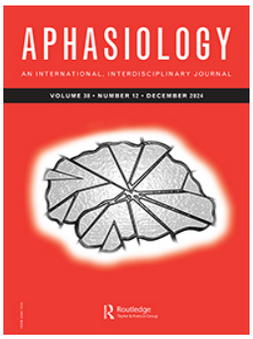
“The illuminating quiet”: a metaphor analysis of autobiographical descriptions of inner speech in aphasia



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"The illuminating quiet": a metaphor analysis of autobiographical descriptions of inner speech in aphasia

Bethan Tichborne, Fang Liu and Arpita Bose

School of Psychology and Clinical Language Sciences, University of Reading, Reading, UK

ABSTRACT

Background: Inner speech in aphasia is a rapidly expanding research area, but can be defined in numerous ways. Unlike behaviourally observable language processes such as overt word-production, inner speech is only directly available to introspection. Subjective experience thus grounds our understanding of inner speech and is a necessary starting point for investigating its definition. Descriptions of inner speech written by people with aphasia can make an important contribution to conceptual clarity in the literature. This important data source has not been systematically analysed. Our research addresses this gap.

Aims: This research aims to understand the subjective experience of impaired and preserved inner speech in aphasia, through analysis of the metaphors used in autobiographical accounts, and to interpret the findings in relation to the inner speech literature.

Methods & Procedures: This study carries out a metaphor-led discourse analysis of descriptions of inner speech in four autobiographical accounts of aphasia. Metaphorical expressions describing language processing were identified and coded, then systematic metaphors (i.e. the related concepts which are used consistently to describe a particular topic) were described. The metaphors used to describe inner speech were then analysed, with attention to patterns of use and contextual information.

Results & Discussion: 338 expressions made use of the main systematic metaphors which were used to describe inner speech. Two types of inner speech- Phonological Inner Speech and Dialogic Inner Speech – were described as distinct and dissociable experiences, and were described using different metaphors. Phonological Inner Speech, the internal activation of phonological representations, as used in mental repetition of a word or phrase, was described by two authors using the metaphors WORDS AS OBJECTS, MIND AS CONTAINER and INNER SPEECH AS HEARING WORDS. Dialogic Inner Speech, the use or awareness of linguistic inner reasoning or dialogue, was described by two different authors using the metaphors INNER SPEECH AS INNER VOICES/PERSONS/MONOLOGUE/DIALOGUE and APHASIA AS SILENCE/FLUID/SPIRITUAL EXPERIENCE. A double dissociation of these different definitions of inner speech is seen across two of the accounts.

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CONTACT Arpita Bose a.bose@reading.ac.uk School of Psychology and Clinical Language Sciences, University of Reading, Reading RG6 6AL, UK

Different impacts on language processing and cognition were also described.
Conclusions: This research demonstrates that subjective accounts of inner speech can help clarify theoretical discussions and clinical implications. Although recent research within aphasiology has focused mainly on Phonological Inner Speech, we show that in these accounts the impairment of Dialogic Inner Speech was described as more salient and more explicitly as a "lack of inner voices".

Background

"Whether or not people with aphasia have access to their 'inner voice' might create a huge variety in the way people experience the condition" suggests Lauren Marks (2017, p. 300), who experienced aphasia with a loss of inner speech following a haemorrhagic stroke at the age of twenty-seven. The role that inner speech (whether impaired or intact) plays in aphasia has been raised as an important topic by both researchers and people with aphasia. Below we outline the different definitions of inner speech, and the different approaches to its investigation in aphasia. A gap in this research is identified, and the approach taken by the current study to addressing this gap is outlined.

Defining inner speech

Exploration of inner speech in aphasia is a rapidly expanding research area, with innovative new methodologies being developed and applied (see review by Fama & Turkeltaub, 2020). There is a recognition within this growing literature in aphasia that inner speech is a complex concept. However, there is a lack of consistency in the way in which it is defined for empirical investigation. There are many reasons for this lack of consistency: unlike behaviourally observable language processes such as overt word-production, inner speech is only directly available to introspective observation; inner speech is complex and involves multiple mental processes or stages which may vary depending on the model used to contextualise it, and consequently the tasks which have been devised to explore it vary widely in nature, meaning that they may be measuring different processes (Alderson-Day & Fernyhough, 2015); and finally, it is variable in content and frequency even across neurologically healthy individuals (Heavey & Hurlburt, 2008).

Different researchers make different distinctions between definitions of, and approaches to, inner speech. The rationale for distinguishing different subtypes or aspects of inner speech varies with the interests of the researchers: distinctions may be drawn on the basis of methodological approach, linguistic content, relative involvement of different mental processes, or phenomenological or functional differences. A few examples from the recent literature are given here, to illustrate the variety of ways in which this can be done. Fama and Turkeltaub (2020) describe "two ways to define inner speech", following Levine et al. (1982), the first of these being "the subjective phenomenon of talking to oneself, of developing an auditory-articulatory image of speech without uttering a sound", and the second "the objectively measurable ability to appreciate the auditory-articulatory structure of speech irrespective of its meaning". Geva et al. (2011) propose

that "future studies should differentiate between the two extreme ends of inner speech processing: fully conscious inner speech . . . versus the less-conscious inner speech, which might be the one responsible for on-line error monitoring in less-demanding speech tasks". Brown (2009) describes two components of inner speech, "a motoric (action) component organised in the (left) anterior language area, and a perceptual component, organised in the left posterior language area", each of which may be involved or impaired differentially in inner speech, leading to a continuum of experiences and mental processes. Alexander, Langland-Hassan, et al. (2023) and Sierpowska et al. (2020) refer to Grandchamp et al'.s (2019) "ConDialInt" model of inner speech, according to which inner speech can vary along the multiple dimensions of "condensation, dialogality, and intentionality". In this model, condensed inner speech is primarily semantic, and is lacking in acoustic, phonological and syntactic content, in contrast to expanded inner speech, which additionally has these features in a closer analogue to overt speech. Dialogic inner speech involves multiple "voices" in imagined conversation in contrast to an inner monologue or soliloquy. Intentional inner speech is the deliberate use of inner speech, such as for verbal rehearsal, and unintentional inner speech is the more passive experience of inner speech arising during mind wandering (Grandchamp et al., 2019). In the current study we investigate subjective experiences of inner speech, taking a broad approach which aims to capture various types or aspects of inner speech. While we did not pre-impose any specific definitions or distinctions, two differentiated subtypes – Phonological Inner Speech (Phonological IS) and Dialogic Inner Speech (Dialogic IS) – emerged from the analysis and guided the organisation of our findings. Although these subtypes of inner speech relate to the distinctions discussed above, they do not exactly map onto any of them. They align closely to the two main research traditions in inner speech which are explored in the following section.

Measuring inner speech

A range of tasks have been used to measure the presence or impairment of inner speech. The successful retrieval of single word phonology has been measured by self-report in silent picture naming (Fama, Henderson, et al., 2019; Fama, Snider, et al., 2019; Hayward et al., 2016). This can also be measured objectively (with additional cognitive demands) through rhyme and homophone judgment tasks (Alexander, Langland-Hassan & Stark, 2023; Feinberg et al., 1986; Geva et al., 2011; Langland-Hassan et al., 2015; Stark et al., 2017). These approaches fit within the "Working Memory" tradition of research in inner speech (Alderson-Day & Fernyhough, 2015). The theoretical framework most commonly used to contextualise this work is Baddeley and Hitch's (1974) model of an inner "phonological loop" as a component of working memory, which underlies inner speech as it is used for tasks such as verbal rehearsal, and consists of an active process of articulatory rehearsal by means of which we can maintain a phonological form in the passive phonological store.

This approach contrasts with much of the inner speech research carried out in neurotypical adults which relies more on self-report of inner speech content and functions in daily life. Some research in aphasia does investigate this more ecologically valid approach to inner speech. Most of this research uses theories and methods from the "Vygotskian" tradition which draws on Vygotsky's theory that inner speech develops as the

internalisation of the child's dialogues with caregivers. In this research tradition the focus on inner speech as internalised social dialogue has led to explorations of its role in cognition and behaviour, in particular self-regulation through an inner "conversation" that develops from early experiences of dialogues with caregivers (Alderson-Day & Fernyhough, 2015).

Sierpowska et al. (2020) include in a case report the comments of a person reflecting on her experience of global aphasia following brain surgery, that "she was able to formulate thoughts and even to internally elaborate the messages she wanted to convey, but that she could not utter them". This self-reported presence of inner speech during global aphasia is the motivating point of interest for the case report, showing the value of attention to self-described experiences of inner speech. However more precise detail, such as a direct quotation of her description of this experience of intact inner speech, is not presented. A more in depth analysis of self-reported experiences of inner speech is provided by Morin (2005, 2009), who illustrates his arguments about the impact of impaired Dialogic IS on self-identity and consciousness with passages from two well-known autobiographical accounts of the experience of aphasia (Moss, 1972; Taylor, 2009). Morin's exegeses of these two subjective accounts of impaired inner speech show the value of detailed analysis of autobiographical accounts for understanding the nature and impact of inner speech in aphasia. However, the use of selected excerpts to support a preexisting theoretical interest limits the potential contribution of such accounts, as researchers are likely to notice and report information which is consistent with their interests and may miss information in those, or other, accounts which is better explained by another approach.

