RH communication deficits that interfere with the ability to convey and interpret intended meaning (Blake, 2018; Joannette & Ansaldo, 1999; Myers, 2001), which may co-occur with or be exacerbated by cognitive impairments (i.e., attention, memory and/or executive function deficits).

Apragmatism has three distinct components: linguistic, paralinguistic and extralinguistic. Following RHD, people can experience changes in their production and comprehension of verbal language, prosody, gestures, facial

expressions and/or body language to convey pragmatic information. However, the lack of a consistent label to categorize and communicate about these apragmatic deficits hampers inter- and intra-disciplinary communication, which is essential for effective and efficient rehabilitation and medical care. As shown in a retrospective chart analysis of patients following RHD, SLTs did not use consistent terminology in their documentation to describe the observed deficits (Blake et al., 2002). This inconsistency complicates the processes of comparing findings across patients, clearly describing deficits to patients, families and professionals, and demonstrating progress towards rehabilitation goals over time. Such inconsistencies in terminology may also limit the generation of appropriate referrals for speech and language therapy services, education of current and future clinicians, and consolidation of evidence across studies. Adopting the term *apragmatism* could help alleviate all these concerns. In addition, use of a common term could foster intradisciplinary communication between SLTs in different settings across the continuum of care. Such communication is imperative to ensure that people with apragmatism do not get lost to follow-up as they progress through their course of rehabilitation.

The underlying mechanism(s) accounting for apragmatic deficits are not fully understood. We can be fairly certain that damage to the RH emotional prosody network results in aprosodia (paralinguistic component; Durfee et al., 2021). Evidence of inefficient suppression of contextually inappropriate meanings (Tompkins et al., 2000) likely underlies some of the linguistic components of apragmatism. Deficits in theory of mind (i.e., the ability to view a situation from the needs and perspectives of another person) impact pragmatics; however, the extent to which they underlie or impact apragmatism needs to be examined. In addition, we expect that attention and executive function impairments (i.e., ability to organize one's discourse and to include/exclude various details based on the contextual demands of the task or situation) exacerbate apragmatism, and may be in part responsible for the inconsistent performance across tasks with differing goals and demands.

Apragmatic deficits can be difficult to identify and assess for a variety of reasons. First, the population of people with RHD is heterogeneous (Tompkins, 2012) and there are few clear patterns of co-occurring cognitive and communication deficits (Blake et al., 2002; Ferré et al., 2012). This necessitates taking a close look at a wide variety of cognitive–communicative domains during assessment. Second, apragmatism itself can take a variety of forms, as described above, and in some cases can be difficult to differentiate from typical adult discourse. People with apragmatism, as well as those without brain damage can

be verbose or speak very little; they can be tangential or interrupt; and they can say things that can be considered 'rude' or insensitive. Unlike aphasia, with its obvious, pathognomonic effects on language production and comprehension, apragmatism can be missed by a casual or even an experienced listener. Thus, it is important that SLTs consult with patients and their significant others to help discern if and how a given patient's pragmatic behaviours have changed. In addition, there is a critical need for objective, clinically relevant assessment measures with which to identify apragmatism. Unfortunately, there are few such tools available that comprehensively and reliably identify and measure the three components of apragmatism, leaving SLTs with limited resources to reliably differentiate pragmatic patterns associated with RHD from those associated with typical ageing.

One resource that holds promise in this regard is the RHDBank and the RHDBank protocol (Minga et al., 2021b; <https://rhd.talkbank.org/>), which includes a variety of discourse tasks that can illuminate deficits across the three components. RHDBank is a small but growing shared database of discourse samples from people with RHD. The protocol can be easily administered by a clinician using simple instructions and online or downloadable stimuli. A patient's responses can be recorded and transcribed to allow for a variety of different analyses. The protocol can be administered before and after a course of therapy to assist the clinician in progress monitoring. There are not yet established norms that clinicians or researchers can use to assess for and identify apragmatic deficits. However, the establishment of a label for this disorder and delineation of its potential deficits that can be identified during typical speech and language therapy communication assessments provide a solid basis upon which to start the work of establishing norms. Until such norms can be developed, the ability to reliably diagnose apragmatism clinically will continue to depend on the experience of the clinician and the input of the family and patient as to the nature and degree of any post-stroke changes in pragmatic performance.

