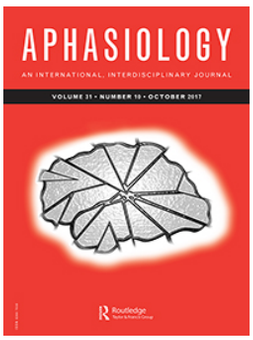

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Clinical use of linguistic discourse analysis for the assessment of language in aphasia

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ABSTRACT

Background: Linguistic discourse analysis is an assessment method widely applied within aphasia research literature to examine impairments as they affect the language of daily function—discourse. Although this literature suggests that clinical applications do occur, it also identifies barriers that may inhibit the translation of research to practice.

Aims: This study aimed to identify the frequency of use and methods of linguistic discourse analysis application by speech pathologists when assessing their clients with aphasia.

Methods & Procedures: A survey was distributed electronically to speech pathologists in five English-speaking countries using the online survey management tool Survey Monkey®. Clinical applications of linguistic discourse analysis were examined using descriptive statistics and cross-tabulation analyses.

Outcomes & Results: Of 123 valid survey results, 106 clinicians reported use of linguistic discourse analysis to assess language in aphasia. Respondents collected language elicited in conversational contexts and expositional discourse samples most often, and subjected these samples to a range of linguistic measures. Most clinicians applied a judgement-based method of analysis based on clinical observation. Clinicians reported positive attitudes towards the use of linguistic discourse analysis, but were limited from widespread use by barriers such as a lack of available clinical time.

Conclusions: Results revealed that speech pathologists defined and therefore implemented linguistic discourse analysis in a variety of ways. The methods used to elicit, prepare and analyse discourse varied among respondents. Further investigation is warranted to examine the effectiveness of clinical discourse analysis applications and to support the translation of evidence-based research methods to clinical practice.

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Aphasia; discourse; language; discourse analysis

Assessment of language is a vital component in the delivery of speech pathology services to people with aphasia. The impact of language impairment following left hemisphere cerebrovascular accident can be dramatic and wide-ranging, affecting an individual's psychological and social health as it limits the ability to communicate with others in their environment (Worrall et al., 2011). The International Classification of

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Functioning, Disability and Health (ICF) (World Health Organization, 2011) provides a framework to guide a comprehensive assessment that encompasses all areas of health and well-being beyond medical impairment. This holistic approach to aphasia intervention and management incorporates assessment and therapy that targets the language used for daily communication.

The assessment of discourse, defined generally as *language in use*, offers an ecologically valid option for evaluation of communication (Ballard & Thompson, 1999). This language in use describes or expresses an opinion (expositional discourse), provides instruction (procedural discourse), tells a story (narrative discourse) or facilitates interaction (conversational discourse) (Bandur & Shewan, 2008). Discourse definitions vary subject to the theoretical approach applied. Structural theory defined discourse as any structure above the level of the sentence. That is, a minimum of two sentences combined created a discourse structure. Functional theory included any language used to convey a message, recognising single words and phrases used to assert, request or answer as discourse (Armstrong, 2000). We have proposed a more inclusive definition of discourse that draws on both structural and functional theories. We define discourse as language structures above the sentence level and smaller structures such as words and phrases used in meaningful, interactive contexts (Bryant, Ferguson, & Spencer, 2016). The analysable unit recognised by this definition would include two or more linked sentences in monologic samples, or two or more linked contributions (i.e., any meaningful words, phrases or sentences) to a dialogic interaction.

Similarly, discourse analysis is defined generally as the assessment of any language behaviour used in discourse. Analysis may examine elements of transaction that affect the structure of communicative content, such as linguistic structures, or elements of communicative interaction that influence expression of that content, including non-verbal behaviours and conversational co-constructions (Brown & Yule, 1983). Given its complexity, different methods of analysis have been developed to describe and measure various discourse elements. Linguistic discourse analysis, which examines the linguistic structures of language in use, is the focus of this study. Linguistic discourse analysis samples the language of a single individual collected during monologic or dialogic contexts. This excludes contributions of other speakers, unlike, for example, Conversation Analysis (Sacks, Schegloff, & Jefferson, 1974) which examines contributions of all interlocutors.

Linguistic discourse analysis in research

A recent review of linguistic discourse analysis in aphasia examined current research practice regarding discourse elicitation, transcription and measures used to analyse discourse (Bryant et al., 2016). A meta-synthesis of 165 studies identified use of linguistic analysis of discourse to assess aphasic language over 40 years. Analysis was used for various reasons, such as describing patterns of language impairment, comparing language between individuals of different ages and impairments, and measuring the outcomes of interventions aimed at improving communicative ability. Approximately a quarter of reviewed studies suggested that the methods described might be of use in clinical practice. However, those methods varied in terms of discourse elicitation, transcription and analysis measures.

Elicited discourse in research studies primarily utilised visual stimuli to structure the discourse sample (Bryant et al., 2016). That is, stimuli provided structure to the sample by limiting the range of vocabulary, information and grammatical structures that could be produced. These samples included narratives based on single pictures, picture sequences or familiar fairy tales and expositional picture descriptions. Narrative samples were used most frequently as they permitted the analysis of cohesive devices central to everyday discourse production (Olness, 2006). Naturally occurring conversational discourse samples were used infrequently in research, despite providing more representative view of discourse production than structured samples (Armstrong, 2000). Structured discourse samples offered the capacity to compare samples over time to assess changes resulting from intervention, and between individuals to examine deviations from neurologically intact language (Nicholas & Brookshire, 1995). The unpredictable nature of the content of conversation limited comparisons and so restricted the usefulness of such samples for assessment purposes. Therefore, while conversational samples offer high ecological validity to analysis, structured samples permitted comparisons to facilitate interpretation of outcomes for clinical purposes. Brookshire and Nicholas (1994) recommended that clinical discourse analysis be completed from samples of procedural, expositional and narrative discourse elicited using visual (i.e., picture) or auditory (i.e., spoken instruction) stimuli to best represent conversational discourse while preserving the reliability and validity of assessment. The recent development and testing of the Curtin University Discourse Protocol (CUDP) represents a systematic way to collect and analyse discourse data (Whitworth, Claessen, Leitao, & Webster, 2015). The CUDP elicited a range of narrative, procedural and expositional samples frequently used by individuals to communicate in everyday speaking situations. These samples represented multiple genres that adhered to a macrostructural framework consistent among neurologically intact language users.

Following discourse elicitation, the sample is prepared for analysis through a process of transcription, segmentation into units and coding of features to support analysis. An investigation of transcription-less discourse analysis demonstrated poor reliability and accuracy, supporting the need for transcription (Armstrong, Brady, Mackenzie, & Norrie, 2007). However, reporting of transcription methods in discourse analysis research was inconsistent, potentially confusing understanding of this process for clinicians implementing evidence into practice (Bryant et al., 2016). Linguistics research recognises the importance of recording and transcribing discourse samples to support accuracy and reliability in the following analysis (Ball, Howard, Müller, & Granese, 2013; Rutter & Cunningham, 2013). Despite this, the time consuming nature of transcription is also widely acknowledged (Boles, 1998; Elia, Liles, Duffy, Coelho, & Belanger, 1994).

