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'What 'form' does informal assessment take? A scoping review of the informal assessment literature for aphasia

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Abstract

Background: Aphasia assessment is traditionally divided into formal and informal approaches. Informal assessment is useful in developing a rich understanding of the person with aphasia's performance; eg., describing performance in the context of real-world activities, and exploring the impact of environmental and/or partner supports upon communication. However, defining 'informal assessment' is problematic and can result in clinical issues including idiosyncratic practices regarding why, when and how to apply informal assessment.

Aims: To examine the extent to which the informal assessment literature can guide SLTs in their clinical application of informal assessment for post-stroke aphasia.

Method: A scoping review methodology was used. A systematic search of electronic databases (Scopus, Embase, PyscInfo, CINAHL, Ovid Medline and AMED) gave informal assessment references between years 2000-2017 to which title/abstract and full-text screening against inclusion criteria were applied. Data was extracted from 28 resulting documents using an extraction template with fields based on the review's purpose.

Main contribution: The review examines the informal assessment guidance regarding: rationale; areas of interest for informal assessment; available methods; procedural guidance; documentation; and analytic frameworks. Rationale for using informal assessment included several aspects such as gaining a 'representative' sample of the individual's language. Ten communication areas of interest were found with 13 different assessment methods. The procedural guidance for these

methods varied considerably, with the exception of conversation and semi-structured interviewing. Overall, documentation guidance was limited but numerous analytic frameworks were found.

Conclusions: Several informal assessment methods are available to SLTs. However, information is mixed regarding when they might be used or how they might be applied in terms of their administration, documentation and analysis.

Introduction

The emphasis for many Speech and Language Therapists (SLTs) working with people with aphasia in the early days after stroke is assessment. Assessment can be defined as ‘the quantitative and qualitative data gathering process for the purpose of circumscribing an individual’s communicative function and activity limitations, understanding his or her participation restriction, and devising appropriate rehabilitative objectives’ (Murray and Coppens 2013 pg. 67). Comprehensive assessment is important as it enables the SLT to: identify the individual’s linguistic and communicative strengths and weaknesses; establish both the severity of the disorder and baselines for evidencing improvement; determine relationships to theoretical frameworks, and inform management including goal setting and treatment options (Bruce and Edmonson, 2010; Hersh et al. 2013; Hersh et al. 2017). A clinician’s selection of the appropriate assessment approach and procedures is influenced by several factors in the early days post-stroke, and must take place on a case-by-case basis (Murray and Coppens 2013). Factors include the person with aphasia’s level of alertness, degree of cognitive, sensory and perceptual difficulties, the presence of psychological distress, and spontaneous recovery (Vogel et al. 2010). The choice of assessment approach is also influenced by the individual’s previous and current levels of functioning (Murray and Coppens 2013). The therapist's overarching clinical philosophy, knowledge, skills, experience, and aspects of the clinical setting (e.g. resources availability, time pressures or prioritisation models) are also at play (Bruce and Edmundson 2010). Several studies have explored the assessment practices of SLTs in clinical practice.

Vogel et al. (2010) surveyed the assessment practices of 174 speech pathologists / SLTs working in the acute time period after stroke (first 30 days) in Australia and New Zealand. The respondents reported using a range of assessment approaches and methods, but the preferred approach for measuring language performance was informal assessment. Reasons given for this preference included time efficiency, flexibility of use (e.g. being able to repeat informal assessments with sufficient frequency), and increased sensitivity to changes in communication abilities that occur in the immediate post-stroke period. Interaction and observation were reported as assessment practices by over 70% of respondents, along with over 51% reporting using measures developed by the individual clinician or the institution. Assessment of conversation was noted by the authors as the focus for assessment. This finding is in line with Petheram (1998) who, in a UK survey, found that 80% of the 236 SLT respondents reported using an informal approach instead of, or as well as, formal assessment. In a more recent study, Foster et al. (2016) conducted in-depth interviews with 14 Australian speech pathologists to explore aphasia management in an acute hospital setting. The authors suggest the informal assessment approach most widely used by the interviewees gives an overview of the person with aphasia's language whilst protecting them from feelings of failure that may be experienced with formal assessments.

Defining what exactly is meant by informal and formal assessment is not, however, straightforward. A lack of clarity and precision surrounds relevant terminology and definitions (Coelho et al. 2005). Providing an agreed definition or description of informal assessment is particularly problematic. The simplest definition of informal assessment would describe it as any methodology that does not meet a formal

assessment definition. For example, Coelho et al. (2005) suggests informal assessments are not commercially published resources, that they lack psychometric properties, and/or that they lack defined procedures. In essence, informal assessments are non-standardised. A more broad, process-orientated description is provided by Murray and Coppens (2013) who describe informal assessment as a 'fluid exercise in critical thinking' (pg.77) and a 'process of creating and manipulating stimuli for the purpose of making clinical decisions, usually by answering hypothesis questions' (pg. 68). Hersh et al. (2017) state that informal assessment appears to refer to the type of materials and tasks used, along with the way in which the SLT interacts with the person with aphasia during the assessment process.

Despite the challenges in defining informal assessment, benefits of the approach and procedures are apparent. The tendency towards informal assessment in the aforementioned studies, along with some of the reasons provided for using informal means (e.g. Foster et al. 2016 highlight the reporting of informal assessment preserving 'precious time' (pg. 1771)), suggests that SLTs find the approach to have real clinical value. The Australian Aphasia Rehabilitation Pathway (AARP) (Clinical Centre for Research Excellence in Aphasia Rehabilitation (CCREIAR) 2014) states informal assessment is particularly useful in developing a rich understanding of the person with aphasia's performance. The AARP outlines several assessment purposes best served by informal methods; e.g. determining communicative ability in areas for which there are no suitable formal tests available (e.g. discourse), describing performance in the context of real-world activities, and exploring the impact of environmental and/or partner supports upon communication. Discourse, including conversation, is the most frequent and natural of all communication activities and

therefore has social validity as an assessment task as it reflects real-life communication more than (language) testing (Hesketh et al. 2008; Ramsberger and Rende 2002).