Other researchers have applied experimental methods to the investigation of self-report of inner speech in people with aphasia. Fama et al. (2017) investigate retrieval of single word phonology in daily life through self-report in response to questions. They define three different subjectively reported experiences of full or partial awareness of linguistic representations in the absence of the ability to produce the word aloud: successful inner speech, a tip-of-the-tongue state, and an idea without the word. They find that patterns of reporting of these different subjectively reported states are associated with distinct lesion locations, and that the successful inner speech relates to overall severity of aphasia and to impairment of phonological output processes. This shows that fine-grained aspects of processing related to inner speech can be consistently subjectively reported and provides clinically useful information, but it is limited in restricting participants to confirming or denying researcher-defined experiences. Alexander, Hedrick, et al. (2023) demonstrate that methods widely used in research with neurotypical adults can be used to investigate inner speech in aphasia, with their successful use of experience sampling (in which participants report their experience just before interruption in daily life) and of administration of a questionnaire about the content and function of inner speech in daily life, and the activities during which it occurs. While experience sampling provides rich and ecologically valid descriptions of subjective experience, it relies on training participants to categorise their experiences according to predetermined types. Thus, in this study, participants were reporting whether or not they experienced inner speech in a given moment according to researcher-determined criteria of what is and is not an experience of inner speech.

Two studies are noteworthy in combining radically different measures from both the working memory and Vygotskian traditions of research in the investigation of inner speech in aphasia: Alexander, Langland-Hassan, et al. (2023) administer rhyme judgments and self-report of inner speech in a naming task, in addition to a subjective rating scale asking participants about inner speech in daily life (both in terms of single word phonological retrieval and in more general terms of "talking in your head"). They found a lack of correlation between the results of the rating scale and the phonological retrieval and manipulation tasks. Similarly, Kljajevic et al. (2017) report findings that for eight participants with aphasia, group performance on phonological manipulation tasks including picture-based rhyme judgment, was impaired, yet responses to a questionnaire showed presence of some types of inner speech in daily life.

Distinctions between the different definitions of, and measures used to investigate, inner speech are not merely theoretically interesting, but may lead to dissociations in patterns of impaired and preserved functions in aphasia where they target different mental processes. Given the variation in the frequency, form and content of inner speech and the multiple levels of linguistic-cognitive processes involved, we should expect a wide range of profiles of impaired and preserved elements of inner speech in aphasia. Clarifying the range of concepts which can be designated "inner speech" is an important step in providing a basis for the interpretation and synthesis of the growing literature.

The use of autobiographical accounts to study IS

Our understanding of inner speech is necessarily grounded in subjective experience. While objective behavioural and neuroimaging measures have been shown to be valid tests of inner speech (Fama et al., 2017; Kühn et al., 2014), the phenomena targeted by objective or proxy measures of "inner speech" are rooted in subjective experiences such as "hearing a voice in your head", "talking to yourself", or "thinking in words". The wide range of possible profiles of experiences of impaired and preserved elements of inner speech in aphasia can be assumed to underlie a wide range of subjective experiences of inner speech and its impairment, which may differ both from typical experiences and from each other.

There is evidence that first-hand descriptions of people's experiences of inner speech in aphasia can provide an important source of insight. As discussed in the above section existing approaches to self-report have either relied on researcher-determined definitions of inner speech experience or limited the role of first-hand descriptions of inner speech experience to illustration or contextualisation of ideas arrived at by other methods. Our research is prompted by the need for a systematic and bottom-up analysis of a range of subjective accounts, to minimize the influence of researcher preconceptions and obtain insight into the heterogeneity of experiences of preserved and impaired inner speech in aphasia.

First-hand accounts of the experience of inner speech in aphasia can make an important contribution to this conceptual clarification. Such accounts are available in autobiographies produced by people with aphasia, some of which describe at length and in detail the private experience of inner speech in various contexts. This source of insight remains largely untapped; our research addresses this gap by investigating the metaphors used to describe inner speech by authors with aphasia. This study uses metaphor-led discourse

analysis to systematically investigate descriptions of the subjective experience of inner speech in aphasia in autobiographical accounts of aphasia, in order to gain insight into the range of experiences of impaired or preserved inner speech. This methodology has been used in wide range of clinical populations (e.g., Littlemore, 2019; Plug et al., 2009; Semino et al., 2015), including for word finding and production difficulties in people with aphasia (Tichborne et al., 2023).

The current study

In this research we investigate subjective descriptions of inner speech to understand how the experiences described in autobiographical accounts can contribute to our understanding of inner speech in aphasia. A number of people with aphasia have written detailed autobiographical accounts of their experiences. Their accounts are produced independently and without time pressure, and without the potentially priming environment of a research or clinical setting. That they are long form means that often multiple descriptions of the same symptom or experience are included. Unlike clinical notes or privately collected subjective reports, the autobiographies are all available as published accounts, allowing other researchers to confirm or challenge our interpretations. This study therefore makes use of written autobiographical data to explore the subjective experience of inner speech in aphasia.

To make sure that the analysis includes all relevant data we examine all descriptions of mental processes and functions which have been identified as either being constituent parts of, identical to, or dependent on "inner speech". For example, subvocal rehearsal, dialogic thought, propositional thought, any inner "hearing", "seeing" or "speaking" of a linguistic representation, and any descriptions of "inner speech", "inner voices", "inner dialogue" or similar. Taking this inclusive approach means remaining agnostic on the much-debated question of the boundary between linguistic and non-linguistic thought. Including unclear cases allows us to consider the range of experiences which have been addressed in the broader inner speech literature. For example, the influential work of Hurlburt includes "inner speech", "partially worded" inner speech which includes "holes", and "unworded" inner speech which is "nothing but holes", as well as "unsymbolized thinking" (Hurlburt & Heavey, 2006). Vicente and Martinez Manrique (2011) argue that even unsymbolized thoughts are propositional states, having "semantic and syntactic features analogous to those of the contents of utterances" and thus are continuous with inner speech. In the current study any instances of thought which appear to describe language-like semantic or syntactic content are included to allow for a comprehensive analysis. By systematically analysing the metaphors used to describe inner speech and related experiences, we can describe patterns in the selection of particular metaphors to describe a range of experiences of inner speech in aphasia. This will provide a novel source of insight into the nature of inner speech, and the ways in which it may be preserved or impaired in aphasia.

We implement metaphor-led discourse analysis to carry out a fine-grained and bottom-up analysis of this data. Metaphor-analysis can capture ordinary language descriptions of inner speech as well as more novel and creative ones. Metaphorical expressions are extracted from discourse data and coded in order to group together instances of metaphor use into categories which reflect the systematic use of particular conceptual

metaphors. These systematic metaphors are written in SMALL CAPS to distinguish them from individual metaphorical expressions. Certain systematic metaphors may be conventionally used in everyday speech to describe a particular experience, or relevant or closely related topics (e.g., MIND AS CONTAINER). There may also be use of novel metaphors or novel extensions of conventional metaphors, which are often more obviously metaphorical or creative (e.g., MIND AS PLANT), and which are used to integrate new conceptual elements or reconceptualise a concept.

The analysis takes a bottom-up approach to this data which minimises the imposition of researcher preconceptions or interests on selection and interpretation of data. This is achieved both through the inclusion of every description of inner speech in each account, and through the use of metaphor for analysis. Unlike many other qualitative methods, the coding of metaphorical expressions is done with regard to the basic meaning of the metaphorical words which are used, before interpretation of what these metaphors are being used to describe.

This research aims to: understand the subjective experience of impaired and preserved inner speech in aphasia, through an analysis of the systematic metaphors that authors with aphasia use to describe inner speech; identify whether there are dissociations between the identified types of inner speech in these accounts; and explore whether these descriptions align with the processes identified as "inner speech" in aphasiology research.

Method

Data source

Four autobiographical accounts of aphasia were selected to explore the experience of inner speech in aphasia. These were *My Stroke of Insight* (Taylor, 2009), *Stroke Diary II* (Broussard, 2016), *A Stitch Of Time* (Marks, 2017), and *Crossing the Void* (Schultz, 2010). These books were selected from a set of 12 autobiographical accounts of aphasia (Tichborne et al., 2023) as the authors described experiences of inner speech, verbal working memory, verbal thinking, and/or inner dialogue or monologue. Steps 1–4 below describe the coding of data which was carried out on the entire set of 12 books, Step 5 describes the analysis of the 4 selected books for this study. We provide a brief description of the biographical details of the author, their overall aphasic symptoms and some examples of their descriptions of inner speech which motivated their inclusion in the study.

My stroke of insight (Taylor, 2009)

Jill Taylor is an academic and neuroanatomist, who had a haemorrhagic stroke at the age of 37, affecting her left parietal, temporal and frontal lobes. As a result, she experienced a non-fluent aphasia with some initial receptive difficulties. She describes the loss and recovery of inner speech as a defining feature of her experience of aphasia, and wrote a second book exploring the functions of inner dialogue in more depth (Taylor, 2022). She describes fluctuating access to inner speech during acute stroke "my verbal thoughts were now inconsistent, fragmented, and interrupted by an intermittent silence" (Taylor, 2009, p. 40).

A stitch of time (Marks, 2017)

Lauren Marks, an actor and doctoral student, had a left middle cerebral artery haemorrhagic stroke at the age of 27, damaging her left perisylvian area and basal ganglia. This caused an expressive language impairment and apraxia, with some initial receptive and self-monitoring difficulties. She describes an initial loss of inner speech, which had an impact on many aspects of her experience: "lacking my inner voice for a period of time made a profound impression on me" (Marks, 2017, p. 300)

Crossing the void (Schultz, 2010)

Carol Cline Schultz, co-owner of a family-run outdoor activities shop, had an ischaemic left posterior middle cerebral artery stroke at the age of 53. In her account she describes a resultant fluent aphasia, with some difficulties in receptive language and understanding abstract concepts. She describes alterations in her inner speech, such as reporting that initially she is "thinking without words" (Schultz, 2010, p. 7)

Stroke diary II (Broussard, 2016)

Broussard, formerly a naval engineer and then in workforce development, had an ischaemic stroke at around 60 years old, leading to a fluent aphasia, with some initial lack of insight into his difficulties. He describes certain particular difficulties with inner speech, such as in reading: "I would look at every 'Bentley' sign… I was aware I couldn't pronounce it in my mind" (Broussard, 2016, p. 56).