Research studies have used over 500 unique measures to analyse linguistic structures in discourse (Bryant et al., 2016). Such a large number of measures were evident for two key reasons. First, researchers created measures to answer their specific research questions. The flexibility of discourse assessment observed in reviewed studies demonstrated that linguistic discourse analysis could also be adapted in clinical settings to meet the individual assessment needs of people with aphasia. Second, most studies implemented multiple linguistic measures to provide a multidimensional perspective of discourse production. Such an approach was necessary to encapsulate the complexity of discourse production (Saffran, Berndt, & Schwartz, 1989; Sherratt, 2007). These findings would suggest that speech pathologists in clinical settings would implement a wide range of

linguistic discourse measures in order to assess discourse ability of individual clients with aphasia in a comprehensive manner. However, such a large number of measures may have the potential to introduce confusion in to the process of selecting appropriate measures for individual clients.

Discourse in Clinical Settings

While a large number of research applications of linguistic discourse analysis were identified, no investigation directly examined clinical applications of these methods to assess the discourse of people with aphasia. Only two studies specifically examined the use of discourse analysis in clinical settings: one with Australian paediatric speech pathologists and the other with American clinicians treating non-aphasic language impairment. In paediatric speech pathology, where it is a more established method of language assessment, 90.8% of the 247 surveyed clinicians reported using linguistic discourse analysis (Westerveld & Claessen, 2014). These clinicians reported eliciting discourse from conversational, narrative and expository genres. While approximately half of the respondents recorded and transcribed the spontaneous discourse samples that they collected, only 37% performed detailed, transcription-based analysis. Eighty-nine per cent of speech pathologists used a judgement-based analysis, completed using clinical knowledge and experience. Respondents reported that lack of training limited further use of detailed language sampling and analysis.

Maddy, Howell, and Capilouto (2015) specifically investigated the use of discourse analysis by clinicians working with people with non-aphasic acquired brain injury. Semi-structured interviews with nine speech pathologists showed that clinicians' values reflected the importance of assessing and treating discourse for these patients to improve social participation and quality of life. However, environmental influences such as limited clinical time and a lack of ongoing education about how to conduct assessment and intervention of adult discourse outweighed these values and impeded clinical application of discourse analysis. Clinicians did continue to elicit discourse samples and analyse for discourse deficits using clinical judgement during the discourse process, but were unable to perform a detailed, transcription-based analysis using measures defined in research literature due to the external pressures.

Other studies that took a more general approach to the investigation of language assessment have echoed findings of infrequent use of discourse analysis in clinical contexts. In an international survey of assessment practices for people with traumatic brain injury conducted by Frith, Togher, Ferguson, Levick, and Docking (2014) fewer than 10% of 265 respondents used discourse analysis. Similarly, Verna, Davidson, and Rose (2009) surveyed speech pathologists in Victoria (Australia) and found that only two clinicians in a sample of 70 reported use of discourse analysis to assess people with aphasia. Findings from both investigations suggested that rating scales were used most frequently to complete these discourse assessments. While the widespread use of rating scales reflects a move towards the type of assessment promoted by the ICF, such methods of assessment have been criticised as being subjective, unreliable and lacking validity (Verna et al., 2009).

The findings of each of these aforementioned studies suggested that linguistic analysis of discourse, particularly the use of detailed and replicable transcription-based methods is uncommon in clinical settings. However, the same survey by Verna and colleagues also

found that most speech pathologists implemented interventions that targeted discourse skills. This result was in line with the Aphasia Pathways Best Practice Statements (Clinical Centre for Research Excellence (CCRE) in Aphasia Rehabilitation, 2014), which recommends that discourse-based interventions, and in particular communication partner training, be used with every speech pathology client with aphasia. The incongruity between discourse assessment and intervention suggested the outcomes of therapies directly targeting discourse were not measured using tools designed to capture change at the level of discourse, in particular discourse analysis. Rose, Ferguson, Power, Togher, and Worrall (2014), however, found that even discourse-based interventions were limited in Australian speech pathology services due to limited knowledge and confidence using such methods. The results of these studies suggest that the use of discourse interventions for people with aphasia is limited, and in instances where they are used, outcomes are unlikely to be measured using discourse measures.

The limited use of detailed transcription-based discourse analysis evident in the findings of many studies (Frith et al., 2014; Maddy et al., 2015; Verna et al., 2009; Westerveld & Claessen, 2014) may be the result of a number of hypothesised barriers to clinical application of such assessments. One such barrier is the time necessary to complete discourse elicitation, transcription and analysis. Researchers have estimated that the process may take from 6 to 12 min for transcription and analysis, up to 60 min for transcription alone for every minute of language sampled (Armstrong et al., 2007; Boles, 1998; Elia et al., 1994; Marini, Andreetta, del Tin, & Carlomagno, 2011). Another barrier, identified by speech pathologists, was knowledge of the discourse analysis process; a lack of familiarity and understanding of discourse sampling and analysis methods limited greater clinical application of linguistic discourse analysis (Maddy et al., 2015; Rose et al., 2014; Westerveld & Claessen, 2014).

Despite these hypothesised barriers, no study has attempted to identify potential solutions to overcome this problem, leaving an apparent gap between discourse analysis research and practice. It has been argued that finding solutions to clinical use of discourse analysis is important as the benefits of assessing discourse outweigh any barriers (Togher, 2001). These solutions may be apparent in aphasia literature, where linguistic discourse analysis is often used and reported (Bryant et al., 2016). For example, computerised analysis software may simplify the analysis process and create the time efficiency that currently impedes widespread clinical use of discourse analysis procedures (Long, 2001). However, before any such solution can be trialled, the nature and extent of this research–practice gap first needs to be examined and understood.

Research aims

By directly examining clinical use of discourse analysis, the survey by Westerveld and Claessen (2014) provided a means to examine the alignment between research and practice in paediatric speech pathology. This investigation partially replicates that study with speech pathologists who provide services for adults with aphasia, and expands the investigation to an international sample. The following research questions were asked:

- How frequently do speech pathologists use discourse analysis to assess clients with aphasia, and is this use affected by location, age and years of experience?

- What methods do speech pathologists use to elicit and prepare discourse samples for analysis, and analyse linguistic structures within discourse of people with aphasia?
- What are the perceived benefits and limitations of using linguistic discourse analysis for clinical assessment of aphasia?
- What perspectives and attitudes do speech pathologists have in regards to facilitating clinical use of discourse analysis, and specifically towards the use of computerised analysis software?

Method

The University of Newcastle Human Research Ethics Committee reviewed and approved this research (approval H-2015–0258). This survey contributed to a larger study investigating the research–practice gap affecting the use of linguistic discourse analysis to assess the language of people with aphasia.

Participants

Speech pathologists in Australia, New Zealand, Canada, the USA and the UK with experience assessing adults (over 18 years of age) with aphasia were invited to participate in the survey. Potential participants were contacted through their international professional associations: the Speech Pathology Association of Australia (SPAA), the New Zealand Speech Therapy Association (NZSTA), Speech-Pathology & Audiology Canada (SAC), the American Speech-Language and Hearing Association (ASHA) in the USA and the Royal College of Speech Language Pathologists (RCSLP) in the UK. In Australia, participants were also contacted through the online interest group Speech Pathology Email Chats (SPECs) due to limited means of distribution through the Australian association and a resulting low response rate. During the final month of the survey, participants were informed through recruitment information and the Participant Information Statement that they were welcome to forward the link to the Participant Information Statement and survey to colleagues who may have been interested in the research. This "snowball" recruitment strategy was employed for Australia only in order to boost participant numbers.