In contrast, formal assessments are more easily defined. They are commonly published, standardised tests or test batteries that have a clear administration procedure, can be scored and measured, and have psychometric properties (Bruce and Edmonson 2010; Coelho et al. 2005; Murray and Coppens 2013). These formal assessments are often selected by SLTs in the belief that they provide valid, reliable, and sensitive measurements of communicative performance (Bruce and Edmonson 2010). They also enable quantitative comparison of performance (AARP website CCREIAR 2014). Formal assessments are typically deficit-orientated, attempting to elucidate the nature of the language impairment (Fratalli, 1992). They therefore relate most closely to the level of body structure and function (impairment) according to the World Health Organisation's International Classification of Functioning, Disability and Health (ICF) (WHO 2001). The extent to which formal tests reflect real life performance has been questioned. For instance, the distraction-free environment may mask problems, and conversely, in a test environment, a person may be prevented from employing a successful compensatory strategy used to accomplish a task in everyday life (Coelho et al. 2005). Formal testing can also expose the person with aphasia to potential failure (Foster et al. 2016) and therefore be face-threatening (Myrberg et al. 2017). More broadly, such tests have been criticised for not reflecting adequately the problems that a person with aphasia may experience in a social world (Spreen and Risser 2003). Davidson and Worrall (2000) state clearly that the impact of aphasia upon a person's everyday life (e.g. their

activity and participation) ought to be established along with the nature and severity of their language problem (e.g. the impairment).

The lack of clarity regarding assessment definitions gives rise to clinical and research challenges. For example, a given assessment can be categorised as *either* informal *or* formal depending on the definition used. Assessments used to establish psychological wellbeing / quality of life (QoL) or activity and participation often fall into this category. Commonly described as functional communication assessments, these assessments attempt to distinguish between natural language use and linguistic performance in artificial test situations (Carlomagno et al. 2000). They often lack the traditional array of psychometric properties but have some degree of administration procedure, which can sometimes be akin to test conditions, and can be readily scored. In addition, varied terms may also be used to discuss assessment practice, particularly informal methods. For example, Myrberg et al. (2017) compare the interactions between people with aphasia and speech pathologists / SLTs in test conversations and in more everyday-like conversations with performance on an aphasia test battery. However, the term 'informal' is not used explicitly in the article to describe an assessment methodology (conversation) that many SLTs would consider to be inherently informal in nature; instead 'conversation-based assessment' is used (pg. 2). Consequently, SLTs accessing the evidence-base in relation to aphasia assessment practice may not be accessing all relevant studies; depending on how a study has defined or described assessment, or indeed how the SLT has defined it through the search terms used to explore the literature. This is problematic as carrying out effective assessment requires up-to-date knowledge (Murray and Coppens 2013).

Lack of agreement on a definition also directly influences the clinical application of the approach. Although informal assessment can be defined by a lack of detailed guidance (Coelho et al. 2005), *some* degree of framework or guidelines is highly beneficial, for example, to provide suggestions of 'how' to go about implementing an informal method (in the knowledge that it does not have to be adhered to) or allowing for a shared understanding of what is being referred to in clinical discussions or documentation. This is particularly valuable to ensure students, newly-qualified SLTs or inexperienced clinicians working within stroke are sufficiently educated, trained and confident in the clinical application of the approach. Hersh et al. (2017) highlight the limited attention that has focused on the 'how' of informal assessment, suggesting assessing informally might impact upon the clinical interactions. Again, such research is made more problematic by limited agreement on what is informal assessment methodology - in terms of process, tasks and materials.

The eclectic and flexible nature of informal assessment has clear advantages for the clinician and the person with aphasia. However, the variation in what may be considered informal assessment can lead to idiosyncrasy in clinical practice in terms of why, when and how to apply the approach and its methods. The current evidence base may offer assistance in addressing some of the potential issues by providing some degree of information and guidance to SLTs on elements such as rationale for informal assessment, possible assessment methods and procedural information. Given the increasing, and appropriate, emphasis within the NHS of evidence-based practice, such guidance strengthens the position of SLTs who are potentially

vulnerable when practising without up-to-date knowledge.

The current review

This paper focuses on discovering what methods of informal assessment are available to SLTs working in clinical practice with people with aphasia after stroke, and the extent of guidance for implementing these methods from across the published literature regarding informal assessment. The paper does not focus on a comparison or evaluation of various informal assessment methods.

Informal assessment is defined, for the purposes of this review, as any non-standardised assessment. This definition allows for inclusion of informal assessment methods that are different in nature (e.g. conversation versus simulated activity or role play).

The review aims to explore: any described rationale for using an informal approach and / or specified method; areas of communication requiring consideration as part of informal assessment; possible informal assessment methods and procedural guidance (e.g. when it should be used, how it should be carried out, and how it should be documented). In doing so, the review will aim to answer the clinical research question:

To what extent can the informal assessment literature guide SLTs in their clinical application of informal assessment for post-stroke aphasia?

Method

This review uses a scoping review methodology. This methodology was selected as it is an approach useful in identifying the types and sources of evidence to inform aspects of clinical practice (Mallidou 2014). Scoping reviews enable knowledge synthesis by thoroughly and thoughtfully mapping the literature on a particular topic or research area (Daudt et al. 2013). Their strength lies in extracting information from across a broad body of evidence (Davis et al. 2009).

Searching the literature

The literature search was carried out in February 2017. The primary method was a systematic search of the electronic databases Scopus, Embase, PsycInfo, CINAHL, Ovid Medline and AMED from 2000 up to and including 2016. Key search terms were: 'aphasia / dysphasia', 'assessment' and 'stroke'. Using a limited number of search concepts ensured the greatest likelihood of capturing the wide-ranging terms used to describe informal assessment. No restrictions were applied based on document type or study methodology. Secondary search methods were also used. These included: 1) searching the reference lists and citations of included literature; 2) searching within relevant journals e.g. *Aphasiology*; 3) generic web searching (e.g. Google/Google Scholar) and 4) inclusion of relevant literature already known to the authors.

Selecting the studies

Duplicates were removed from the search results, and a preliminary screen from the titles of the retrieved search results eliminated all items which clearly did not relate to aphasia as the phenomenon of interest; and aphasia resulting from stroke in

adults. Titles that passed this screen were imported into Excel and any further duplicates were deleted.

Title/abstract, and then full-text screening was performed in respect of the remaining documents against an inclusion criteria: informal assessment methodologies aiming to capture any aspect of performance (e.g. language impairment, activity, participation or needs), and informal assessment of aphasia as the central focus of the document (where there was a broader assessment scope to a document e.g. comparing an informal with a formal method, only informal assessment methodologies were included). These broad inclusion criteria allowed for adequate capture of relevant literature (to include grey literature as well as empirical research studies), allowing for a more informative review. Studies were excluded which did not relate to aphasia assessment at all or only formal assessment.