Metaphor identification, coding and analysis

The analysis was carried out according to a five-stage process for metaphor identification, coding, and analysis. This was done following Cameron et al. (2009) metaphor-led discourse dynamic method (see Figure 1). The full dataset of metaphors can be obtained by request from the authors. Identification and coding of metaphors were carried out by the first author (a Speech and Language Therapist), and three research assistants (Speech and Language Therapy students). Steps taken to ensure rigor are described briefly for each step below.

Step 1 - familiarisation with texts and selection of descriptions of language processing

To create the dataset, researchers first familiarized themselves with the texts, by reading and rereading all texts before identifying relevant sections, and then identified all descriptions of the subjective experience of language processing before beginning any identification of metaphor (following Cameron and Maslen (2010) recommendations on reducing researcher expectation and bias). For each text a minimum of two researchers independently identified relevant sections, with discussion of any points of disagreement.

Step 2 - metaphor identification

Metaphorical expressions were identified following Cameron and Maslen's (2010) modified version of the Pragglejaz Group's (2007) Metaphor Identification Procedure. Maslen's (2010) recommendations on working with large amounts of metaphor data were also

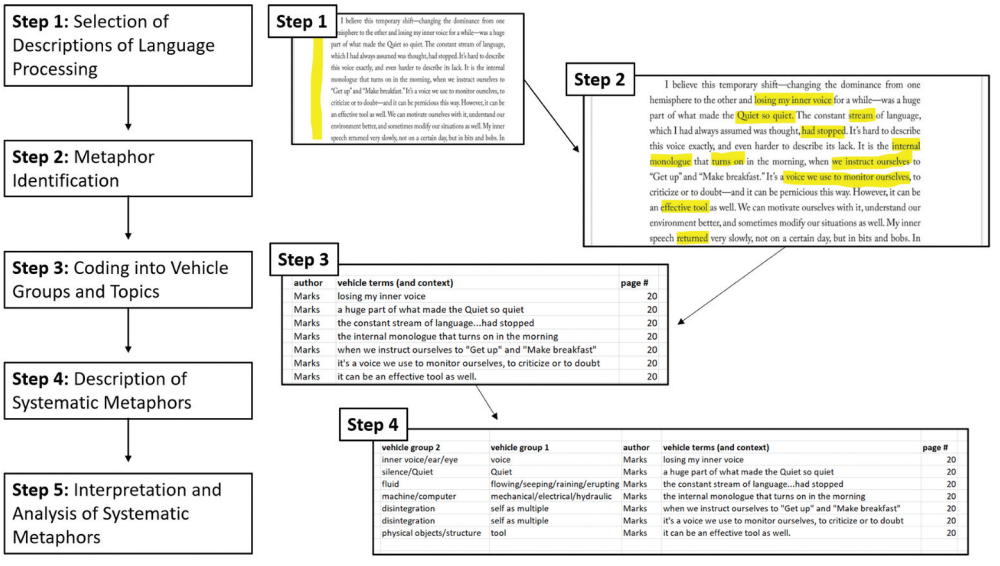

Figure 1. Overview of the Steps of Metaphor-led Discourse Analysis (following Cameron et al., 2009).

followed. All selections relevant to language processing were reread, and possible metaphorical expressions identified. These expressions were then individually checked for:

(1) meaning in the discourse context; the existence of another, more basic meaning;
(2) an incongruity or contrast between these meanings;
(3) a transfer from the basic to the contextual meaning (Cameron & Maslen, 2010).

If all three of these conditions are met, then an expression is considered metaphorical. To give an example, Taylor's description of "those little voices" (Taylor, 2009) has 1) the meaning in context of Dialogic IS (as determined in this case by the immediate context which continues "that brain chatter that customarily kept me abreast of myself in relation to the world outside of me"), a more basic meaning of multiple voices (i.e., externally perceived speech), 2) a contrast between the meaning in context and the more basic meaning, and 3) a transfer in meaning from the basic meaning to the meaning in context, in that inner speech is being understood in terms of multiple external voices chattering. All expressions meeting these criteria were added to a spreadsheet. At least two researchers independently conducted the metaphor identification for each text, following training on the methodology. Metaphor identification inter-rater reliability was checked until > 80% consistency was achieved. Unclear cases were discussed as a group, and decisions made were documented to maintain consistency. Discrepancies between the two versions for each text were resolved through further discussions until consensus was reached. The first author then reviewed the data produced for each text for consistency with the finalized inclusion principles (see Tichborne et al., 2023 for full details of these principles and of other steps taken to ensure methodological rigour).

Step 3 – coding into vehicle groups and topics

The words or phrases which carry the metaphorical meaning (e.g., "those little voices") are the metaphor's "vehicle" terms as they are the vehicle which carries the metaphorical meaning. These were coded into semantically related "vehicle groups". This was done following Cameron and Maslen (2010), with two levels of generality coded: "Vehicle Group 1", which remained as near as possible to the specific term used (e.g., "inner voice", "mind's eye" and "inner ear" were coded separately here), and a "Vehicle Group 2", which brought related Vehicle Group 1 categories together into broader categories (e.g., at this level a category incorporating these inner perceptions was created as they are similar and often appear together). Metaphorical expressions which could be included in more than one category were duplicated, as a single expression may combine multiple metaphors. The metaphorical expressions were then coded into broad topic categories based on their meaning in context, most of these relating to language modality (expressive language, reading, writing, etc.).

To ensure rigour at this stage the coding process was carried out as a collaborative, iterative process. Vehicle terms were coded first, to minimize premature interpretation. Regular group meetings were arranged for collaborative decision-making, and all data was cross-checked (data for all texts checked by BT, each text also checked by PM, JT or EJ).

Step 4 - description of systematic metaphors

To examine language production, a subset of the data was extracted which included all descriptions of spoken or written language, including use of language for thinking. Description of systematic metaphors (i.e., the sets of "linguistic metaphors in which connected vehicle words or phrases are used metaphorically about a particular topic" Cameron et al., 2010). was carried out by BT through repeated sorting and examination of the data, sorted by vehicle group and author, with reference to the original entire texts to establish context, patterns of use and discourse function as recommended by Maslen (2010). PM conducted the same process on a subset of four accounts. There was consistency in the most prevalent metaphors identified (with minor variations in wording) in these separate analyses (see Tichborne et al., 2023 for details). Inner speech was identified at this stage as a salient symptom for four authors.

Step 5 – identification and analysis of descriptions of inner speech

A further subset of the dataset was extracted, consisting of the metaphorical expressions related to inner speech from the four accounts which had been identified as describing impaired or preserved inner speech as salient. Metaphorical expressions related to inner speech, or which described a topic relating to Inner Speech, were manually selected from the original dataset. Vehicle groups used to describe inner speech were: INNER VOICES, INNER HEARING/MIND'S EAR and MIND'S EYE, SILENCE, SPIRITUALITY, and FLUIDITY. In terms of topics, all descriptions of the various processes and functions identified as "Inner Speech" in Phonological IS and Dialogic IS considered above were included, as well as any descriptions explicitly linked to "Inner Speech" or verbal thought by the accounts' authors. Thus, all metaphorical expressions relating to the following were also included for analysis: the phonological loop and other forms of working memory, mental imagery with

linguistic content or functions, descriptions of thought and reasoning, and inner dialogue.

This data was then used to explore in depth how each of the four authors described their experience of inner speech. Similarities, patterns, and recurring themes within and across the texts were examined. Throughout the analysis process, attention was given to the contextual elements surrounding the descriptions of inner speech by referring to the texts in their entirety. Reported neurological or psychological measures, changes over time, use of deliberate strategies for compensation or recovery, the time-course of symptoms, and the broader impact of symptoms on identity, perception and cognition were all considered in the interpretation of the data. Regular meetings were held between the first author and the third author, to discuss interpretation of the data, expectation and bias. No specific psycholinguistic model was used in interpretation. Inner speech was identified as a subjectively important topic from the initial analysis, it was not a preexisting theoretical interest of the first author.

Results and discussion

First, we present the systematic metaphors used to describe inner speech in these autobiographical accounts.

These systematic metaphors were used to describe two distinct types of inner speech experience, Dialogic IS and Phonological IS, a distinction which is made on the basis of three aspects of the results: 1) the difference in systematic metaphors used; 2) the contextual information given about the authors' experiences of preserved or impaired inner speech and the impact of this; and 3) a pattern of dissociation of these two types of experience, with authors describing one as impaired while the other was intact. The first type described was the use of inner speech for inner dialogue or monologue (Dialogic IS), which was described most explicitly in terms of "inner voices" or "inner dialogue/monologue". (This could also arguably be described as "propositional inner speech", as it also included descriptions of difficulty in propositional thought, and inner use of syntax, but its dialogic function was most emphasised in the accounts). A loss or impairment of this type of inner speech was described as highly salient, and as leading to profound changes in cognition and emotion. Recovery of this inner speech for dialogue was described as involving emotional adjustment to the return of its sometimes-negative emotional effects. The second type described was the use of inner speech for conscious rehearsal of phonology (Phonological IS), with systematic metaphors which either made use of the conventional metaphors for communication (of words as objects, and mind as container), or with metaphors of sensory perception (of seeing or hearing words).

Following this, a more detailed analysis is provided which maps the experiences described onto the types, components and aspects of inner speech which have been described in the literature. Finally, we consider patterns of association and dissociation in the impairment or preservation of these processes, and the metaphors used to describe them.

Table 1. Count of metaphors describing inner speech by relevant vehicle group categories.