Distribution

The survey was available electronically over a period of three and a half months, from mid-August to end of November 2015, using the online survey management tool Survey Monkey® (www.surveymonkey.com). Each professional association utilised different methods to contact members, as per their specific policies, with postings performed either by the first author or by an association moderator. Due to specific association guidelines, release date of the survey varied across the included countries between late August and early October. All association members received a minimum of 2 months for survey completion. Reminders for survey completion were sent a month prior to survey closing to encourage further participation.

Speech pathologists were invited to complete the survey online with a web link posted to social media sites, monthly newsletters and special interest groups, and emailed to participants. The methods of survey distribution for each recruitment site were as follows:

- Speech Pathology Association of Australia—listed in the monthly National e-News Newsletter by an association moderator
- New Zealand Speech Therapy Association—posted to the social media pages of the association and emailed in a regular email update to members by an association moderator
- Speech Pathology and Audiology Canada—emailed to participants in a paid email list rental by an association moderator
- American Speech-Language and Hearing Association—posted on association Special Interest Group discussion boards by the first author
- Royal College of Speech Language Pathology—posted on social media pages of the association by the first author and on association Special Interest Group discussion boards by an association moderator
- Speech Pathology Email Chats (Australia)—posted on the group discussion board by the first author

Survey design

An eight-item questionnaire was developed to investigate the use of, and attitudes towards, linguistic discourse analysis for the clinical assessment of language in aphasia. Questions were informed by a review of the literature investigating how and why linguistic discourse analyses were applied in research (Bryant et al., 2016) and a previous survey that investigated the use of linguistic discourse analysis by paediatric speech pathologists (Westerveld & Claessen, 2014). A statistical consultant experienced in the design of questionnaires reviewed the survey to ensure the phrasing of the questions would provide data for analysis in line with the research questions. Results of the consultation informed the final survey design used in the present study.

Multiple question types were used in the survey to collect data that addressed both the attitudes and experiences of speech pathologists assessing people with aphasia. Questions included multiple choice, multiple answers, yes/no, closed questions, open questions, opinion scales and free text responses. Questions addressed the following:

(1) The frequency of linguistic discourse analysis use by speech pathologists (never, rarely, sometimes, usually or never)
(2) Methods used to collect discourse samples for analysis (e.g., conversations, picture description, etc.)
(3) Preparation of discourse samples (e.g., recording and transcription)
(4) Analysis measures and methods applied to discourse samples (e.g., verbal productivity, grammatical complexity, sentence structure, information content, etc.)
(5) Other assessments used in the clinical environment (e.g., psycholinguistic tools, functional rating scales, etc.)

(6) Perspectives towards linguistic discourse analysis as an assessment tool in aphasia (e.g., importance, perceived competence); and
(7) Attitudes towards computer tools to support clinical application of linguistic discourse analysis (e.g., computer software for transcription and linguistic analysis)

Open-ended questions investigated attitudes towards linguistic discourse analysis and provided insight into responses to closed questions (Creswell & Plano Clark, 2011). Demographic information was collected at the end of the survey. Skip logic was applied within the survey so clinicians who reported no use of linguistic discourse analysis were not asked about discourse sample elicitation, preparation or analysis. The survey was designed to take a maximum of approximately 20 min to complete. No identifying information was collected from participants during the completion of the survey as an anonymous format allowed clinicians the opportunity to share opinions and experiences without the threat of judgement or repercussions (Creswell & Plano Clark, 2011). Submission of the survey indicated implied consent for responses to be analysed.

The term "discourse" was used throughout the survey without the authors providing a specific definition for this term. This was a deliberate decision in order to gain responses from clinicians without causing confusion or restricting collected information to one theoretical perspective, whether structural or functional. The depth of assessment that constituted a "discourse analysis" was similarly not specified. The open definition permitted the collection of inclusive and wide-ranging data on the topic of discourse analysis and facilitated comprehensive examination of the use of discourse in clinical assessment of aphasia.

Analysis

Following close of the survey period, responses were downloaded from Survey Monkey® to a Microsoft Excel spreadsheet. Responses to closed questions were entered into the statistical analysis package IBM Statistical Package for the Social Sciences (SPSS) version 22 and coded for analysis. Descriptive statistics were used to analyse responses to demographic questions, and to determine the frequency of responses to questions investigating the discourse analysis process—discourse sample collection, preparation and analysis. One-way ANOVAs were used to test for any difference in use of discourse analysis by region, age and years of experience. Cross-tabulation analyses were also employed to investigate relationships between responses.

Open-ended short answer comments on closed questions and free response questions were extracted from the Excel spreadsheet to a Microsoft Word (2010; version 14.0.7166.5000) document. The first author grouped responses by question across participants in order to examine reported factors that influenced specific responses. The identified factors were ordered from the most to least reported to provide supporting information on reported attitudes and practices. The open-ended response data is presented descriptively in the results.

Results

Responses

One hundred and sixty-one survey responses were received, of which 38 were excluded from analysis: 35 responses were incomplete; 1 participant was disqualified after indicating they had not read the Participant Information Statement; and two participating speech pathologists did not meet the survey inclusion criteria. For those respondents, one lived outside the included countries where English was the primary spoken language, and one did not practise clinically with people with aphasia. The remaining 123 survey responses were included for analysis: 56 from Australia, 41 from the USA, 11 from Canada, 8 from New Zealand and 7 from the UK. Speech-Pathology & Audiology Canada returned a response rate of 2.8%. The number of potential participants and the response rate could not be estimated for Australia, New Zealand, the USA and UK, as total numbers to whom the survey link was sent was unknown.

Demographics of participants

Participating speech pathologists practised in a range of clinical settings (see Table 1), with 52.0% reporting that they practised across multiple settings. Most respondents (61.0%) assessed people with aphasia at least once per week as a part of their practice. Almost 60% of participants practised in metropolitan cities, and the majority were employed on a full-time (64.2%) or part-time (24.4%) basis. Almost all respondents (82.92%) practised as part of a team of speech pathologists. Fifty-two per cent of respondents had more than 10 years of experience working as a speech pathologist, while 19.5% had less than 5 years. Similarly, 46.3% had more than 10 years of experience working with people with aphasia. Only 5.7% indicated less than a year of experience, while 24.4% reported 1–5 years and 23.6% reported 6–10 years.

Use of discourse

Speech pathologists used a range of assessment methods to diagnose people with aphasia, set intervention goals and measure therapy outcomes including detailed, transcription-based discourse analysis and a transcription-less, judgement-based discourse analysis that relied on the evaluation of discourse ability using observation and clinical judgement (see Table 2). Fifty-nine per cent of respondents reported that their

Table 1. Number of participants indicating setting of practice.

Practice setting	Number of participants (n = 123)	Per cent of participants
Rehabilitation	80	65.0%
Acute	63	51.2%
Community health	36	29.3%
Private practice	12	9.8%
University clinic	12	9.8%
Aged care	9	7.3%
Hospital outpatient service	8	6.5%
Not-for-profit organisation	7	5.7%
Home health	4	3.3%
Disability services	2	1.6%

Table 2. Language assessment methods used to diagnose, set goals for and measure the therapy outcomes of people with aphasia.