Data Extraction and Synthesis

Data were extracted using an extraction template generated by the first author with fields based on the clinically informative aims of this scoping review. These included: rationale; area of interest for assessment; assessment method; procedural guidance (who can carry it out, when should it be used, elicitation method and stimuli sub-fields); documentation; and analytic framework.

The first author reread the studies several times to extract the relevant information and created a dynamic list of key constructs for each of the proposed fields.

Recurring patterns or aspects were then generated by the first author from the list of key constructs and used to organise the relevant extracted information for each of

the desired fields. In some instances, potentially similar or related constructs were kept separate to provide a more clinically informative outcome. Extraction required frequent interpretation by the first author, as the relevant information was often implicit within the literature and rarely explicitly corresponded to the fields generated for this review.

Results

Included documents

From 1029 initial search results, 28 documents are included in this scoping review after meeting the inclusion criteria. Nine potentially relevant documents are not included as it was not possible to obtain the full-text. Seventeen of the included documents are research papers, ranging from descriptive single case studies to large cohort studies from across Europe, Australia, New Zealand, America and South East Asia (see Table 1 for characteristics of these studies). Two of the research papers are reviews. A further five records are book chapters and two are books. A Master's thesis and a website resource with its supplementary set of best practice statements¹ are also included. The foci of these various documents include clinical guidance for aphasia assessment; investigation of aphasic discourse (including measurement, transcription and analysis) and measurement of aphasia across the ICF.

¹ For this purposes of this review, this cluster of web pages and its supplementary best practice statements are treated as a single document to make for efficient reporting. Clarification is made as appropriate in the main body of the text when referring to the web pages or the best practice statements.

Table 1: Characteristics of research studies arising from the literature search (inc. study aim, design, population and sample size)

Authors	Year	Study aim and design	Study population and sample size
Armstrong and Ulatowska	2007	Illustrative case report analysing evaluative language in the stroke narrative of people with aphasia	n=3 English speaking people with aphasia post-stroke (data extracted from a larger study of 25 people with aphasia)
Armstrong and Mortensen	2006	Illustrative analysis of everyday talk in aphasia using Speech Function Network	n=3 English speaking people with aphasia post-stroke and their spouses (data extracted from a larger conversation study)
Armstrong et al.	2007	Clinical study investigating the potential of transcription-less discourse analysis	n=10 English speaking people with aphasia post-stroke
Beeke et al.	2003	Case report investigating conversation grammar	n=1 people with aphasia (data extracted from another case report)
Fergadiotis et al.	2013	Analysis study evaluating four measures of lexical diversity to determine how effective they were at measuring lexical diversity in people with aphasia	n=101 English speaking people with aphasia post-stroke
Herbert et al.	2008	Clinical study aiming to develop a method of quantifying lexical retrieval in aphasic conversation, and to establish the reliability of the method.	n=10 English speaking people with aphasia post-stroke and their conversation partners
Hesketh et al.	2011	Clinical study comparing speakers', carers', and speech and language therapists' perspectives of stroke survivors' functional communication and examining the effect of severity of aphasia on levels of agreement.	n=56 English speaking people with aphasia post-stroke (Total n=102)
Hesketh et al.	2008	Clinical study testing the reliability of a clinically feasible procedure for collecting and rating a conversation sample	n=57 English speaking people with aphasia only and n=28 aphasia and / or dysarthria post-stroke (Total n=102)
Jaecks et al.	2012	Clinical study exploring whether there are variables in the spontaneous	n=41 German speaking people with aphasia post-stroke (Total n=65)

		communication of mild aphasia that enables distinction from persons without aphasia	
Kong and Law	2004	Clinical study aiming to design a new instrument for quantifying Cantonese aphasic narratives	n=10 Cantonese people with aphasia post-stroke or TBI (Total n=40)
Kong and Law	2009	Clinical study investigating the usefulness of the Cantonese Linguistic Communication Measure in monitoring changes of narrative production	n=4 Cantonese people with aphasia
Laska et al.	2007	Study 1: Observational study and Study 2: RCT allowing for comparison of standardised and functional aphasia tests	Study 1, n = 119 and Study 2, n=89 Swedish people with aphasia post-stroke
Marini et al.	2011	Case report of a comprehensive, multi-level procedure for both structural and functional analysis of narrative discourse produced by speakers with aphasia	n=2 people with aphasia (1 post-stroke and 1 post-TBI)
O'Halloran et al.	2007a	Clinical study investigating whether 2 communication activity measures adequately captured hospital-based interactions	n=2 Australian people with aphasia only post-stroke (Total n=10)
Olness et al.	2002	Clinical study exploring whether the quantity and quality of discourse produced in response to pictorial stimuli differed between African Americans and Caucasians with and without aphasia.	n=62 English-speaking people with aphasia (33 African American and 29 Caucasian) post-stroke (Total n=124)
Ramsberger and Rende	2002	Clinical study aiming to develop an objective measure of transactional success in conversation.	n=14 people with aphasia (12 people with aphasia post-stroke and 2 post-TBI) (Total n=60)
Rochon et al.	2000	Clinical study investigating 1) whether particular measures would pattern together and (2) whether different performance patterns would emerge within the patient group and also reporting reliability measures	n=29 English-speaking people with aphasia post-stroke

Rationale underpinning informal assessment

Three overarching aspects emerge from the reviewed literature as rationales for informal assessment. These include: 1) establishing performance across one or more areas of the ICF; 2) gaining a 'representative' sample of the individual's language; and 3) the therapeutic nature of the approach.

1) Performance across the ICF

The most consistent and frequent aspect emerging from the literature is the value that informal assessment offers the clinician in establishing the person with aphasia's abilities and behaviours across *all* aspects of the ICF – impairment, activity and participation. Assessment of all three areas is 'imperative for meaningful outcomes in aphasia' (Armstrong et al. 2016, pg. 271), as they are the key to living life successfully with aphasia. This position is incorporated into the AARP website and its supplementary Aphasia Rehabilitation Best Practice Statements (CCREIAR 2014). Best practice statement 4.3 states 'all domains of functioning and disability should be considered for assessment'.