Author	Vehicle Group						
Vehicle Group 2	INNER VOICE/EAR/MIND'S EYE						
Vehicle Group 1	INNER EAR	MIND'S EYE	INNER VOICE	SILENCE	SPIRITUALITY	FLUID	Total
Taylor (2009)	3 (2.3%)	8 (6.1%)	10 (7.6%)	19 (14.5%)	31 (23.7%)	60 (45.8%)	131
Marks (2017)	1 (1.1%)	2 (2.3%)	10 (11.5%)	26 (29.9%)	25 (28.7%)	23 (26.4%)	87
Schultz (2010)	4 (4.8%)	29 (34.5%)	1 (1.2%)	3 (3.6%)	13 (15.5%)	34 (40.5%)	84
Broussard (2016)		7 (19.4%)			8 (22.2%)	21 (58.3%)	36
Total	8 (2.4%)	46 (13.6%)	21 (6.2%)	48 (14.2%)	77 (22.8%)	138 (40.8%)	338

Systematic metaphors used to describe inner speech

Table 1 shows the count of metaphors in the main vehicle groups which coded metaphorical expressions used to describe inner speech in the four accounts analysed, with a total of 338 expressions which made use of these main metaphors. It shows a relatively greater use of INNER VOICE and SILENCE by Taylor and Marks, and of MIND'S EYE by Broussard and Schultz. The quantitative data shown here does not capture a qualitative difference in Schultz and Broussard's use of metaphors coded as SPIRITUALITY, which were mainly idiomatic uses of "mystery", "blessing", "salvation", and "miracle". In contrast, the metaphors coded as SPIRITUALITY for Taylor and Marks were novel and emphatic in describing an unusual experience.

Descriptions of Dialogic IS and Phonological IS

Dialogic IS was described more explicitly as relating to "inner speech" by the authors who described its impairment, despite receiving less attention in the literature. The metaphors used to describe impairment of Dialogic IS, compensation for this impairment and the process of its recovery are presented here, as well as the metaphors used to describe Dialogic IS by authors who experience no impairment of this function. Phonological IS is then discussed, following a similar structure. Table 2 provides an overview of the patterns of impairment and preservation of inner speech which were described across the four accounts and which are presented in detail below. As Table 2 illustrates, the results show a dissociation of Phonological IS and Dialogic IS, with Taylor describing severely impaired Dialogic IS with preserved Phonological IS, and Schultz describing the opposite pattern. Table 3 lists the main systematic metaphors which were used to describe different aspects or types of inner speech in the four accounts.

Dialogic IS

Impairment and recovery of Dialogic IS is described by Taylor and Marks, both of whom emphasize the impact of this as profoundly affecting their cognition, sense of self, and motivation for recovery. Schultz and Broussard describe intact inner dialogue from early in recovery. The impairment of Dialogic IS is more salient than

Table 2. Patterns of impaired and preserved Dialogic and Phonological IS described in four autobiographies by people with aphasia, showing a double dissociation across Taylor's and Schultz' accounts.

	Dialogic Inner Speech	Phonological Inner Speech
Marks (2017) A Stitch in Time Left MCA haemorrhagic stroke. Aphasia and apraxia.	**Impaired** "my inner monologue, my self-directed speech, had also gone almost completely mute" (p.17)	**Impaired** "I could rarely see or hear the words in my own head". (p.31)
Taylor (2009) *My Stroke of Insight* Left hemisphere haemorrhagic stroke. Non-fluent aphasia.	**Impaired** "Those little voices inside your head, reminding you of who you are and where you live, become silent". (p.79)	**Preserved** "I was going to pay attention to nothing else that he said and just repeat the words over and over again in my mind, holding them in memory"[a] (p.91)
Schultz (2010) *Crossing the Void* Ischaemic left posterior MCA stroke. Fluent aphasia.	**Preserved** "I am kept awake thinking, thinking without words. I try to find the words for what I am thinking" (p.81) "My mind thinks and it remembers"[b] (p.29)	**Impaired** "her name erases itself from my brain almost as soon as she says it"[a] (p.50) "I do not know whether it is a for-real word until I say it correctly"[c] (p.127) "the title does not say words to me"[d] (p.62)
Broussard (2016) *Stroke Diary II* Ischaemic stroke Fluent aphasia.	**Preserved** "I could tell there was a 'third person' talking to a 'first person' and I was both of those people". (p.57) "I had been thinking *then* (and had tried to express my intentions using fractured grammar) versus *now*, with a healing (not quite whole) grammar" (p.40)	**Impaired (less severe impact)** "the working memory improvements I had built up over three years were damaged again"a (p.117) "As soon as I could say it, I could tell it was wrong"[c] (p.81) "I would look at every 'Bentley' sign. . . I was aware I couldn't pronounce it in my mind"[d] (p.56)

When the preservation or impairment of Phonological or Dialogic IS was less subjectively salient the quotations given describe the functions which they have been associated with in the inner speech literature: [a]phonological working memory; [b]mental time-travel; [c]external speech required for self-monitoring; [d]lack of a "voice" in silent reading.

Table 3. Examples of metaphors used to describe impaired and preserved Dialogic and Phonological IS.

	Dialogic Inner Speech	Phonological Inner Speech
Impaired	INNER SPEECH AS INNER VOICES/PERSONS INNER SPEECH AS MONOLOGUE/DIALOGUE APHASIA AS SILENCE APHASIA AS FLUID APHASIA AS RELIGIOUS EXPERIENCE	WORDS/LANGUAGE AS OBJECTS and MIND/PART OF MIND AS CONTAINER INNER SPEECH AS HEARING/SEEING WORDS
Recovery or Compensation	Recovery: As above, plus MIND AS PLANT MIND/PART OF MIND AS MACHINE/VEHICLE	Compensation: WORDS AS OBJECTS and MIND/PART OF MIND AS CONTAINER INNER SPEECH AS SEEING WORDS
Preserved	APHASIA AS FRAGMENTATION AND PERSONIFICATION OF SELF WORDS/LANGUAGE AS OBJECTS and MIND/PART OF MIND AS CONTAINER	WORDS/LANGUAGE AS OBJECTS and MIND/PART OF MIND AS CONTAINER

its preservation; while Schultz and Broussard reflect on their access to this ability, and to post-stroke alterations to its content and form, these reflections do not receive the emphasis that impaired Dialogic IS does in the accounts of Taylor and Marks.

Impairment of Dialogic IS

Several metaphors are used to describe the impairment of Dialogic IS. They can be divided here into two groups of metaphors which frequently appear in combination in the texts. The first of these is INNER SPEECH AS INNER VOICES/PERSONS; INNER SPEECH AS MONOLOGUE/DIALOGUE; and APHASIA AS SILENCE. These are similar to those used in the inner speech literature, and in everyday language in describing a typical presence of internal "voices" or "monologue". When these are absent, the resultant state is described as "silence" or "quiet". This latter metaphor is familiar as a goal of "quieting the mind" or "inner silence" in meditative practices which aim to detach from or reduce inner dialogue (e.g., Hernández et al., 2018). The second group of metaphors which occur in combination describe the cognitive and emotional impact of the experience of this state of APHASIA AS SILENCE, which is described using various metaphors, which combine the inner "silence" with spiritual experiences (APHASIA AS RELIGIOUS EXPERIENCE), and with a sense of "fluidity" (APHASIA AS FLUID);, which is used to describe a sense of interconnectedness of self and world

Table 4. Examples of metaphors used to describe impairment of Dialogic IS by Taylor and marks.

	Metaphorical expression (with relevant context, *vehicle words in italics*)	Author	Page #
INNER SPEECH AS INNER VOICES/PERSONS; INNER SPEECH AS MONOLOGUE/DIALOGUE; APHASIA AS SILENCE			
4A	*those little voices, that brain chatter* that customarily kept me abreast of myself in relation to the world outside of me were *delightfully silent*	Taylor	42
4B	I welcomed the reprieve that *the silence* brought from the *constant chatter* that related me to what I now perceived as the insignificant affairs of society	Taylor	43
4C	The most notable difference between my pre- and post-stroke cognitive experience was the *dramatic silence that had taken up residency* inside my head.	Taylor	74
4D	Those *little voices inside your head*, reminding you of who you are and where you live, become *silent*. You lose memory connection to your old emotional self and the richness of this moment, right here, right now, captivates your perception	Taylor	79
4E	my *inner monologue*, my self-directed speech, had also gone almost completely *mute*	Marks	17
4F	It's hard to describe this *voice* exactly . . . It is the *internal monologue* that turns on in the morning, when we instruct ourselves to "Get up" and "Make breakfast".	Marks	20
4 G	It's a *voice* we use to monitor ourselves, to criticize or to doubt – and it can be pernicious this way.	Marks	20
4 h	With my *internal monologue on mute*, I was mainly spared from understanding my condition early on.	Marks	20
4I	lacking my inner *voice* for a period of time made a profound impression on me	Marks	300
APAHSIA AS SILENCE; APHASIA AS FLUID; APHASIA AS RELIGIOUS EXPERIENCE			
4J	in [the little voices'] absence, my memories of the past and my dreams of the future *evaporated*	Taylor	42
4K	*My soul* was as big as the universe and frolicked with glee in a *boundless sea* . . . without the judgment of my left brain saying that I am *a solid*, my perception of myself returned to this *natural state of fluidity*	Taylor	69
4 L	when I had experienced myself as a *solid*, I had possessed the ability to experience loss . . . in this shifted perception, it was impossible for me to perceive either physical or emotional loss because I was *not capable of experiencing separation* or individuality	Taylor	70
4 M	in its place was the *radiant Quiet. The nourishing Quiet, The illuminating Quiet*	Marks	18
4N	observations often lacked specific categories and *dimensions*, and a sense of my own personal preference	Marks	20
4O	the *flow* of my mind was still mainly *Quiet*	Marks	44

(again, similar metaphors are found in descriptions of meditative practice, Silvestre-López, 2020). Thus, the metaphor of APHASIA AS SILENCE plays a key role in descriptions of impaired Dialogic IS, in bridging the two groups of metaphors which are described here. It is also emphasized by both authors, with Marks capitalizing "the Quiet", and Taylor describing it as the "most notable difference" between her pre- and post-stroke experience (see Table 4).