(*n* = 123)	Diagnosis	Goal-setting	Outcome measurement	Total
Detailed transcription-based discourse analysis	19 (15.5%)	20 (16.3%)	18 (14.6%)	31 (25.2%)
Judgement-based discourse analysis	108 (87.8%)	112 (91.1%)	92 (74.8%)	120 (97.6%)
Standardised assessment tools (e.g., WAB, BDAE)	115 (93.5%)	103 (83.7%)	81 (65.9%)	116 (94.3%)
Functional assessment (e.g., CADL, AHSA-FACS)	64 (52.0%)	69 (56.1%)	–	80 (65.0%)
Client report	–	–	97 (78.9%)	97 (78.9%)

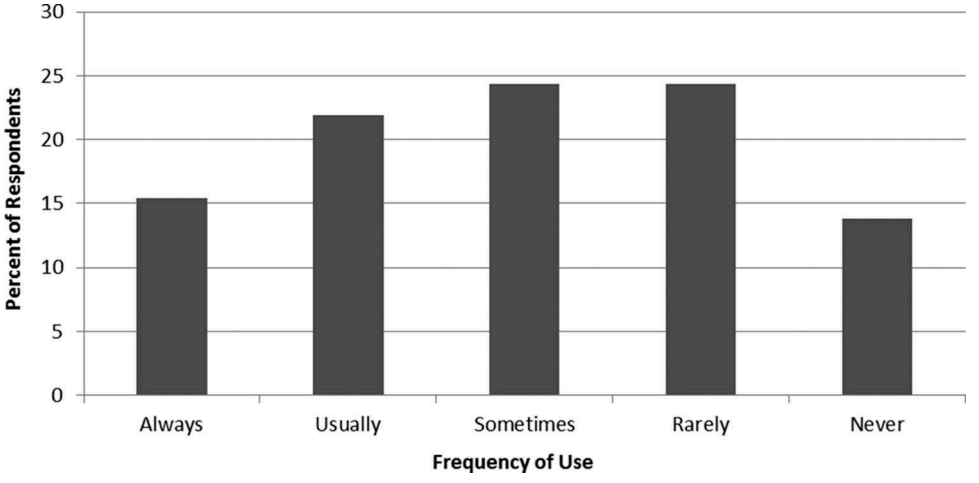

Figure 1. Reported frequency of use of linguistic discourse analysis reported by participants.

knowledge and training affected the choice of assessments they used, while clinical experience was a factor for 66.7% of respondents. The communicative ability of clients and the time available to conduct assessments were also reported factors influencing decisions, reported by 69.1% and 56.9% of respondents, respectively.

Most participants (60.8%) indicated that they used the analysis of discourse samples at least some of the time to assess language in aphasia (see Figure 1). Statistical analysis (one-way ANOVAs) indicated that there was no significant relationship between the frequency of discourse use and geographical region of practice, age or years of practice experience. Fourteen per cent of respondents indicated that they never used linguistic discourse analysis. Reported factors influencing this decision for these respondents were lack of time (88.2%; 15/17), that the employer did not require the use of linguistic discourse analysis (47.1%), and lack of training (58.8%), expertise (52.9%) and resources (52.9%).

Discourse sample elicitation[1]

All respondents indicated that they elicited spoken discourse samples for analysis, with 34.9% collecting only spoken discourse samples, and 64.2% collecting both spoken and written discourse. The subtests and stimuli of psycholinguistic language assessments (e.g., Boston Diagnostic Aphasia Examination Cookie Theft Picture (Goodglass,

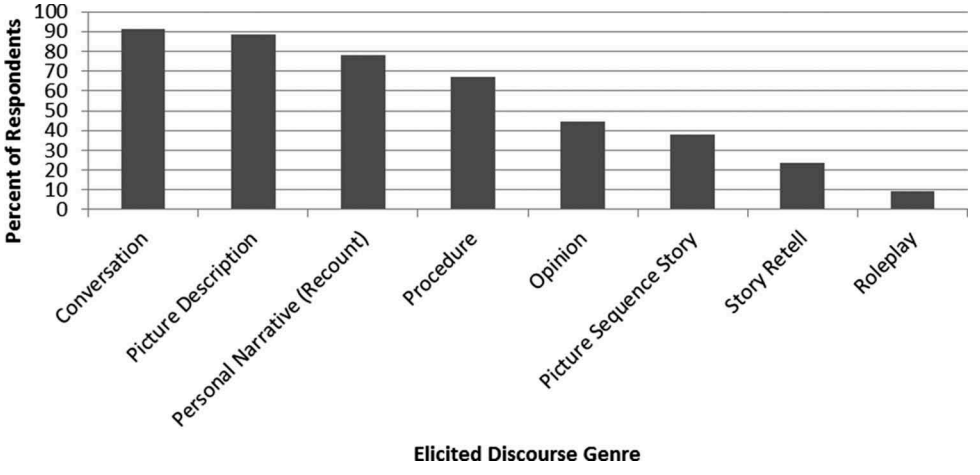

Figure 2. Genres of discourse elicited to assess language in aphasia.

Kaplan, & Barresi, 2001), and Western Aphasia Battery Picnic Scene (Kertesz, 2006)) were used by 85.9% of participants to elicit discourse. Existing discourse protocols such as the AphasiaBank (TalkBank.org, 2007) and Nicholas and Brookshire (1993) protocols were used by 21.7% of respondents, and 24.5% used a self-developed procedure.

Ninety-three per cent of respondents reported sampling multiple discourse genres (e.g., narrative, procedure, exposition and conversation). Spontaneous conversation was the most utilised elicitation procedure, by 91.5% of respondents (see Figure 2). Expositions (e.g., opinions and/or picture descriptions) were the most sampled genre, elicited by 93.4% of speech pathologists. When choosing discourse genres to sample, respondents commented that the availability of clinical time (66.0%) and assessment resources (40.6%) affected their decision-making. The diagnosis of the client affected the choice of discourse genre for 85% of speech pathologists, commenting that samples such as picture descriptions were easier for people with aphasia. Respondents also indicated that they aimed to sample discourse genres that were relevant to the client given their age (e.g., due to effects on life experience and cognition) (46.2%), suspected prognosis (43.4%) and their functional needs and goals (9.4%).

Recording and transcription

Less than half of respondents (38.7%) audio or video recorded the sample and 64.2% created a written transcript. Fifty-four per cent (37/68) of those who transcribed did so from a recording, and 45.6% performed the transcription online, as discourse was elicited. Thirty-two per cent of respondents created no recording or transcript and reported performing analysis online. Cross-tabulation with the reported use of detailed linguistic analysis indicated that 29 of the 31 respondents who analysed discourse in detail did so from a transcript, with 21 of these transcribing from a recording. The two who did not transcribe indicated that they performed a detailed linguistic analysis of discourse online, with no recording.

Respondents reported that their use of transcription was limited by a lack of available clinical time (90.6%), an absence of the knowledge or skills needed to perform transcription (19.8%) and a belief that transcription was not needed to assess language in aphasia adequately (20.8%). However, speech pathologists also commented that transcription facilitated the analysis process (36.8%), assisted documentation and reporting (17.0%), helped gauge a client's functional ability (13.2%), guided goal setting (12.3%) and improved the accuracy and objectivity of linguistic analysis (10.4%). While 63.8% of respondents indicated that they would use a service to outsource transcription and analysis if it were available, issues such as the assessments value, time, cost and client confidentiality were reported barriers to the use of such a resource.