2) Gaining representative samples of language

Several records refer to the value of discourse elicitation in order to gain a more accurate and naturalistic reflection of an individual's overall linguistic performance compared to language testing (e.g. Armstrong et al. 2016; Prins and Bastiaanse 2004; Marini et al. 2011; Spreen and Risser 2003). Certain linguistic competencies are suggested to be evident only within discourse, e.g. lexical diversity (Fergadiotis et al. 2013), evaluative language (Armstrong and Ulatowska 2007) and certain

grammatical structures (Beeke et al. 2003). Several of the conversation studies highlight the different ways in which people with aphasia may display their aphasia in everyday, naturalistic contexts compared to those that are more artificial (e.g. Beeke et al. 2003; Armstrong and Mortensen 2006; Hesketh et al. 2008; Herbert et al. 2008; Jaecks et al. 2012).

3) Assessment as a therapeutic process

A less frequent rationale for informal assessment is outlined by Hersh et al. (2013). They define assessment as ‘therapeutic’ because such interactions allow for an opportunity to share information that may enable persons with aphasia to better understand their condition and the wider rehabilitation process. The approach also provides opportunity for communicative success as the individual is not constrained and limited to a given (language) task. Furthermore, the SLT can trial potentially successful communication strategies during the assessment (Spreeen and Risser 2003; Murray and Coppens 2013). Arguably, some principles of therapeutic assessment could be applied to formal assessment – a point made by Hersh et al. (2013) – but formal assessment often conveys little of the success a person with aphasia might have in their communicative attempts *despite* their deficits (Spreeen and Risser 2003). Central to this therapeutic approach is dynamic assessment, in which the SLT trials strategies and techniques during the assessment process (Hersh et al. 2013). The AARP website (CCREIAR 2014) summarises dynamic assessment based upon Coelho et al. (2005). Coelho et al. (2005) describe dynamic assessment as experimental in nature, in that the method attempts to identify factors that may influence performance (e.g. strategies, task modification, context factors and environmental supports). These principles are reflected within the AARP supplementary Best

Practice Statements (CCREIAR 2014). Best practice statement 4.1 is ‘the assessment process should be iterative and dynamic’ and 4.2 is ‘assessment should be therapeutic’ (pg 16).

Hersh et al. (2013) propose that therapeutic assessment is an intervention in its own right, with the person with aphasia (and often their family or carer) actively engaged in the process. This view is promoted in an early work by Spreen and Risser (2003) where they state ‘assessment is not an end in itself but must be considered in relation to its potential value to the patient’ (pg. 223).

Goal-orientated conversation (through semi-structured interviewing) is a method endorsed by Hersh et al. (2013) to achieve therapeutic assessment. The method can help SLTs move successfully from seeing assessment as separate, or an adjunct, to therapy and result in greater collaboration between the SLT and person with aphasia.

Communication areas of interest requiring consideration

Ten areas are reported in the literature as requiring consideration during informal assessment. These are, in order of decreasing prevalence in the literature reviewed (see Table 2): assessment of discourse, activity and participation of the person with aphasia, psychological wellbeing/QoL (of the person with aphasia and caregiver), language skills, communication skills, reading, writing and communication skill of conversation partner (CP), and finally gesture and cognition.

Methods of informal assessment

Thirteen informal assessment methods (as defined by this review) are cited in the literature (See Table 3). Conversation is the most commonly reported. This is

followed in decreasing prevalence by simulated activity / role-play, single picture description, observation, semi-structured interviewing, and story retelling. Less commonly reported assessment methods identified are picture sequence description, procedural description, interviewing (contextual inventory), conversational sampling (for CP skills), listener retelling, text reading and text writing.

Certain methods are used to explore more than one communication area of interest; e.g. semi-structured interviewing was used to examine activity and participation but also wellbeing / QoL. Similarly, several methods of informal assessment are used within one area of interest - e.g. conversation, single picture description, picture sequence description, story retell, listener story retell, and procedural description are cited as possible ways to informally assess discourse. Some areas of interest (e.g. gesture) have no associated method reported.

Table 2: Areas of communication suggested to require consideration during informal assessment

Area of Interest	Reference
Language skills, e.g. naming, repetition and spoken comprehension	CCREIAR 2014; Murray and Coppens 2013; Spreen and Risser 2003
Cognition	Murray and Coppens 2013
Communication skill (including interaction)	Armstrong and Mortensen 2006; Murray and Coppens 2013; Prins and Bastiaanse 2004
Discourse (conversation/narrative/'everyday talk')	CCREIAR 2014; Armstrong and Mortensen, 2006; Armstrong and Ulatowska, 2007; Armstrong et al. 2016; Armstrong et al. 2007; Beeke et al. 2003; Fergadiotis et al. 2013; Herbert et al. 2008; Hesketh et al. 2008; Jaecks et al. 2012; Kong and Law 2004, 2009; Lee 2016; Murray and Coppens 2013; Olness et al. 2002; Prins and Bastiaanse 2004; Ramsberger and Rende 2002; Rochon et al. 2000; Senhorin et al. 2016; Spreen and Risser 2003
Activity and/or participation (inc. needs)	CCREIAR 2014; Armstrong and Mortensen 2006; Armstrong et al. 2016; Davidson and Worrall 2000; Hersh et al. 2013; Hesketh et al., 2011; Hirsch and Holland 2000; Laska et al. 2007; Murray and Coppens 2013; O'Halloran et al. 2004; O'Halloran et al. 2007a; Prins and Bastiaanse 2004; Spreen and Risser 2003
Wellbeing / QoL:	
1. Person with aphasia	Hersh et al. 2013; Hirsch and Holland 2000; Murray and Coppens 2013; Spreen and Risser 2003
2. Caregiver	Hirsch and Holland 2000; Murray and Coppens 2013
Reading	Senhorin et al. 2016; Spreen and Risser 2003
Writing	Senhorin et al. 2016; Spreen and Risser 2003
Gesture	Senhorin et al. 2016
Communication skill of CP	Hersh et al. 2013; Murray and Coppens 2013

Table 3: Informal approaches with associated elicitation tools / stimuli found to explore given areas of interest