Taylor describes the loss of Dialogic IS as a pervasive and important experience, affecting her cognition and perception more broadly. Taylor uses two main metaphors to describe the loss of Dialogic IS. She repeatedly uses the metaphor INNER SPEECH AS INNER VOICES in describing an absence of "little voices" and of "brain chatter" (Table 4, rows A, B and D), and she describes the resultant state of mind with a metaphor of APHASIA AS SILENCE (Table 4, rows A-D). These metaphors are often combined (Table 4, rows A, B and D). This silence is described as a positive state of mind (Table 4, rows A, B and K). Its positive aspects are repeatedly described with the metaphors APHASIA AS SPIRITUAL EXPERIENCE and APHASIA AS FLUID in combination with the use of APHASIA AS SILENCE (Table 4, rows K and L). Taylor relates this lack of Dialogic IS to various impacts on cognition, including mental time travel, engagement in ruminative thought, personal identity, and as affecting her emotional reaction to her stroke, using the same metaphors (Table 4, rows J-L).

Marks also describes a loss of Dialogic IS as an important aspect of her aphasia, affecting not only language, but cognition and perception, including insight and understanding of "distinct categories" (Table 4, rows H, I, N and O). She defines this as a falling silent of INNER SPEECH AS A VOICE/PERSON (Table 4, rows F, G and I), as well as a loss of INNER SPEECH AS MONOLOGUE (Table 4, rows E and H). The resultant experience of this is described using APHASIA AS SILENCE, in combination with APHASIA AS FLUID and APHASIA AS SPIRITUAL EXPERIENCE, in particular with her descriptions of "the Quiet" (Table 4, rows M and O). Marks, like Taylor, describes an impact on her broader cognition. She notes an effect on abstract thought and self-identity, and describes that she "lacked specific categories", using a metaphor of a lack of solidity (Table 4, row N). She notes explicitly a reduction of "mental time-travel" (p.15), of "sophisticated recollection and future planning" (p.197). She explains a positive impact with reference to the functions of inner speech, noting its function in negative rumination, and also reporting that the impact on cognition had an initially beneficial emotionally protective effect (Table 4, rows G and H).

Compensation for Dialogic IS with visualisation

Taylor describes attempting to use visual imagery, or "thinking in pictures", (using variations of the metaphors which she uses to describe preserved Phonological IS as discussed below), to compensate for difficulties in use of Dialogic IS for thought which requires syntactic and semantic processing. She gives an example in describing her thought process when she is asked the question "Who is the President of the United States?" (pp.76-77). First, she makes use of her intact phonological loop to activate the semantic representations from long term memory "I took the sounds of the key words and repeated them over and over again in my brain so that I would not forget what they sounded like. Then I would go on a process of exploration to identify a meaning that matched the sound of those words". The meaning for each of the concepts that she retrieves is "a

picture in my mind", so to construct a meaning for the whole question she then attempts to "put together the two images – that of a President and that of the United States". This strategy is highly effortful, and is not successful, "my brain could not get from 'President' and 'United States' to 'Bill Clinton', I gave up – but only after hours of probing and exhausting mental gymnastics".

Recovery of Dialogic IS

Taylor reports an initial ambivalence about the recovery of Dialogic IS, using the same metaphors which are discussed in the above section. In contrast to the earlier experience of APHASIA AS FLUID, she describes this as a return of solidity (Table 5, row I).[1] The personification of Dialogic IS (for example as a "storyteller")

Table 5. Examples of metaphors used to describe recovery of Dialogic IS by Taylor and marks.

	Metaphorical expression (with relevant context, *vehicle words in italics*)	Author	Page #
INNER SPEECH AS INNER VOICES/PERSONS; INNER SPEECH AS MONOLOGUE/DIALOGUE; APHASIA AS SILENCE			
5A	Although I really loved the *bliss of a silent mind* I was relieved to know that my left brain had the potential to recover its *internal dialogue*.	Taylor	118
5B	My left mind *thinks in language and speaks to me constantly*. Through the use of *brain chatter*, it not only keeps me abreast of my life, but also manifests my identity.	Taylor	142
5C	A tiny portion of the *story-teller*, however, does not seem *to be unconditionally attached to my joy, and is excellent at exploring* thought patterns that have the potential to really derail my feeling of inner peace	Taylor	152
5D	I give my *story-teller* full permission to *whine rampantly* between 9-9.30am and then again between 9-9.30pm	Taylor	152
5E	*the Quiet* had become harder to access as my *inner* and outer *voices had become louder*	Marks	138
5F	my now-working *inner voice was fixated* on the catastrophic	Marks	195
5 G	I . . . can't gauge how much of my *inner speech* came back post-stroke. I don't think it is at the level it used to be – or maybe I just won't let that happen – because I don't *welcome its many negative and self-defeating aspects*.	Marks	344
APHASIA AS SILENCE; APHASIA AS FLUID; APHASIA AS RELIGIOUS EXPERIENCE			
5H	Making the decision to recover was a difficult, complicated, and cognitive choice for me. On the one hand, I loved the *bliss of drifting in the current of the eternal flow*	Taylor	82
5I	The linearity of internal dialogue helped *build a foundation and structure* for my thoughts	Taylor	118
5J	Via my *left brain language center's ability to say*, "I am", I become an independent *entity separate from the eternal flow*	Taylor	142
5K	*The Quiet* is no longer my baseline, but it is something *I try to nurture*, and the moments when I connect with it feel *sacred*	Marks	326
MIND AS PLANT; MIND/PART OF MIND AS MACHINE/VEHICLE			
5L	Paying attention to which *array of circuits we are concurrently running* provides us with tremendous insight into how our minds are fundamentally *wired*, and consequentially, how we can more effectively *tend our garden*.	Taylor	156
5M	I view *the garden in my mind as a sacred patch of cosmic real estate* . . . I choose to *nurture those circuits that I want to grow and consciously prune back* those circuits I prefer to live without.	Taylor	176
5N	my inner voice *turned on* . . . I suspect my uneasiness in November was at least partially related to its *reengagement*	Marks	102
5O	I try to *nourish* the ones that are productive and helpful, and *starve out* the ones that aren't	Marks	326

APHASIA AS SILENCE is included in two sections here, as it appeared in combination with both sets of other metaphors, bridging the description of the subjective experience of the lack of Dialogic IS and the impact of this on cognition and sense of self.

allows Taylor to emphasize the fact that the returning Dialogic IS is not under direct conscious control when in use (Table 5, rows B-D). It also gives a ready mapping for her ambivalence, as she can describe a relationship with the personified processes which has both antagonistic and cooperative elements (Table 5, rows B, C, D and J). The metaphor also provides a mapping for an attitude and strategies which help her to navigate this ambivalence, represented as negotiation and compromise (Table 5, row D). The importance of the insight that internal dialogue is a process which can be engaged in carefully, consciously and in negotiation with inner voices, is reflected in Taylor's subsequent work which describes the emotional benefits of personifying different aspects of self and engaging in inner dialogue (Taylor, 2022).

Later in her account Taylor uses the metaphors MIND AS PLANT and MIND AS COMPUTER to describe a more complex conceptualization of agency and Dialogic IS (this is the focus of much of her account and is what is described in Table 5, rows L and M). She recognizes that while instances of use of IS are outside conscious control, there is nevertheless a longer-term ability to inculcate habits of thought, and she thus does have some control over engaging and sustaining Dialogic IS, and over its effects on emotions. The mappings of MIND AS PLANT allow her to describe these longer-term processes in terms of the pruning and tending of a garden, in combination with the mappings of MIND AS COMPUTER to describe the shorter-term automatic processes. Taylor repeatedly combines these metaphors in a way that allows her to map these two important aspects of Dialogic IS in recounting how she resolved her initial ambivalence about its recovery.

Marks describes a similar ambivalence about the recovery of IS, as a loss of control, and she also describes a similar use of strategies in negotiating a relationship with this returning ability. She notes in a contemporaneous journal entry that Speech and Language Therapy "isn't just communicate/ing. It taking on a world of thoughts many occupied with anxiety and fears" (p.20). The return of inner language brings with it the loss of her experience of "the Quiet" (Table 5, row E). This experience of a return of inner language as a return of anxiety continues, often using the metaphors of INNER SPEECH AS A VOICE/PERSON (Table 5, rows F and G). Marks, like Taylor, makes use of personification as well as MIND/PART OF MIND AS MACHINE/VEHICLE to emphasise a lack of agency as Dialogic IS is recovered (Table 5, rows F, G and N). Marks describes a similar strategy to Taylor in managing this experience, also using the metaphor MIND AS PLANT to describe the ability to shape longer-term habits of thought (Table 5, row O).

Preserved Dialogic IS

Schultz describes inner dialogue without phonological properties throughout her recovery. She reports that she is "thinking without words" (p. 7, and Table 6, rows A, B and H), describing examples of mental time-travel, planning and problem-solving from early in recovery (Table 6, row F), often using metaphors of APHASIA AS FRAGMENTATION AND PERSONIFICATION OF SELF to describe her "mind" or "brain" as thinking (Table 6, rows A-C). She describes the kind of ruminative anxiety which Taylor and Marks reported as initially absent (Table 6, row G). She finds her ability to think without words puzzling, or even paradoxical, wondering, and links this puzzle to the philosophical paradox of whether a tree falling in a forest makes a sound if no one has heard (Table 6, row I). This analogy seems to imply that only the sensory

Table 6. Examples of metaphors used to describe preserved Dialogic IS.