Analysis of discourse

Manual scoring of linguistic measures, reported by 51.9% of respondents, was used most frequently to complete linguistic discourse analysis, with 49.1% reporting that they implemented no specific system of measures. The most used detailed linguistic analysis method (i.e., method defined by research literature) was Nicholas and Brookshire's (1993) Correct Information Unit analysis (CIU), reported by 24.5% of respondents. Speech pathologists also reported using Quantitative Production Analysis (QPA) (Rochon, Saffran, Berndt, & Schwartz, 2000; Saffran et al., 1989) (2.8%), Developmental Sentence Scoring (DSS) (Lee, 1966) (4.8%) and Language Assessment, Remediation and Screening Procedure (LARSP) (Fletcher & Garman, 1988) (6.6%). Only 12.4% of respondents indicated use of computer software, primarily Systematic Analysis of Language Transcripts (Miller & Iglesias, 2012) (11.3%) and Computerised Language Analysis (MacWhinney, 2000) (2.8%), to linguistically analyse elicited discourse samples.

Given the number of measures available to analyse discourse, respondents were asked what categories of analysis they used to assess language in aphasia (see Figure 3). Most respondents (97.2%) used multiple categories of analysis and two respondents used only a

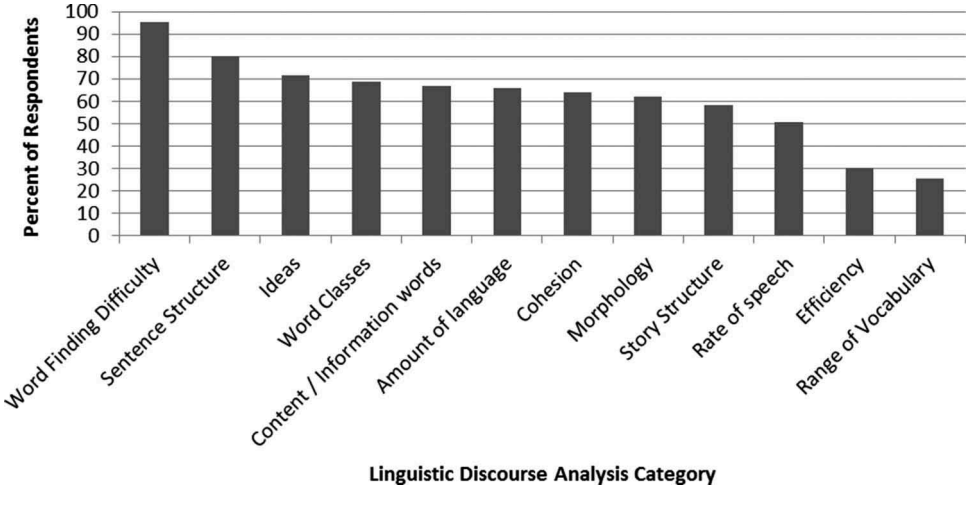

Figure 3. Categories of linguistic analysis measures used to assess language in aphasia.

single category—word-finding behaviours. Sixty-four clinicians (60.4%) reported specific linguistic measures they used to examine aphasic language. The most reported measures were word counts (29.7% of 64), Mean Length of Utterance (29.7%), number of CIUs (25%) and counts of paraphasias (21.9%).

Attitudes towards discourse and computer-assisted analysis[2]

Respondents indicated their level of agreement with statements regarding the importance of linguistic discourse analysis, their competence using such analysis and their confidence using computer technology and learning to use new computer programmes in clinical environments (see Figure 4). Half (50.4%) of respondents agreed or strongly agreed that detailed linguistic analysis was important to assess language in aphasia as it is used for everyday communication. However, comments suggested the value of detailed linguistic discourse analysis was dependent on the clinical setting and diagnosis (i.e., type and severity of aphasia) of patients, with the acute setting inappropriate for such an assessment. Thirty per cent of respondents agreed or strongly agreed that they felt competent using linguistic discourse analysis. The 41.5% who disagreed or strongly disagreed with this statement commented that their lack of use, experience, knowledge and training were the major contributing factors.

Most respondents (85.4%) indicated that they felt competent using a range of clinical technologies, including iPads and tablets, desktop and laptop computers, and recording and assistive communication devices. Similarly, 75.6% of respondents agreed or strongly

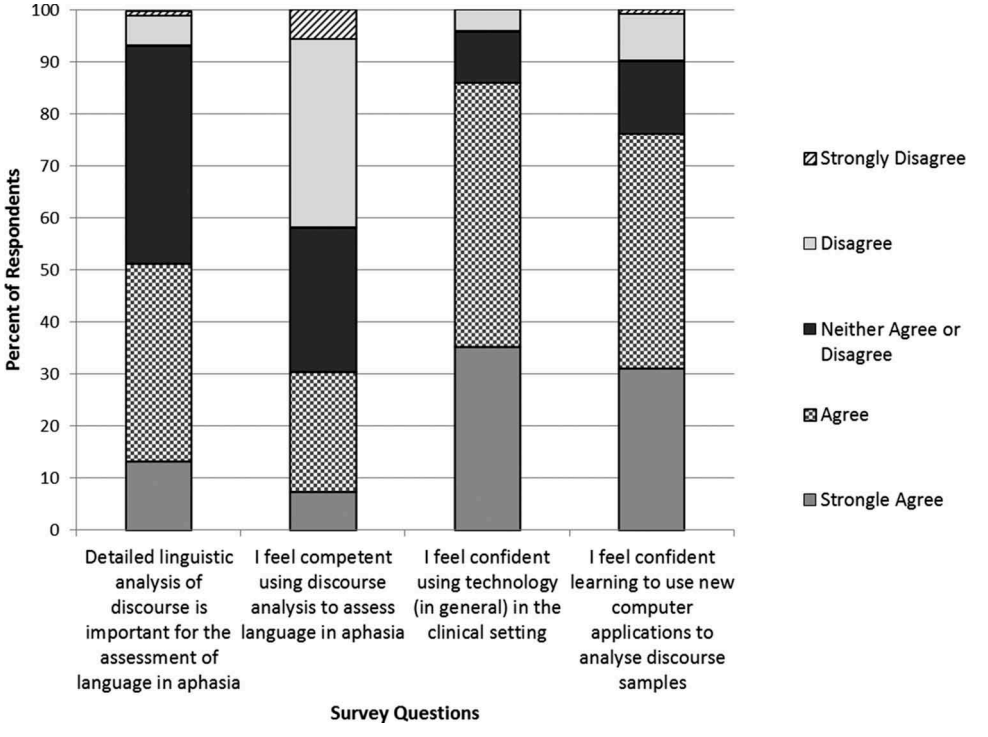

Figure 4. Agreement with opinion statements regarding the use of linguistic discourse analysis.

agreed that they felt confident learning to use computer software to linguistically analyse discourse samples. However, comments from respondents suggested a need for time and training to support learning. Others stated that they were unsure of the process due to limited experience with such technology. Sixty-three per cent of respondents indicated that they would be interested in software to assist with transcription of discourse samples, while 72.4% indicated interest in analysis software. Speech pathologists commented that computer programming would likely increase the speed and time efficiency of the transcription (26.8%) and analysis process (20.3%), and provide objective, "standardised," and detailed assessment information (8.9% for transcription; 13.8% for analysis). Many indicated that they were unsure whether they would use software for transcription (28.5%) and analysis (22.0%) as they were uncertain of programme function, ease of use and recognition of aphasic jargon and errors (e.g., paraphasias and neologisms).