Assessment Approach and / or method	Area of Interest	Task elicitation / stimuli tools	Reference
Picture Description (single)	Discourse – fictional narrative	• N/A	Murray and Coppens 2013; Fergadiotis et al. 2013
		• Cookie Theft (Boston Diagnostic Aphasia Examination, Goodglass et al. 2001)	CCREIAR 2014; Armstrong, et al. 2007; Beeke et al. 2003; Lee 2016; Marini et al. 2011
		• Domestic life (kitchen, living room)	Kong and Law 2004; Kong and Law 2009
		• Picnic (Western Aphasia Battery, Kertesz, 1982)	Marini et al. 2011
		• Chinese Restaurant	Kong and Law, 2004; Kong and Law, 2009
		• Financial	Olness et al. 2002
		• Religious	Olness et al. 2002
Picture description (sequence)	Discourse – fictional narrative	• Dinner Party	Beeke et al. 2003.
		• N/A	Fergadiotis et al. 2013
		• Flower Pot (Huber and Gleber, 1982)	Marini et al. 2011
		• The Quarrel (Nicholas and Brookshire, 1993)	Marini et al. 2011
Person with aphasia story retell	Discourse – fictional narrative	• Mischievous child	Olness et al. 2002
		• Cinderella story (Grimes 2005)	CCREIAR 2014; Beeke et al., 2003; Fergadiotis et al. 2013; Lee 2016; Rochon et al. 2000
		• Other fairy tale (e.g. Little Red Riding Hood)	Rochon et al. 2000
Listener story retell	Discourse – fictional narrative	• TV episode	Armstrong et al. 2016
		• TV episode	Ramsberger and Rende 2002
Procedural description	Discourse – procedure	• N/A	Murray and Coppens 2013
		• E.g. ‘How to make a sandwich’ and ‘How to change a light bulb’	Armstrong et al. 2007
Conversation	Discourse – everyday talk	• N/A	Armstrong and Mortensen 2006; Murray and

			Coppens 2013; Spreen and Risser 2003
		<ul style="list-style-type: none"> • Co-constructed topic/s 	Armstrong et al. 2016; Herbert et al. 2008; Senhorin, et al. 2016
		<ul style="list-style-type: none"> • CP constructed topic/s – ‘Tell me about...’- e.g. family, interests, work, holidays, daily routine, stroke. 	Armstrong et al. 2007; Hesketh et al. 2008; Jaecks et al. 2012; Senhorin et al. 2016
	Discourse – personal narrative	<ul style="list-style-type: none"> • Life / personal experiences e.g. life story, ‘frightening experience’ 	Armstrong et al, 2016; Armstrong and Ulatowska 2007; Fergadiotis et al. 2013
Conversational sampling	Communication skills of CP	<ul style="list-style-type: none"> • N/A 	Hersh et al. 2013; Murray and Coppens 2013
Semi-structured interview	Activity and participation	<ul style="list-style-type: none"> • In-patient Functional Communication Inventory (IFCI) (O’Halloran et al. 2004) • SMARTER goal-setting framework (Hersh et al. 2012) 	CCREIAR 2014; Hersh et al. 2013; O’Halloran et al. 2004
	Wellbeing / QoL - person with aphasia	<ul style="list-style-type: none"> • Psychosocial Well-being index 	Hirsch and Holland 2000
Observation	Activity and participation	<ul style="list-style-type: none"> • ASHA Functional assessment of communication skills adults (ASHA-FACS) (Frattali et al. 1995) 	CCREIAR 2014; Davidson and Worrall 2000; Hersh et al. 2013; O’Halloran et al. 2007a; Prins and Bastiaanse, 2004; Spreen and Risser 2003.
		<ul style="list-style-type: none"> • Edinburgh Functional Communication Profile (Wirz et al. 1990) 	Spreen and Risser 2003
		<ul style="list-style-type: none"> • Pragmatic Protocol (Prutting and Kirchner 1987) 	CCREIAR 2014; Prins and Bastiaanse 2004; Spreen and Risser 2003
Interview (Contextual Inventory)	Activity and participation	<ul style="list-style-type: none"> • Communicative Profiling System (Simmons-Mackie and Damico 1996) 	CCREIAR 2014; Hersh et al. 2013; Hirsch and Holland 2000.
Simulated activity and Role Play	Activity and participation	<ul style="list-style-type: none"> • Functional Communication Profile (Sarno 1969) 	CCREIAR 2014; Armstrong et al. 2016; Armstrong and Mortensen 2006; O’Halloran et al. 2007a; Prins and Bastiaanse 2004; Spreen and Risser 2003
		<ul style="list-style-type: none"> • Communication Assessment of Daily Living 	CCREIAR 2014; Davidson and Worrall 2000; Hirsch

		(CADL) (Holland 1980) / CADL-2 (Holland et al. 1998)	and Holland 2000; O'Halloran et al. 2007a; Prins and Bastiaanse 2004; Spreen and Risser 2003
		<ul style="list-style-type: none"> • Assessment of Language Related Functional Activities (Baines et al. 1999) 	Spreen and Risser 2003
		<ul style="list-style-type: none"> • ANELT (Blomert et al.1994) 	CCREIAR 2014; Laska et al. 2007
		<ul style="list-style-type: none"> • E.g. Using telephone, doctor consultation, shopping 	Armstrong et al. 2016
Text writing	Writing	<ul style="list-style-type: none"> • Daily Routine 	Senhorin et al. 2016
Text reading	Reading	<ul style="list-style-type: none"> • Traffic laws and signs 	Senhorin et al. 2016

Procedural guidance for informal assessment methods

The focus of procedural guidance includes when a method could be used; who could carry out the method; suggested guidelines for how it could be conducted; how assessment findings might be analysed and how assessments might be documented.

1. Who might carry out a specified informal method and when

The majority of procedural guidance found across the literature is for conversation and semi-structured interviewing; for other methods, the amount and detail varies. Several articles do not directly provide this information, but instead direct the reader to additional references for more detailed information (Spren and Risser 2003; Rochon et al. 2000).

An SLT is stated as the person who should be eliciting and analysing information gained through informal assessment (Hesketh et al. 2008; O'Halloran et al. 2004). Armstrong et al. (2007) recruit SLT students but provide comprehensive training in their discourse study. Several discourse references suggest the approach should take place in a familiar environment e.g. Herbert et al. 2008; Armstrong et al. 2007. Settings include homes, clinics and institutions. Articles employing semi-structured interviewing suggest the approach can be used early on in a hospital setting (Hersh et al. 2013; O'Halloran et al. 2004 and CCREIAR 2014) as well as for those living in the community (Hersh et al. 2013). There is no information on when the approach is most appropriate to administer (e.g. time post recovery).