	Metaphorical expression (with relevant context, *vehicle words in italics*)	Author	Page #
APHASIA AS FRAGMENTATION AND PERSONIFICATION OF SELF			
6A	My mind *thinks and it remembers*	Schultz	29
6B	Though wordless, my mind *races*	Schultz	48
6C	What is left of my brain *thinks very hard*	Schultz	53
6D	I could tell there was a *"third person"* talking to a *"first person"* and I was *both of those people.*	Broussard	57
6E	As I considered my problems, metaphorical explanations *appeared like unbidden guests.*	Broussard	72
WORDS/LANGUAGE AS OBJECTS and **MIND/PART OF MIND AS CONTAINER**			
6F	I had *organized* my mind for the work I needed to do when I get home	Schultz	22
6 G	there are worrisome thoughts *in my mind*	Schultz	33
6 h	I am kept awake thinking, thinking without words. I try to *find the words* for what I am thinking	Schultz	81
6I	When one of those great old growth fir trees falls crashing to the ground, has the crash made a sound if no one has heard?. . . When one no longer understands the spoken word and can no longer speak, does one no longer *have thoughts in their head*?	Schultz	107
6J	I had been thinking then (and had tried to express my intentions *using fractured* grammar) versus now, *with a healing (not quite whole*) grammar.	Broussard	40

aspect of IS, that is the phonology, is missing from an otherwise linguistic experience. While elsewhere she describes some instances of complex visual and spatial thought (e.g., "I visualize the things I would do. The first thing would be to adjust the blades on the planer". p.41), the subjectively paradoxical nature of what she describes suggests that visual and spatial mental imagery cannot fully account for her experience. Similarly, her attempt to find "words for what I am thinking" (Table 6, row H) could suggest that the "thoughts" have some linguistic properties, despite a lack of phonology.

Broussard similarly reports the presence of an inner dialogue from the earliest stages of his aphasia. He describes initial confusion and anosognosia, and yet simultaneous engagement in complex reasoning about his situation, in particular while walking (e.g., "there was lots of time to consider (reflect, contemplate, ruminate) my situation", p.56). The linguistic status of the thought processes he describes is unclear as he recorded them as diagrams, which may reflect a visual modality of thought (e.g., "I drew a metaphorical picture of a mountain range with the letters from the word 'APHASIA' written across the peaks. . . Since I could not write, I had been using many metaphorical drawings about what I was thinking". P.68). Nevertheless, a form of inner dialogue is clearly explicitly described in places, predominantly with metaphors of APHASIA AS FRAGMENTATION AND PERSONIFICATION OF SELF (Table 6, rows D and E). Broussard also reports a syntactic impairment which affected thought as well as expression, thus providing additional evidence that this thought was linguistic, as for syntax to be disordered, syntax must be present (Table 6, row J).

Phonological IS

In contrast to Dialogic IS, impaired Phonological IS is not described explicitly in any of the accounts as a "loss of inner speech" or any close equivalent. However, it is clear from the descriptions given that what is being described is the type of mental process which is investigated in the tradition of Phonological IS research.

Table 7. Examples of metaphors used to describe impairment of Phonological IS.

	Metaphorical expression (with relevant context, *vehicle words in italics*)	Author	Page #
WORDS/LANGUAGE AS OBJECTS and **MIND/PART OF MIND AS CONTAINER**			
7A	Mentally *in my head* and physically in my mouth I try to remember the sound that comes when I see "ch"	Schultz	43
7B	her name *erases itself from* my brain almost as soon as she says it	Schultz	50
7C	I flap my arms to mimic the flitting thing. "Bird?" "Yes, - b – b – ird". Bird. That is a short word and there is something about it that is similar to the bear word. Now I *have another word* to remember. *Bear* and – and - ?. . . I've *lost it*	Schultz	53
7D	The flying thing name *did not stick in* my brain. *It was there. Now it is not*	Schultz	55
7E	The new words *drain through my mind as through a sieve*	Schultz	56
7F	the working memory improvements I had built up over three years *were damaged again*	Broussard	117
7 G	My past is erasing even as I . . . teaching/practing myself words like "erasing" and "practing". After *each syllabul repairs*, it is forgotten	Marks	100
INNER SPEECH AS HEARING/SEEING WORDS			
7 h	I could rarely *see or hear the words in my own head*	Marks	31
7I	The words were corrupted in such a way that I couldn't jump from a mental appreciation for the words (that I could see) into a physical set of syllables (that I couldn't say) . . . I would look at every "Bentley" sign. . . I was aware *I couldn't pronounce it in my mind*	Broussard	56
7J	I could tell I couldn't say some words . . . I actually could *see* those words in my mind.	Broussard	51
7K	There were some words I couldn't *"see"*, but that wasn't because they were "lost". It was a different issue and a different deficit.	Broussard	63

Impaired Phonological IS

Schultz describes a severe impairment of verbal working memory. These descriptions primarily use the conventional metaphors of WORDS AS OBJECTS and MIND AS CONTAINER (Table 7, rows A-E). An experience while she is in hospital illustrates several important details of this impairment. She describes attempting to find the word "bird",: "The familiar movement of flying creatures. What is that word that names them?" (p. 53) Her first word-finding attempt is a (possibly silent) articulation of a word encountered the previous day: "'Bear?' I mouth out loud. *No*." This illustrates a possible impairment of internal self-monitoring, which she compensates for by physically articulating the word, allowing for external (auditory or kineasthetic) monitoring and an immediate successful judgement of the word being incorrect (elsewhere she states explicitly "I do not know whether it is a for-real word until I say it correctly" p. 127). When she is able to ask a nurse for the word, she can recognize and repeat it without delay: "'Bird?' "Yes, - b – b – ird"." She also spontaneously notes a phonetic similarity to the incorrect word that she had produced: "there is something about it that is similar to the bear word". However, she then describes a rapid loss of the representation: "Now I have another word to remember. *Bear* and – and - ?" From this short but detailed passage it appears to be specifically the articulatory rehearsal aspect of the phonological loop which is impaired: she cannot rehearse or perceive a phonological form without physically articulating it. She also reports a lack of IS when reading ("the title does not say words to me", p. 62). Schultz describes various impacts of this impaired Phonological IS on language processing, including on "relearning of words" (as described above), word-production ("the need to somehow remember the word until the next day so it can be used" p. 94), comprehension ("my mind immediately forgets the words" p.15), and reading and writing ("I do not know how to write them down. I tell her I do not *hear* them". p. 114).

Broussard also reports a deficit of phonological working memory, although this is more limited in its impact than the symptoms which Schultz describes. His awareness of this

difficulty arises only when carrying out the particular demanding task of writing down a name from a letter-by-letter auditory presentation of the name, a task which increases in difficulty following a second stroke (Table 7, row F). He describes impairment of Phonological IS in reading of some words (Table 7, row I). His internal self-monitoring is also affected, with his ability to monitor his own overt speech recovering before his ability to monitor Phonological IS ("As soon as I could say it, I could tell it was wrong" p.81).

Broussard describes some instances of an inner "seeing" of words despite an inability to say them (Table 7, row J). Marks briefly notes an inability to "see" or "hear" words internally (Table 7, row H). In a contemporaneous journal entry, she also describes a difficulty with phonological working memory (Table 7, row G). The contrast between inner "hearing" and inner "seeing" of words is explored in more detail in the following section.

Compensation for Phonological IS with visualisation

As noted above, Broussard describes inner "seeing" of words repeatedly throughout his account, rather than inner "hearing" or "saying". That Marks specifically notes a difficulty with both "seeing" and "hearing" words provides some additional evidence that two distinct phenomenological experiences may be captured by these related metaphors. One possibility is that Broussard makes use of an ability to visualise the orthography of words in compensation for an impairment to Phonological IS (Table 8, rows C and D). If this is the case, it could explain why Broussard describes a less severe impact of impaired Phonological IS on his language processing more broadly than does Schultz. Schultz describes relearning grapheme-to-phoneme conversion as a significant part of her rehabilitation, and following this she discovered that she was able to make use of visualised orthography as a compensatory strategy, initially as a conscious and effortful process to support word-finding (Table 8, rows A and B), but eventually describing that the "many cognitive steps appear to come automatically" (p. 183).

Schultz describes an additional use of visualisation, as a tool for semantic self-cuing. She describes attempted word-finding of a road name, which is affected by her impaired Phonological IS "I am trying to bring forth the *Jersey* sound word that fades in and out of my mind" (p.70). She describes a sequence of episodic memories and visual images which she maintains in her working memory until she is able to produce a semantically related word

"Alice introduced me to a couple who milked Jersey cows … Brown comes into my imagination. But then only the colour, not the letters of the word. I could say it makes

Table 8. Examples of metaphors used to describe recovery or compensation for impaired Phonological IS.

	Metaphorical expression (with relevant context, *vehicle words in italics*)	Author	Page #
INNER SPEECH AS SEEING WORDS, WORDS/LANGUAGE AS OBJECTS and **MIND/PART OF MIND AS CONTAINER**			
8A	The *blackboard in my mind visualizes* "e-l-e-v-e-n"	Schultz	139
8B	With the spelled *image* of the letters "p-e-t-a-l-s" *in my head* my mouth is able to enunciate the sounds of the word	Schultz	143
8C	I could not "say" the right word. I could *see the word in my mind*.	Broussard	28
8D	If you couldn't say the word you wanted (but you could still *see it in your mind*), you could describe the item with other associated words.	Broussard	120

Table 9. Metaphors used to describe preserved Phonological IS.