Barriers and facilitators of linguistic discourse analysis

Respondents were asked to indicate which component of the linguistic discourse analysis process (eliciting a discourse sample, preparing the sample through transcription, selecting appropriate analysis measures, completing analysis and interpreting outcomes) posed the greatest barriers to clinical use of detailed linguistic discourse analysis. They indicated that transcription (61.8%) and completion of analysis (65.9%) were the most significant barriers. For 41.5% of respondents, this was due to the time required to complete these steps of the detailed analysis process. Selecting appropriate linguistic analysis measures to reflect individual client needs (41.5%) and interpreting the results (39.8%) were also barriers. Respondents stated that they needed more time (82.1%), access to assistive tools (72.4%) and professional development training (65.9%) to facilitate clinical use of linguistic discourse analysis.

The 106 survey respondents who reported use of linguistic discourse analysis had received training on the completion of analysis during their speech pathology degree (80.2%), self-directed learning (55.7%), a personal demonstration (22.6%) and professional development training (20.8%). Most respondents, including those who reported never using linguistic discourse analysis, indicated that they would access a range of prospective training to learn about new developments in computer-assisted applications, including online tutorials (85.4%), demonstrations (71.5%), workshops (67.5%) and instructive lectures (43.1%). Only one respondent indicated no interest in furthering their knowledge of linguistic discourse analysis.

Discussion

The survey aimed to identify the frequency with which speech pathologists use discourse analysis to assess clients with aphasia. Results indicated that most speech pathologists do use linguistic discourse analysis to assess the language of adults with aphasia. The methods used to elicit, prepare and analyse discourse varied among respondents and revealed the extent to which a research–practice gap affects linguistic discourse analysis of language in aphasia.

The methods of linguistic discourse analysis applied most frequently in clinical speech pathology were judgement-based, whereby clinicians used their professional knowledge and experience to assess linguistic ability in discourse contexts as discourse samples were elicited. Almost all survey respondents indicated the use of a judgement-based analysis. For many respondents who reported using linguistic discourse analysis, this judgement-based method was the only discourse analysis they used. However, all speech pathologists who reported "never" using linguistic discourse analysis also indicated that they used their clinical judgement during clinical conversations to analyse linguistic features for diagnosis, goal setting and outcome measurement. This response indicated that some speech pathologists did not consider their judgement-based assessment to form part of a linguistic discourse analysis, while others did. This difference between respondents raised a question regarding what practising clinicians consider as falling within a working definition of "discourse analysis."

The complexity surrounding the term "discourse analysis" may be the product of the complexity of the analysis process itself. A discrepancy was apparent in how speech pathologists defined linguistic discourse analysis, with some clinicians interpreting an analysis as a detailed process requiring counting and calculating linguistic behaviours alone, and others including judgement-based methods in their definition. These differences may represent a systemic issue in the speech pathology discipline whereby the complexity of the analysis process has led to a multi-faceted understanding and therefore definition of what "discourse analysis" included. The many different approaches evident at each stage of the linguistic discourse analysis process—sample elicitation, preparation and analysis—demonstrated that linguistic discourse analysis itself is a varied and complex form of language assessment, which may have influenced the diverse definitions.

Respondents reported that they lacked the clinical time needed to complete detailed, transcription-based linguistic discourse analysis procedures such as Correct Information Units or Type Token Ratio. This report was universal amongst speech pathologists, affecting the frequency of use of linguistic discourse analysis regardless of age, experience or country of practice. Further, this external, environmental influence appeared to take precedence over potential beliefs that linguistic discourse analysis was an important part of a comprehensive aphasia assessment. These findings were congruent with those of Maddy et al. (2015) which showed time and education pressures forced clinicians away from detailed discourse analysis to assess the discourse production of clients with acquired brain injury, and towards a judgement-based assessment. However, such observational methods of analysis required the subjective judgement of outcomes, as clinicians were required to interpret deficits in the elicited sample based on only a single observation.

All respondents who indicated that they used linguistic discourse analysis, whether in its judgement-based or detailed, transcription-based form, did so for multiple purposes. Descriptive discourse analyses were used to diagnose linguistic impairments and identify targets for intervention, using any knowledge that could be obtained regarding premorbid language use, and through observation of the elements of discourse that affected the clients' ability to communicate. Comparative discourse analysis was used to measure change pre- and post-intervention. In contrast to this, applications of linguistic discourse analysis in reviewed literature typically served descriptive or

comparative purposes, but not both (Bryant et al., 2016). The differences between research and practice may have stemmed from the distinctive aims of each approach to aphasia. Research aimed to answer specific questions about the nature of language in aphasia or determine the effectiveness of specific approaches to intervention. Conversely, clinical speech pathologists aimed to assess individuals with diverse language impairments, using linguistic discourse analysis both descriptively and comparatively in a diverse and inconsistent approach to assessment. To achieve this, clinicians were required to select from a large range of measures available in published research, with little guidance as to those most appropriate to facilitate improved activity and social participation, in line with the ICF approach to health (Bryant et al., 2016; World Health Organization, 2011).

To complete an appropriate linguistic analysis of discourse, speech pathologists most frequently reported the collection of conversational discourse. The absence of visual or auditory stimuli when eliciting these conversational samples led to responses with variable content and grammatical structure between individuals. Armstrong (2000) suggested that conversational discourse best represented the communication of daily function, making it the ideal genre to be sampled in clinical contexts. However, research applications of linguistic discourse analysis did not often report the use of conversational samples as research aims required comparison between samples, which could be better achieved with structured elicitation methods (Bryant et al., 2016). Conversation introduced confounding variables of individual style in grammatical structure, vocabulary, topic content and degree of speaker participation (i.e., complete sentences or single word responses) which could confound intended comparison to measure change over time as a result of intervention or neurological impairment. These confounding variables were problematic in research contexts, and could have similar implications for the clinical assessment of aphasia (Whitworth et al., 2015). As such, the development of surrogate discourse protocols such as the CUPD (Whitworth et al., 2015) offered an alternative to the use of conversation. The collation of multiple discourse samples from narrative, expositional and procedural genres provided a method to sample discourse representative of conversational language while limiting the influence of confounding variables.

Sampling of multiple discourse genres for analysis was also recommended by Brookshire and Nicholas (1994) to more accurately represent the communication of daily function. Reported practices of survey respondents, where most speech pathologists reported collecting multiple discourse samples across genres, may have reflected this recommendation. While this finding was positive, it remained unclear from the reported practices of survey respondents if they collected multiple discourse genres from each client, or if their practices varied depending on client abilities and contextual factors (e.g., available clinical time). Reported factors that influenced the choice of discourse elicitation methods suggested that speech pathologists used samples of greater structure in cases where the severity of diagnosis limited the verbal output of their clients. For example, where a client was unable to participate in a conversation, a picture description offered a greater level of support for discourse output. The amount of clinical time again appeared to be a barrier to the collection of a more diverse range of discourse samples. As such, the use of multiple samples in practice may not have reflected the procedure used for each individual client.

Most reported linguistic discourse analysis research used a process of recording and transcription to prepare discourse samples for analysis. However, speech pathologists reported that environmental barriers existed that limited their ability to prepare discourse samples in such a manner. Respondents reported that they did not have access to a quiet setting and high-quality recording device to create a clear recording from which to transcribe. Linguists suggested that without a clear recording, transcription would be inaccurate and therefore the accuracy of the analysis taken from the transcript would be of questionable accuracy (Rutter & Cunningham, 2013). The understanding of transcription itself further impeded the use of transcription-based linguistic analysis in some cases. Some clinicians considered transcription as a phonetic representation of spoken language, and so reported that they did not transcribe, though they did create a written version of spoken discourse. Each of these issues may have influenced clinicians to take a judgement-based approach to analysis where recording and transcription were not necessarily required and evaluation of discourse samples occurred as they were elicited.