2. How might a specified informal method be carried out

For conversation, family members (Armstrong and Mortensen 2006; Herbert et al. 2008) and unfamiliar people (Armstrong et al. 2007; Hesketh et al. 2008) are reported as CPs across the conversation articles. There is similarity in elicitation method and stimuli, in that the CP typically initiates topics, usually by requesting information (e.g. "Tell me about your stroke/interests/work"). Hesketh et al. (2008: 983) provide an appendix showing the starter and prompt questions asked, as well as the overall structure of the conversation e.g. "(Opener) Can you tell me about your friends and family? (Prompts) Where do your family live? Do they live near? Who do you see in a week? What about friends or neighbours?" Sampling guidance is provided in terms of length of time of the conversation (Herbert et al. 2008; Armstrong et al. 2007; Hesketh et al. 2008; Armstrong et al. 2016) and amount (Murray and Coppens 2013; Jaecks et al. 2012).

Less detailed guidance is provided for story-retelling. A sample of at least 150 words is suggested by Lee (2016) and Rochon et al. (2000). The main stimulus used is the Cinderella story (Grimes 2005) (Beeke et al. 2003; Fergadiotis et al. 2013; Lee 2016; Rochon et al. 2000).

Seven different picture stimuli are used, with slight differences in elicitation protocols for picture description. Lee (2016) has the picture available for the duration of the task, and participants are given an unlimited time to respond. Olness et al. (2002) allow as much time as desired to view each picture, but remove it before description. Olness et al. (2002) instruct the participant to 'tell a story' based on the stimulus, whereas Kong and Law (2004) ask the participant to 'tell (me) everything you see happening in this picture'. No further detail regarding assisting or prompting the person with aphasia is provided.

Two protocols are found for semi-structured interviewing, either a) an environment-orientated conversation (within hospital) using the In-patient Functional Communication Interview (IFCI) (O'Halloran et al. 2004) or b) goal-orientated conversation (in the community) using the SMARTER framework (Hersh et al. 2012). The IFCI comprehensively outlines the information to be sought from review of medical records for use during the interview (medical, contextual, personal) and how to conduct the semi-structured interview, including a conversational script. Hersh et al. (2013) clearly outline how to conduct goal-orientated semi-structured interviews using the SMARTER framework (Hersh et al. 2012). The framework leads to goal-orientated conversations being *shared, monitored, accessible, relevant, transparent, evolving* and *relationship-centred*. Hersh et al. (2013) present a case example of the framework as well as some functional tools that can support identification of the impact of aphasia upon activity and participation.

Limited guidance is found for administering the remaining methods of informal assessment; namely simulated activity / role-play and observation. Guidance is primarily signposting to (published) resources (Murray and Coppens 2013; Spreen and Risser 2003).

3. Analysis of the results from a specified informal method

Numerous analytic frameworks are used across the literature (See Table 4). Informal assessment methods that are frequently reported are analysed using several different frameworks e.g. seven techniques are found for analysing picture description. Less frequently reported assessment methods typically have a single technique e.g. one analysis approach and associated technique (conceptual analysis using number of concepts

expressed) is found for listener retell, which is only explored in a single study by Ramsberger and Rende (2002).

Description of the analytic techniques varies greatly. Little or no information is provided for analysis of some of the most commonly reported informal assessment methods e.g. observation and simulated activity/role-play. In contrast, the less frequently reported approach of semi-structured interviewing describes in detail how to analyse the interaction using the IFCI (O'Halloran et al. 2004).

The exception is for discourse - a frequently reported assessment method. A large proportion of the articles reporting on discourse provide a description of the analytic approach. In several instances, sufficient information is provided to allow the clinician to carry out the given analysis (e.g. Speech Function Analysis (Armstrong and Mortensen 2006; Armstrong et al. 2016) and the Quantative Production Analysis (QPA), Rochon et al. 2000; Lee 2016).

Computerised analyses of discourse are also found. Armstrong et al. (2016) discuss the merits of automated analysis such as increased speed, the need for SLTs to be trained in only one program rather than several analysis techniques, and the complexity of analysis that computer programs enable. Fergadiotis et al. (2013) investigate a set of computational programs to analyse story retelling.

4. Documentation of the results from a specified informal method

Documentation guidance is limited across the reviewed literature.

The majority of documentation guidance for discourse paradigms is concerned with recording modes and transcription options. Recording includes both audio and visual channels (e.g. Armstrong et al. 2007; Olness et al. 2002); audio only (Marini et al. 2011; Jaecks et al. 2012; Herbert et al. 2008; Rochon et al. 2000; Fergadiotis et al. 2013) and video only (e.g. Hesketh et al. 2008; Ramsberger and Rende 2002 and Beeke et al. 2003). The most common transcription approach is orthographic (Kong and Law, 2009; Jaecks et al. 2012; Ramsberger and Rende 2002; Herbert et al. 2008). Herbert et al. (2008) use conversation analysis conventions based on Levinson (1983) whilst Fergadiotis et al. (2013) transcribe in CHAT format (MacWhinney 2000), which they use to analyse the transcriptions. Armstrong et al. (2007) are the only authors to propose a transcription-less approach, but no details are provided in the paper. They suggest such a method is more accessible to SLTs working in clinical practice with people with aphasia.

Documentation guidance for semi-structured interviewing is informative but infrequent. For example, the IFCI (O'Halloran et al. 2004) provides the clinician with a form to guide the recording of information. No explicit information is available on how to document for other approaches e.g. simulated activity or observation.