	Metaphorical expression (with relevant context, *vehicle words in italics*)	Author	Page #
WORDS/LANGUAGE AS OBJECTS and **MIND/PART OF MIND AS CONTAINER**			
9A	Mother, Mother, Mother. G.G., G.G., G.G. I kept repeating the words to *find those files, open them* and remember. Eventually, I kind of understood what a mother was and what G. G. represented.	Taylor	85
9B	I decided that today I was going to pay attention to nothing else that he said and just repeat the words over and over again *in my mind, holding them in memory* until it was time to *blurt them out*. At the end of our visit, he asked me to recall the three items. With confidence I uttered, "Firefighter, apple, something Whippoorwill Drive.	Taylor	91
9C	I remember pondering Tuna, tuna, tuna and no image or understanding *came into my mind* . . . I could not *find the file* for tuna salad	Taylor	96

cream. Cream? Again, I can only picture its colour, its texture, its taste . . . If I had that word, I could tell Frank that Jersey cows made whipping cream . . . Then suddenly, "Cow!" comes out. (pp. 71–72). This sequence shows a deliberate use of visual working memory to retrieve semantic associates of a target word, leading to partial success with the communicative goal.

Preserved Phonological IS

The day after her stroke Taylor describes the deliberate repetition of a phonological form to activate the related semantic representation, using a metaphor of MIND AS CONTAINER (Table 9, row A). She does not specify whether this was carried out with spoken or inner speech, but on the third day after her stroke she describes a similar use of repetition, this time in response to a test of verbal memory, in which it is clear that inner rather than spoken speech is used (Table 9, row B). In the seventeen-day period after her stroke and before surgery, Taylor describes further instances of inner repetition of words. Of particular note is another use of phonological repetition as a strategy to activate semantics (Table 9, row C). This example provides evidence that phonological loop rehearsal is being described: the experience is definitely "inner" as she is "pondering", rather than speaking, and it is evident that this is repetition of a purely phonological representation, as the semantic information was not successfully retrieved. That she has successfully maintained the representation despite a lack of activation of semantics is evidenced as she then repeats the word to ask for clarification ("So I queried, 'Tuna?'" p. 96).

Conclusion

The experiences of impaired and preserved inner speech described in these four accounts are heterogenous, reflecting both similarities and dissimilarities. The distinction between Dialogic and Phonological IS is able to capture this heterogeneity. Interestingly, these types of inner speech map onto the two different research traditions in inner speech: the "Vygotskian" approach which describes inner speech as internalised dialogue, and which focuses on its cognitive functions such as self-regulation; and the "Working Memory" approach, which defines inner speech as activation and manipulation of phonological representations, and investigates its role in memory and language processing.

Taylor and Marks both describe, using similar metaphors, the profound impact of impaired Dialogic IS. There is a difference in their accounts, in that Taylor describes

using preserved Phonological IS for linguistic and cognitive tasks, and Marks describes a complete impairment of Phonological IS, but neither the impairment nor the preservation of this aspect of inner speech is described as particularly salient to either author. Schultz and Broussard both describe making use of inner dialogue throughout recovery, along with an impairment of Phonological IS, the effects of which are not immediately apparent to them, but which have important effects on linguistic and cognitive function and recovery. The impacts as described by Schultz are more severe than those described by Broussard, possibly due to a compensatory use of visualisation that Broussard describes as an inner "seeing" of words.

The metaphors used to describe these types of inner speech are consistent across the four accounts. Dialogic IS described in terms of voices, dialogue and monologue, and Phonological IS predominantly as the seeing or hearing of inner words, or in terms of words as objects. Striking and novel metaphors were used to describe the impact of impaired Dialogic IS, in particular APHASIA AS SILENCE. The use of different systematic metaphors to describe the impairment of different types of IS suggests that information about the intrinsically hard to measure processes of inner speech may be obtained through discussion of subjective symptoms.

Thus, these findings provide two strands of evidence supporting the making of a useful distinction between Dialogic IS and Phonological IS. Firstly, a double dissociation can be observed: Taylor describes severely impaired Dialogic IS with intact Phonological IS, and Schultz describes preserved Dialogic IS with severely impaired Phonological IS. Secondly, there is consistency within and across accounts in how these different types of inner speech are described (as presented in Table 4). This distinction is important to make as the processes involved in the conscious awareness and manipulation of phonological representations, which are investigated by much recent research into inner speech in aphasia (see Fama & Turkeltaub, 2020), are not the processes which authors with aphasia describe as those which are impaired when there is a loss of "inner voices". Only the impairment of Dialogic IS is described by those authors who experience it, Taylor and Marks, as explicitly a loss of "inner voices". While impairment of Phonological IS was not described as "lack of inner speech", it often was described as the ability to "hear" a word in the head.

Baddeley's (2000) extension of the working memory model to include an "episodic buffer" provides a way to describe both of these aspects of inner speech within one model. This extension of the model was made to incorporate data which could not be explained within the original model, including the fact that most people can remember a much longer string of meaningfully connected words than they can of semantically and syntactically unrelated words. The episodic buffer also allows for the combination, or "binding", of multimodal representations. Thus, this extended model provides a modular architecture which can describe dissociable abilities to consciously access, rehearse and manipulate two kinds of linguistic information: one narrowly phonological, the other syntactic-semantic and multimodal. This provides a useful framework for understanding the range of inner speech experiences described in the current study, in which Phonological IS is carried out by the phonological loop, and Dialogic IS by the episodic buffer.

As well as the distinct experiences and dissociability of these two processes, this model offers an explanation for how visualisation of orthography can compensate for a phonological working memory deficit, as this makes use of the episodic buffer when

the phonological loop is impaired. If the episodic buffer itself is impaired though, there is no similar compensation to be made, but a gradual recovery is possible. This also has an indirect bearing on the question of the boundary between linguistic and non-linguistic thought. The functions which the episodic buffer enables are central to both language and thought, and when it is impaired we experience a loss of inner dialogue. Whether philosophically we consider all of its functions as linguistic or not is not of practical importance to understanding its role and effects in aphasia.

The results of this study suggest that inner speech does not consist of a necessary semantic component which may either be present in isolation ("condensed inner speech"), or in conjunction with acoustic or phonological representations ("expanded inner speech"). Rather than semantic representations having primacy as a necessary component of inner speech which may then be more or less phonologically elaborated, both Dialogic IS (which is necessarily semantically rich and usually to some degree syntactic) and Phonological IS (in which semantic and syntactic representations may not be activated at all) can be separately mentally represented for rehearsal and manipulation. In typical speech and cognition, these processes may be assumed to co-occur to a greater or lesser degree, other than in certain specific circumstances such as rehearsal of unfamiliar word in Phonological IS (especially in early language development, Alderson-Day & Fernyhough, 2015) or, arguably, certain kinds of "unworded inner speech" (Hurlburt & Heavey, 2006). However, when linguistic and cognitive processes are impaired in neurological injury, these functionally distinct processes can be differentially impaired.

Clinical implications, limitations, and future research

The findings demonstrate that understanding the range of ways in which inner speech can be affected in aphasia is of clinical importance. There may be a profound emotional and cognitive impact of impaired Dialogic IS, leading to ambivalence about recovery of language. This suggests that when Dialogic IS is affected in aphasia it may be especially important for clinicians to take a counselling approach as part of any intervention, and to ensure access to psychological and/or spiritual support from a multidisciplinary team. On the other hand, impaired Phonological IS, while it may have important effects on language processing, is less apparent to conscious awareness, but once identified and understood can be consciously compensated for (as described by Schultz, 2010), or improved through practice (as described by Broussard, 2016). This suggests that for people with impaired Phonological IS it may be helpful to use objective and subjective measures to assess Phonological IS, to provide detailed feedback, and to take a collaborative problem-solving approach to rehabilitation or compensation.

The findings of this study could be validated through a case series demonstrating the dissociation described here through objective behavioural measures. There are indications where measures of both Phonological and Dialogic IS have been used in the same experiment, that the results for each do appear to reflect this distinction, although these studies were not designed to address this question (Alexander, Langland-Hassan, et al., 2023; Kljajevic et al., 2017).

Another avenue for further research is suggested by the use of visualised orthography as a compensatory strategy when the phonological loop is impaired. This contrasts with the less successful use of visual imagery to compensate for difficulties with Dialogic IS. There are several case reports in the literature of a compensatory use of the visuospatial sketchpad when the phonological loop is impaired (e.g., Levine et al., 1982; Usinskiene et al., 2019). The successful use of visualisation in compensation for impaired Phonological IS, but not for impaired Dialogic IS, is also of relevance to understanding models of working memory.

Limitations of the study include a possible selection bias in the selection of the accounts from the initial set of twelve books. This was done on the basis that the authors clearly described inner speech, either explicitly, or components, types or aspects of it which are commonly discussed in the literature. One book which was not included in the current study (West, 2008) described experiences of auditory verbal hallucinations during his initial global aphasia, which is relevant to a full understanding of inner speech in interaction with other linguistic and cognitive processes. Therefore, the current study provides a starting point, and further work examining the ways in which inner speech can be affected in aphasia should be done.

This research demonstrates that attention to first-hand accounts of inner speech can help clarify theoretical discussions and their clinical implications. The main topic of investigation in recent research into inner speech in aphasia has been Phonological IS, however people with aphasia who report a "lack of inner voices" are describing impaired Dialogic IS. These two aspects of inner speech can be differentially impaired and have different impacts on language processing and cognition, making this distinction an important to research and to clinical practice. Further research in this area will enable the synthesis of existing research and the development of more effective and targeted clinical interventions.

Note

1. in wording which is reminiscent of Luria's description of Dialogic IS as providing "the linear scheme of the phrase" without which his patients were "unable to construct verbal propositions" (Luria & Tsvetkova, 1968).