It was interesting to note that two survey respondents indicated that they performed a detailed linguistic analysis without recording or transcribing the sample. Armstrong et al. (2007) investigation of transcription-less methods of discourse analysis found that analysis without transcription lacked the necessary accuracy for clinical assessment. However, the authors indicated that accuracy could be achieved with experience and training in analysis methods. Though the two clinicians who reported use of online detailed analysis differed in their level of experience measured in time as a speech pathologist, their level of experience in the application of linguistic discourse was unknown. Further investigation would be necessary to determine if an appropriate level of experience facilitated accurate linguistic discourse analysis without recording or transcription.

Speech pathologists reported performing an assessment of discourse that spanned multiple linguistic analysis categories. While this type of diverse assessment was not always observed in the research literature, it was recommended to achieve a comprehensive assessment of discourse ability (Saffran et al., 1989; Sherratt, 2007). In particular, respondents indicated that they often used measures of cohesion and story structure when assessing discourse samples. Research applications of linguistic discourse analysis did not frequently apply these measures (Bryant et al., 2016), despite recognition that the linguistic structures they examined could not be assessed outside the discourse context (Sherratt, 2007). The inclusion of cohesion and story structure measures by surveyed clinicians highlighted recognition of the importance of these structures to successful functional communication. A multi-measure approach was observed in research applications of linguistic discourse analysis, with 536 unique measures observed in total across 165 reviewed studies; however, no single measure was used in all observed research investigations (Bryant et al., 2016). The use of a similar multi-measure approach in clinical practice may reflect a need for speech pathologists to adapt their assessment to individual clients. Speech pathologists would therefore have to be prepared to use all available measures to adapt their analysis to individual clients. The selection of appropriate measures to suit individual client needs was complicated for clinicians, who reported that selecting appropriate analysis measures could be difficult.

Three-quarters of respondents did not report detailed linguistic analysis methods when asked about the types of assessments they used. However, some still specifically identified application of linguistic measures that required speech pathologists to follow a detailed and documented analysis procedure such as Nicholas and Brookshire's (1993) measure of Correct Information Units (CIUs). Half of those clinicians who reported using this analysis indicated that they examined discourse through clinical judgement, and not using detailed, transcription-based linguistic methods. This stood in contrast to the recommended method of Nicholas and Brookshire (1993), that the extensive rule-based procedure be applied to a written transcript of a discourse sample to analyse CIUs. The pattern of analysis observed in clinical discourse analysis at present may not follow this defined method to measure the same outcomes intended to represent accurate implementation of evidence, to achieve optimal outcomes for people with aphasia.

The survey also aimed to identify the benefits and limitations that speech pathologists perceived to affect their implementation of linguistic discourse analysis in the clinical environment. At all reported stages of the linguistic discourse analysis process, the lack of available clinical time appeared to hamper widespread clinical application of the methods presented in aphasia research. The detailed form of discourse analysis defined throughout the literature did not appear to translate to the clinical environment due to the time intensive process of discourse elicitation, recording, transcription, analysis and interpretation. While time did not preclude the use of detailed analysis completely, it seemed to encourage the evolution of judgement-based linguistic discourse analysis methods. This evolution suggests that the understanding of discourse analysis as presented in research literature may need to be re-examined in light of the environmental restrictions placed on clinical implementation.

However, the benefits of added detail in clinical applications of linguistic discourse analysis should not be overlooked. Respondents identified that the record and objectivity generated through a detailed analysis of linguistic behaviours in discourse supported clinical practice in a way clinical judgement alone could not, although greater time efficiency was still necessary to facilitate more widespread application. Respondents reported positive attitudes towards the integration of computer-assisted linguistic discourse analysis into their practice to maintain assessment accuracy while improving time efficiency (Long, 2001). Survey results indicated infrequent use of such technology to support transcription and analysis despite the large role computers played in assessment, intervention and maintenance of clinical records.

Limitations

While a survey method was considered most appropriate to reach a large, international sample of speech pathologists, it introduced some limitations. Participant recruitment was performed through national professional associations of speech pathologists in participating countries. Recruited participants worked in countries where English was the primary spoken language and as such, care should be taken in generalising results to discourse analyses performed in languages other than English. It was possible that some individuals were contacted through more than one association, as international affiliations and memberships exist within these bodies. Participants were not restricted from

accessing the survey on multiple occasions, and although unlikely, could have completed the survey more than once. The survey distribution method also introduced a possible self-selection bias. As purposive sampling could not be employed while maintaining response anonymity, the survey link was provided generally to all members. Speech pathologists were therefore required to decide themselves if they met the defined criteria for participation, the number of eligible individuals with access to the survey was unknown and response rate could not be estimated to account for any non-response bias in the data (Bethlehem, 2015). The self-selection bias may have skewed the participating demographic towards clinicians with a greater degree of experience using the linguistic discourse analysis methods investigated through the survey. It appeared that most respondents had some awareness and experience of linguistic discourse analysis, though this could have been the product of a self-reporting bias whereby respondents provided answers they perceived as desirable (Fadnes, Taube, & Tylleskär, 2008). Anonymity of responses aimed to minimise this risk of misreporting; however, the risk of bias must be considered when interpreting the results of this investigation. The same factors that introduced a self-selection bias also precluded estimation of response rate in four of the five surveyed countries. As such, the portion of the target population of speech pathologists reached could not be determined. Care should be taken in generalising results to speech pathology practice as a whole.

The design and phrasing of survey questions may also have influenced the nature of responses and therefore the data collected. Participants were not provided with the specific definition for the term "linguistic discourse analysis" used in this study. The absence of explicit definition may have contributed in a lack of consensus among respondents as what constituted "linguistic discourse analysis," and resulted in variability in reported findings. However, this omission was deliberate in order to gain responses from clinicians without causing confusion or restricting collected information to one specific method of analysis. This allowed individual speech pathologists to report the form of "linguistic discourse analysis" they implemented in their own clinical practice. The decision to omit a definition also extended to "transcription." The absence of a specific definition permitted the collection of inclusive and wide-ranging data on the topic of linguistic discourse analysis in aphasia. This in turn facilitated comprehensive examination of the use and the definitions of linguistic discourse analysis in clinical assessment of aphasia.

Future directions

The survey results highlighted that clinical time constraints and knowledge of linguistic discourse analysis had the greatest impact on use of analysis to assess language in aphasia. In particular, differing definitions and interpretations of the requirements of discourse analysis were evident in responses. This information from clinicians suggested that further research is needed in relation to ways to facilitate the translation of linguistic discourse analysis evidence between research and practice. Respondents specifically identified the need for further educational and professional development training to increase their knowledge and understanding of the linguistic discourse analysis process. Additionally, their feedback indicates that current research does not account for the environmental demands of the clinical environment. To this end,

research is underway to investigate the extent to which an education workshop covering all aspects of the linguistic discourse analysis process—discourse elicitation, transcription, analysis and interpretation—may improve clinical application. The research will also investigate the extent to which the integration of research tools, specifically computer software, may further support this process and whether the method of discourse analysis supported by reported clinical experience, that is judgement-based analysis, compares with transcription-based methods in terms of achieving clinical assessment outcomes.