Table 4: Analysis approaches and analysis measures used within the identified informal assessment methods across the literature

Informal assessment method	Area of Interest	Analytic Approach	Measure	Reference
Picture description (single and sequence)	Discourse – fictional narrative	• Syntactic Analysis	• Propositions count (Mross, 1990) - Instances of a predicate and its argument(s)	Olness et al. 2002
		• Genre classification	• Narrative ‘v’ descriptive criteria	Olness et al. 2002
		• Linguistic Analysis	• Linguistic Communication Measure (Menn et al. 1994), Cantonese Linguistic Measure	Kong and Law 2004, 2009
			• Lexical diversity	Fergadiotis et al. 2013
		• Discourse Feature Analysis	• Gesture use, topic use, turn taking, repair, conversational initiation, topic initiation, concept use	Armstrong et al. 2007
		• Productivity	• Number of words, speed, MLU	Marini et al. 2011
		• Lexical processing	• Error rate analysis	Marini et al. 2011
		• Narrative organisation	• Cohesion and coherence	Marini et al. 2011
Story retell (person with aphasia)	Discourse – fictional narrative	• Informativeness	• CIUs (Nicholas and Brookshire 1993)	CCREIAR 2014; Marini et al. 2011
		• Speed	• E.g. Words/minute	Rochon et al. 2000
		• QPA (Saffran et al. (1989)		Rochon et al. 2000; Lee 2016
Listener retell	Discourse – fictional narrative	• Conceptual analysis	• Numbers of concepts (ideas) expressed	Ramsberger and Rende 2002
Procedural description	Discourse –	• Discourse Feature Analysis	• Gesture use, topic use, turn taking, repair, conversational	Armstrong et al. 2007

	procedure		initiation, topic initiation, concept use	
Conversation	Discourse - everyday talk	• Speech Function Analysis	• Ferguson (1992)	Armstrong and Mortensen 2006; Armstrong et al. 2016
		• Analysis of conversation	• N/A	Armstrong and Mortensen 2006; Armstrong et al. 2016; CCREIAR 2014; Beeke et al. 2003
			• CAPP (Whitworth et al. 1997)	Armstrong et al. 2016; Herbert et al. 2008
			• Speech units, turns substantive turns, content words, nouns	Herbert et al. 2008
			• Aachen Aphasia Test 6 Point rating Scale (Huber et al. 1983)	Jaacks et al. 2012
		• Discourse Feature Analysis	• Gesture use, topic use, turn taking, repair, conversational initiation, topic initiation, concept use	Armstrong et al. 2007
	• Listener Rating	• Therapy Outcome Measures (Enderby et al. 2006a)	Hesketh et al. 2008	
	Discourse – personal narrative	• Evaluative Analysis	• Evaluative devices count (Labov, 1972) and Martin, (2003) e.g. Instances of metaphoric language, emotive words and phrases, the use of repetition for emphasis	Armstrong and Ulatowska 2007; Armstrong et al. 2016
Simulated activity / Role Play	Activity and Participation	• Functional Communication Profile (Sarno 1969)		CCREIAR 2014; Armstrong et al 2016; Armstrong and Mortensen 2006; O'Halloran et al. 2007a; Prins and Bastiaanse 2004; Spreen and Risser 2003
		• CADL (Holland 1980) / CADL-2 (Holland et al. 1998)		CCREIAR 2014; Davidson and Worrall 2000; Hirsch and Holland 2000; O'Halloran, Worrall

				and Hickson 2007a; Prins and Bastiaanse 2004; Spreen and Risser 2003
		<ul style="list-style-type: none"> • Assessment of Language Related Functional Activities (Baines et al. 1999) 		Spreen and Risser 2003
		<ul style="list-style-type: none"> • ANELT (Blomert et al.1994) 		CCREIAR 2014; Laska et al. 2007
		<ul style="list-style-type: none"> • E.g. Using telephone, doctor consultation, shopping 		Armstrong et al. 2016
Semi-structured interview	Activity and participation	<ul style="list-style-type: none"> • IFCI (O'Halloran et al. 2004) 		CCREIAR 2014; Hersh et al. 2013; O'Halloran et al. 2004; O'Halloran et al. 2007a
	Wellbeing / QoL	<ul style="list-style-type: none"> • SMARTER goal-setting framework (Hersh et al. 2012) 		CCREIAR; Hersh et al. 2013
		<ul style="list-style-type: none"> • Psychosocial well-being index 		Hirsch and Holland 2000
Interview (Contextual Inventory)	Activity and participation	<ul style="list-style-type: none"> • Communicative Profiling System (Simmons-Mackie and Damico 1996) 		CCREIAR 2014; Hersh et al. 2013; Hirsch and Holland 2000
Observation	Activity and participation	<ul style="list-style-type: none"> • ASHA FACS (Frattali et al. 1995) 		CCREIAR 2014; Davidson and Worrall 2000; Hersh et al. 2013; O'Halloran et al. 2007a; Prins and Bastiaanse 2004; Spreen and Risser 2003
		<ul style="list-style-type: none"> • Edinburgh Functional Communication Profile (Wirz et al. 1990) 		Spreen and Risser 2003
		<ul style="list-style-type: none"> • Pragmatic Protocol (Prutting and Kirchner 1987) 		CCREIAR 2014; Prins and Bastiaanse 2004; Spreen and Risser 2003
		<ul style="list-style-type: none"> • Functional Communication Therapy Planner (Worrall, 1999) 		Hersh et al. 2013

Discussion

The current review aims to discover the methods of informal assessment and the extent of guidance for implementing these methods from across the published aphasia literature to support SLTs working in clinical practice with people with aphasia post-stroke. This has been achieved by investigating several aspects of the literature; notably, the underlying rationale for using informal assessment, communicative aspects requiring consideration during informal assessment, methods of informal assessment, the amount and detail of accompanying procedural information, documentation methods and the analytic frameworks employed. The findings across all of these aspects of guidance are mixed.

Rationale

Two of the three emergent aspects regarding the relative benefit of using an informal assessment approach are of particular relevance to clinical practice. The first is that informal assessment enables SLTs to establish performance across *all* levels of the ICF (Armstrong et al. 2016) in an efficient way because these three levels can be assessed simultaneously.

There is the suggestion within the literature that this opportunity is not provided by formal tests; for example, these tests do not adequately reflect the real-life situations faced by the person with aphasia (Spreen & Risser 2003).

The second is the therapeutic value of informal assessment, with particular focus on the approach being an intervention in its own right, as the SLT can immediately establish aspects such as developing rapport, identifying what the person with aphasia needs or how the SLT should approach management (Hersh et al. 2012; Hersh et al. 2017). Many of the inherent qualities of informal assessment e.g. flexibility, potential for exploration and

iteration, also allow greater opportunity for the person with aphasia to demonstrate strengths in communicating, learn about their communication problem and collaborate with the SLT. All of this ensures that the process is valuable to the person with aphasia (Spreen and Risser 2003; Hersh et al. 2013; Armstrong et al. 2016) at a time point when they are adjusting to having aphasia and are particularly vulnerable and susceptible to changes in psychological wellbeing. This finding may support therapists in reframing their view of assessment, making it a core component of any intervention, rather than only a starting place and may increase clinical confidence in embracing its therapeutic potential.