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ORCID

Bethan Tichborne http://orcid.org/0000-0002-1279-8115

References

Alderson-Day, B., & Fernyhough, C. (2015). Inner speech: Development, cognitive functions, phenomenology, and neurobiology. *Psychological Bulletin*, *141*(5), 931–965. https://doi.org/10.1037/bul0000021

Alexander, J. M., Hedrick, T., & Stark, B. C. (2023, March 29). Inner speech in the daily lives of people with aphasia. *Frontiers in Psychology*, *15*, 1335425. https://doi.org/10.31219/osf.io/gbw3t

Alexander, J. M., Langland-Hassan, P., & Stark, B. C. (2023). Measuring inner speech objectively and subjectively in aphasia. *Aphasiology*. https://doi.org/10.1080/02687038.2023.2235761

Baddeley, A. (2000). The episodic buffer: A new component of working memory?. *Trends in Cognitive Sciences*, *4*(11), 417–423.

Baddeley, A. D., & Hitch, G. (1974). Working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 8, pp. 47–89). Academic Press.

Broussard, T. (2016). *Stroke diary II: The secret of aphasia recovery*. Stroke Educator Inc.

Brown, J. W. (2009). Inner speech: Microgenetic concepts. *Aphasiology*, *23*(5), 531–543. https://doi.org/10.1080/02687030801991160

Cameron, L., Low, G., & Maslen, R. (2010). Finding systematicity in metaphor use. In L. Cameron & R. Maslen (Eds.), *Metaphor analysis: Research practice in applied linguistics, social sciences and humanities* (pp. 116–146). Equinox.

Cameron, L., & Maslen, R. (2010). Identifying metaphors in discourse data. In L. Cameron & R. Maslen (Eds.), *Metaphor analysis*. Equinox.

Cameron, L., Maslen, R., Todd, Z., Maule, J., Stratton, P., & Stanley, N. (2009). The discourse dynamics approach to metaphor and metaphor-led discourse analysis. *Metaphor and Symbol*, *24*(2), 63–89. https://doi.org/10.1080/10926480902830821

Fama, M. E., Hayward, W., Snider, S. F., Friedman, R. B., & Turkeltaub, P. E. (2017). Subjective experience of inner speech in aphasia: Preliminary behavioral relationships and neural correlates. *Brain and Language*, *164*, 32–42. https://doi.org/10.1016/j.bandl.2016.09.009

Fama, M. E., Henderson, M. P., Snider, S. F., Hayward, W., Friedman, R. B., & Turkeltaub, P. E. (2019). Self-reported inner speech relates to phonological retrieval ability in people with aphasia. *Consciousness and Cognition*, *71*, 18–29. https://doi.org/10.1016/j.concog.2019.03.005

Fama, M. E., Snider, S. F., Henderson, M. P., Hayward, W., Friedman, R. B., & Turkeltaub, P. E. (2019). The subjective experience of inner speech in aphasia is a meaningful reflection of lexical retrieval. *Journal of Speech, Language, & Hearing Research*, *62*(1), 106–122. https://doi.org/10.1044/2018_JSLHR-L-18-0222

Fama, M., & Turkeltaub, P. (2020). Inner speech in aphasia: Current evidence, clinical implications, and future directions. *American Journal of Speech-Language Pathology*, *29*(1S), 560–573. https://doi.org/10.1044/2019_AJSLP-CAC48-18-0212

Feinberg, T. E., Rothi, L. J. G., & Heilman, K. M. (1986). 'Inner speech'in conduction aphasia. *Archives of Neurology*, *43*(6), 591–593.

Geva, S., Bennett, S., Warburton, E. A., & Patterson, K. (2011). Discrepancy between inner and overt speech: Implications for post-stroke aphasia and normal language processing. *Aphasiology*, *25*(3), 323–343.

Grandchamp, R., Rapin, L., Perrone-Bertolotti, M., Pichat, C., Haldin, C., Cousin, E., Lachaux, J. P., Dohen, M., Perrier, P., Garnier, M., Baciu, M., & Lœvenbruck, H. (2019). The ConDialInt model: Condensation, dialogality, and intentionality dimensions of inner speech within a hierarchical predictive control framework. *Frontiers in Psychology*, *10*, 2019.

Hayward, W., Snider, S. F., Luta, G., Friedman, R. B., & Turkeltaub, P. E. (2016). Objective support for subjective reports of successful inner speech in two people with aphasia. *Cognitive Neuropsychology*, *33*(5–6), 299–314. https://doi.org/10.1080/02643294.2016.1192998

Heavey, C. L., & Hurlburt, R. T. (2008). The phenomena of inner experience. *Consciousness and Cognition*, *17*(3), 798–810. https://doi.org/10.1016/j.concog.2007.12.006

Hernández, S. E., Barros-Loscertales, A., Xiao, Y., Gonzalez-Mora, J. L., & Rubia, K. (2018). Gray matter and functional connectivity in anterior cingulate cortex are associated with the state of mental silence during sahaja yoga meditation. *Neuroscience*, *371*, 395–406. https://doi.org/10.1016/j.neuroscience.2017.12.017

Hurlburt, R., & Heavey, C. (2006, May 10). *Descriptive experience sampling codebook manual of terminology*. https://hurlburt.faculty.unlv.edu/codebook.html

Kljajevic, V., Gómez, E. U., López, C., Bandeira, Y. B., & Vicente, A. (2017). Inner speech in post-stroke motor aphasia. *CogSci 2017 - Proceedings*, London, UK.

Kühn, S., Fernyhough, C., Alderson-Day, B., & Hurlburt, R. T. (2014). Inner experience in the scanner: Can high fidelity apprehensions of inner experience be integrated with fmri? *Frontiers in Psychology*, *5*. https://doi.org/10.3389/fpsyg.2014.01393

Langland-Hassan, P., Faries, F. R., Richardson, M. J., & Dietz, A. (2015). Inner speech deficits in people with aphasia. *Frontiers in Psychology*, *6*, 528.

Levine, D. N., Calvanio, R., & Popovics, A. (1982). Language in the absence of inner speech. *Neuropsychologia*, *20*(4), 391–409. https://doi.org/10.1016/0028-3932(82)90039-2

Littlemore, J. (2019). *Metaphors in the mind: Sources of variation in embodied metaphor*. Cambridge University Press. https://doi.org/10.1017/9781108241441

Luria, A. R., & Tsvetkova, L. S. (1968). The mechanism of 'dynamic aphasia' foundations of language, *4*(3), 296–307.

Marks, L. (2017). *A stitch of time*. Simon & Schuster.

Maslen. (2010). Working with large amounts of metaphor data. In L. Cameron & R. Maslen (Eds.), *Metaphor analysis*. Equinox.

Morin, A. (2005). Possible links between self-awareness and inner speech: Theoretical background, underlying mechanisms, and empirical evidence. *Journal of Consciousness Studies*, *12*(4–5), 115–134.

Morin, A. (2009). Self-awareness deficits following loss of inner speech: Dr. Jill Bolte Taylor's case study. *Consciousness and Cognition*, *18*(2), 524–529. https://doi.org/10.1016/j.concog.2008.09.008

Moss, C. S. (1972). *Recovery with aphasia: The aftermath of my stroke*. U. Illinois Press.

Plug, L., Sharrack, B., & Reuber, M. (2009). Seizure metaphors differ in patients' accounts of epileptic and psychogenic nonepileptic seizures. *Epilepsia*, *50*(5), 994–1000. https://doi.org/10.1111/j.1528-1167.2008.01798.x

Pragglejaz Group. (2007). MIP: A method for identifying metaphorically used words in discourse. *Metaphor and Symbol*, *22*(1), 1–39. https://doi.org/10.1080/10926480709336752

Schultz, C. (2010). *Crossing the void*. Chuckanut Enterprises, LLC.

Semino, E., Demjén, Z., Demmen, J., Koller, V., Payne, S., Hardie, A., & Rayson, P. (2015). The online use of violence and journey metaphors by patients with cancer, as compared with health professionals: A mixed methods study. *BMJ Supportive & Palliative Care*, *7*(1), 60–66. https://doi.org/10.1136/bmjspcare-2014-000785

Sierpowska, J., León-Cabrera, P., Camins, À., Juncadella, M., Gabarrós, A., & Rodríguez-Fornells, A. (2020). The black box of global aphasia: Neuroanatomical underpinnings of remission from acute global aphasia with preserved inner language function. *Cortex, A Journal Devoted to the Study of the Nervous System and Behavior*, *130*, 340–350. https://doi.org/10.1016/j.cortex.2020.06.009

Silvestre-López, A.-J. (2020). Conceptual metaphor in meditation discourse: An analysis of the spiritual perspective. *GEMA Online Journal of Language Studies*, *20*(1), 35–53. https://doi.org/10.17576/gema-2020-2001-03

Stark, B. C., Geva, S., & Warburton, E. A. (2017). Inner speech's relationship with overt speech in poststroke aphasia. *Journal of Speech, Language, & Hearing Research*, *60*(9), 2406–2415.

Taylor, J. (2009). *My stroke of insight*. Penguin.
Taylor, J. (2022). *Whole brain living: The anatomy of choice and the four characters that drive our life*. Hay House Inc.
Tichborne, B., Liu, F., & Bose, A. (2023). Subjective experience of word production difficulties in aphasia: A metaphor analysis of autobiographical accounts. *Aphasiology*, *38*(5), 862–894. https://doi.org/10.1080/02687038.2023.2243672
Usinskiene, J., Mouthon, M., Martins Gaytanidis, C., Toscanelli, A., & Annoni, J. M. (2019). Orthographic visualisation induced brain activations in a chronic poststroke global aphasia with dissociation between oral and written expression. *Case Reports in Neurological Medicine, 2019*, *2019*, 1–12. https://doi.org/10.1155/2019/8425914
Vicente, A., & Martinez Manrique, F. (2011). Inner speech: Nature and functions. *Philosophy Compass*, *6*(3), 209–219. https://doi.org/10.1111/j.1747-9991.2010.00369.x
West, P. (2008). *The Shadow Factory*. Lumen.