Limitations

While we hope to have made the case for the term *apragmatism* to be adopted by SLTs and other medical professionals, researchers, and educators to consistently describe the linguistic, paralinguistic and extralinguistic changes often exhibited by people following RHD, it is not yet known whether the term will resonate with the relevant professionals. In addition, it is important to note that this term focuses on communication deficits and is not meant to serve as a diagnostic label for concomitant cognitive (i.e., memory, attention, executive functions)

and visual-perceptual deficits that may also occur with RHD. To be sure, such impairments may impact and be enmeshed with apragmatism. Therefore, this term only addresses the need for a descriptive label for the communication deficits exhibited by people with RH damage. In a similar vein, it is known that people with aphasia may also present with non-linguistic cognitive impairments that are not subsumed under and must be evaluated separately from their aphasia per se. Similarly, such deficits in people with apragmatism will need to be assessed and discussed separately from their pragmatic impairments, while recognizing that the functional impairments may result from a confluence of deficits from these different areas. Our emphasis on communication here is a needed addition to RHD diagnostic labels to enhance awareness of and, hopefully, promote scientific inquiry specific to the communication challenges that are contextually based.

Clinical implications and future directions

In order for the term *apragmatism* to meet the goals of improved identification and communication of the linguistic, paralinguistic and extralinguistic challenges that can occur following RHD, it must be widely discussed and disseminated throughout and beyond the field of speech and language therapy. This will require regular and consistent use of the term in educational, clinical, professional development and research contexts. Adding *apragmatism* to the lexicon of SLTs will likely take time and may be challenging. To do so, the term and its three components must be assessed for their utility, comprehensibility and reliability across practitioners in the field. Throughout this assessment, it should be considered whether the usefulness of the label is enhanced by optional modifiers, such as *apragmatism characterized by aprosodia*. Some potential paths by which the assessment may be accomplished could include, for instance, focus groups with people with RHD and their care partners, as well as with SLTs and other related professionals. In addition, research should be conducted on the ability of SLTs to reliably identify the three components in discourse samples of people with RHD.

Another critical area of need is the development of assessment tools that can validly and reliably identify apragmatism across its linguistic, paralinguistic and extralinguistic components. Existing RHD communication assessment tools are limited in number, comprehensiveness, and quality, but will be essential in promoting the ability of clinicians and researchers to identify, quantify, and qualify the nature and extent of apragmatic deficits in people with RH damage.

Identifying the underlying mechanisms resulting in apragmatism is another important avenue for future

research. Doing so can open the door to the development of targeted treatment approaches for individuals with apragmatism. There are only a few such approaches to date, all with limited evidence for their effectiveness. Thus, even if SLTs identify apragmatic deficits in their patients, there are few evidence-based tools at their disposal to treat these deficits. In addition, unless students learn how to identify and treat these impairments, they may enter the field without the confidence and tools to care for patients with apragmatism.

CONCLUSIONS

We advocate for the use of the term *apragmatism* when referencing the pragmatic language impairments that are the hallmark of RHD. Apragmatism can wreak havoc on the lives of RH stroke survivors and their families. Currently, in the absence of a label for what these survivors and their families experience, it is difficult to increase awareness of the communication changes and the functional impact of apragmatism on their lives post-stroke. The lack of a commonly used and understood label also limits clinicians' ability to justify continued therapeutic services. Just as people with aphasia are recognized by other members of the rehabilitation team, as well as by insurance providers, the same level of awareness and understanding of the potential grave impacts of apragmatic challenges is needed for survivors of RH damage. In addition, as experts in disorders of communication, increased awareness of SLTs as critical care providers for these stroke survivors must be promoted. By labelling the linguistic, paralinguistic and extralinguistic RH deficits as apragmatism, we can help lend RH stroke survivors a cohesive voice, which will lead us toward a future where we have the evidence-based assessment and treatment tools at our disposal to ensure they receive the services they need and deserve.

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ENDNOTE

¹The IHRC is fully aware that the prefix 'a-' suggests an absence, but we feel there is a historic basis for its use. For example, the 'a-' prefix is commonly used for disorders of language such as aphasia, alexia, and agraphia as well as aprosodia. These disorder labels are not interpreted clinically to refer to an absence of language ability. Careful and strategic consideration was given concerning the selection of the label within the context of the field of speech-language pathology. Apragmatism captures the essence of what is impaired after RHD—pragmatic language—but which has not historically been specifically recognized. Just as with other terminology, we expect that it will not be interpreted to mean a complete loss of every pragmatic function.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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