Communication areas of interest

The literature contains frequent reference to establishing activity and participation through informal means but minimal reference to establishing language skills performance. This is despite language skills being cited as an area to assess during informal assessment and the claim that the approach can establish performance across all aspects of the ICF. There may be several reasons for this finding, including: a drive to counterbalance the historic research focus on impairment; a desire to provide adequate clinical methods to measure activity, participation and wellbeing; and a belief that establishing a person's linguistic competency has been adequately dealt with by formal, standardised tests.

Methods of informal assessment

Conversation is the most common informal assessment method reported across the literature. This is in keeping with activity and participation being the most frequently cited area of interest for informal assessment across the literature. The finding also aligns with

clinical practice surveys where conversation is found to be a clinically familiar and frequently used informal assessment method (e.g. Vogel et al. 2010). However, this is not the case for simulated activity and role-play methods which are less frequently reported in the clinical surveys but are prevalent across the literature in this review.

Conversation-based methods are primarily employed to establish activity and participation but it appears they could be used to explore impairment within more naturalistic contexts. It is possible that alternative neuropsychological models could be used in conjunction with such methods, further strengthening the approach. These multi-system, connectionist models and theories of language processing, e.g. Primary Systems Hypothesis (Patterson & Lambon Ralph 1999), attempt to make explicit the dynamic processes underpinning language performance whereby language tasks are underpinned by three core systems, of semantics (S), phonology (P) and orthography/vision (O), with the same sets of representations underpinning all multimodal language tasks. Performance in a given task e.g. naming, will be reflected across other language tasks e.g. reading, comprehension or writing. The application of these models within a more informal assessment methodology would be of clinical value, given no degree of guidance is found in this review regarding how to establish language skill performance through informal assessment methods. This is despite language skill being cited in the reviewed literature as an area to assess during informal assessment, along with the reporting of SLTs using informal means to measure language performance in clinical practice surveys (e.g. Vogel et al. 2010).

The numerous assessment methods reported here highlight the challenge faced by therapists and researchers in adequately capturing the breadth of communicative

performance using an informal assessment approach. The finding that, frequently, several informal assessment methods are used to explore a single aspect of communication may suggest a potential lack of consensus on how best to establish performance for a given communicative aspect. However, it also reflects that it is unlikely that one method will enable the SLT to uncover performance across diverse communicative contexts. The presence of less clinically familiar, but potentially valuable, methods in the literature, such as semi-structured interviewing, demonstrates ongoing development of the informal assessment approach.

Procedural guidance: administration, documentation and analysis

The majority of information regarding procedure is provided for assessments of discourse, activity and participation. This is unsurprising given that these areas receive the greatest amount of attention across the informal assessment literature. The discourse literature provides adequate information to allow the SLT to carry out specific aspects of reported relevant methods, e.g. starter and prompt questions used to elicit conversation are provided by Hesketh et al. (2008) and analysis methods by Armstrong and Mortensen (2006). However, there is no clear consensus on how to best to elicit, record or analyse the various types of discourse methods. This may reflect the finding that a substantial proportion of the discourse literature is research papers, which typically explore novel methods rather than implementing established methods.

Minimal guidance is found for the remaining commonly reported informal assessment approaches of simulated activity / role-play and observation. The common reference to using published tools as the stimuli for these approaches may explain this finding.

In contrast, detailed procedural information is provided for some less frequently reported methods, particularly semi-structured interviewing². Hersh et al. (2013) provides an overall view of the method; identifies published resources (e.g. the IFCI by O'Halloran et al. 2004) and also frameworks that can facilitate the method e.g. the SMARTER framework (Hersh et al. 2012). The IFCI is a published tool with accompanying guidance on how to administer the method, document responses and analyse the results. The amount of information offered by both these authors suggests a desire to actively promote the value of semi-structured interviewing for SLTs working with person with aphasia.

Limitations

The primary limitations of this review centre around the challenge of adequately and informatively defining the term informal assessment. The varying terms used to describe informal assessment across the literature mean that some pertinent documents may not have been captured during the literature search. Documents are also included in this review that are not solely focused on informal assessment. It is perhaps unsurprising that limited guidance was then found within these documents on how to implement informal assessment. The inherently non-standardised nature of informal assessment means that we are comparing vastly different methods in this review; therefore the degree of guidance differs depending on the nature (e.g. tasks and materials) of the method. Indeed, the very nature of reviewing the literature for guidance on implementing assessments which are

² Semi-structured interviews are a commonly used method of collecting qualitative data in a variety of contexts; however they are less common in this particular area of healthcare research.

sometimes defined by their lack of set procedure is in itself problematic. However we included such a range of papers because we wished to reflect the raw data and the evidence that an SLT may encounter if searching the literature directly. We wished to capture all relevant methods of informal assessment that clinicians may be familiar with, because given the consensus in the literature that informal assessment methods are both widespread as well as beneficial, our primary focus was not on comparing *methods* but on the *degree of guidance* for a given method.

Conclusion

In summary, the findings are mixed from this scoping review as to the information and guidance available for SLTs implementing informal assessment in clinical practice for people with aphasia. There is clear agreement that informal assessment affords the SLT opportunity to establish, often simultaneously, the impairment, activity and participation of a person with aphasia, in a time efficient, highly therapeutic and principled encounter which is also of value to the person with aphasia. However, there are several informal methods available, with several applicable methods to explore a given area of communication, but little information on when to potentially use a given method, or what might be suggested procedure in terms of administration, documentation and analysis (for a specific method).

Conversation and semi-structured interviewing emerge as two informal methods of particular value with guidance provided for rationale, when to apply and how an SLT might apply it. This then begins to address some of the issues surrounding clinical application of

informal assessment, including it being predominantly experience-based - relying heavily on the experience and skill of the clinician - and the challenge in adequately training students, newly-qualified or less experienced SLTs in clinically applying the approach. The principled nature of the two methods supports a balance between the consistency and quality of clinical assessment with clinical artistry and autonomy.

There may be value in future research building on the current body of work regarding the clinically derived informal methods of conversation and semi-structured interviewing; focusing on whether linguistics skills can be established within fully naturalistic contexts, utilising alternative neuropsychological models, whilst simultaneously establishing activity *and* participation and providing suggested guidelines on how to implement this method.

This could potentially achieve a more accurate, and fully rounded reflection of communicative performance whilst maximising the therapeutic impact of informal assessment.

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