The need for greater collaboration between researchers and clinicians in approaching discourse assessment was also evident. The disconnect between research and practice, and the barriers that limit the use of discourse as defined in research, suggested that researchers need to collaborate with clinicians to bridge the research–practice divide. Speech pathologists identified a need to simplify the linguistic discourse analysis process for the clinical context, reflected in a reported difficulty selecting discourse elicitation procedures and linguistic analysis measures. A defined approach to discourse assessment would provide the direction needed to guide efficient and effective analysis for specific purposes and population groups. In order to achieve this, research would be needed to identify the salient outcomes, and the best measures to analyse those outcomes.

Conclusions

Linguistic discourse analysis is an assessment tool regularly applied in speech pathology research to assess language in aphasia. Despite the many reported barriers to widespread clinical application, the research literature has suggested linguistic discourse analysis should be implemented in clinical practice to assess the outcomes of interventions. This survey demonstrated that discourse analysis is used by speech pathologists for this purpose, and to assess their clients with aphasia. Speech pathologists reported finding value in linguistic discourse analysis using transcription-based and judgement-based approaches, suggesting that continued use of these methods is warranted. However, environmental demands of the clinical setting appeared to lead to adaptations in linguistic discourse analysis methods to facilitate ongoing clinical implementation, which require further investigation.

Notes

1. Please note that all results reported for use, elicitation, sample preparation and analysis are based on the sample of 106 survey respondents who reported using discourse always, usually, sometimes or rarely.
2. Please note that all results reported for attitudes towards discourse and computer-assisted analysis, and barriers and facilitators of linguistic discourse analysis are based on the complete survey sample of 123 unless otherwise stated.

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Declaration of Interest

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References

Armstrong, E. (2000). Aphasic discourse analysis: The story so far. *Aphasiology*, *14*, 875–892. doi:10.1080/02687030050127685

Armstrong, L., Brady, M., Mackenzie, C., & Norrie, J. (2007). Transcription-less analysis of aphasic discourse: A clinicians dream or a possibility? *Aphasiology*, *21*, 355–374. doi:10.1080/02687030600911310

Ball, M. J., Howard, S., Müller, N., & Granese, A. (2013). Data processing: Transcriptional and impressionistic methods. In N. Müller & M. J. Ball (Eds.), *Research methods in clinical linguistics and phonetics: A practical guide* (pp. 177–194). West Sussex: Wiley-Blackwell.

Ballard, K. J., & Thompson, C. K. (1999). Treatment and generalization of complex sentence production in agrammatism. *Journal of Speech Language & Hearing Research*, *42*, 690–707. doi:10.1044/jslhr.4203.690

Bandur, D. L., & Shewan, C. M. (2008). Language-oriented treatment: A psycholinguistic approach to aphasia. In R. Chapey (Ed.), *Language intervention strategies in aphasia and related neurogenic communiication disorders* (5th ed., pp. 756–799). Baltimore: Lippincott Williams & Wilkins.

Bethlehem, J. (2015). Web surveys in official statistics. In U. Engel, B. Jann, P. Lynn, S. Annette, & P. Sturgis (Eds.), *Improving survey methods: Lessons from recent research* (pp. 156–169). New York: Routledge.

Boles, L. (1998). Conversational discourse analysis as a method for evaluating progress in aphasia: A case report. *Journal of Communication Disorders*, *31*, 261–274. doi:10.1016/S0021-9924(98)00005-7

Brookshire, R. H., & Nicholas, L. E. (1994). Speech sample-size and test-retest stability of connected speech measures for adults with aphasia. *Journal of Speech Language and Hearing Research*, *37*, 399–407. doi:10.1044/jshr.3702.399

Brown, G., & Yule, G. (1983). *Discourse analysis*. Cambridge: Cambridge University Press.

Bryant, L., Ferguson, A., & Spencer, E. (2016). Linguistic analysis of discourse in aphasia: A review of the literature. *Clinical Linguistics & Phonetics*, *30*, 489–518. doi:10.3109/02699206.2016.1145740

Clinical Centre for Research Excellence (CCRE) in Aphasia Rehabilitation. (2014). *Aphasia rehabilitation best practice statements. Comprehensive supplement to the Australian aphasia rehabilitation pathway*. Brisbane: CCRE in Aphasia Rehabilitation.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Elia, D., Liles, B. Z., Duffy, R. J., Coelho, C. A., & Belanger, S. A. (1994). *An investigation of sample size in conversational analysis*. Paper presented at the ASHA Convention, New Orleans, LA.

Fadnes, L., Taube, A., & Tylleskär, T. (2008). How to identify information bias due to self-reporting in epidemiological research. *The Internet Journal of Epidemiology*, *7*(2), 1-9. doi:ispub.com/IJE/7/2/9194

Fletcher, P., & Garman, M. (1988). LARSPing by numbers. *International Journal of Language & Communication Disorders*, *23*, 309–321. doi:10.3109/13682828809011940

Frith, M., Togher, L., Ferguson, A., Levick, W., & Docking, K. (2014). Assessment practices of speech-language pathologists for cognitive communication disorders following traumatic brain injury in adults: An international survey. *Brain Injury*, *28*, 1657–1666. doi:10.3109/02699052.2014.947619

Goodglass, H., Kaplan, E., & Barresi, B. (2001). *Boston diagnostic aphasia examination* (3rd ed.). Philadelphia, PA: Lippencott, Williams & Wilkins.

Kertesz, A. (2006). *Western aphasia battery - revised*. San Antonio, TX: Pearson Assessments.

Lee, L. (1966). Developmental sentence types: A method for comparing normal and deviant syntactic development. *Journal of Speech and Hearing Disorders*, *31*, 311–330. doi:10.1044/jshd.3104.311

Long, S. H. (2001). About time: A comparison of computerized and manual procedures for grammatical and phonological analysis. *Clinical Linguistics & Phonetics*, *15*, 399–426. doi:10.1080/02699200010027778

MacWhinney, B. (2000). *The CHILDES project: Tools for analysing talk* (3rd ed.). Muhwah, NJ: Lawrence.

Maddy, K. M., Howell, D. M., & Capilouto, G. J. (2015). Current practices regarding discourse analysis and treatment following non-aphasic brain injury: A qualitative study. *Journal of Interactional Research in Communication Disorders*, *6*, 211–236. doi:10.1558/jircd.v6i2.1905

Marini, A., Andreetta, S., del Tin, S., & Carlomagno, S. (2011). A multi-level approach to the analysis of narrative language in aphasia. *Aphasiology*, *25*, 1372–1392. doi:10.1080/02687038.2011.584690

Miller, J., & Iglesias, A. (2012). *Systematic Analysis of Language Transcripts (SALT) (Version Research version 2012)*. Middleton, WI: SALT Software, LLC.

Nicholas, L. E., & Brookshire, R. H. (1993). A system for quantifying the informativeness and efficiency of the connected speech of adults with aphasia. *Journal of Speech Language and Hearing Research*, *36*, 338–350. doi:10.1044/jshr.3602.338

Nicholas, L. E., & Brookshire, R. H. (1995). Presence, completeness, and accuracy of Main Concepts in the connected speech of non-brain-damaged adults and adults with aphasia. *Journal of Speech Language and Hearing Research*, *38*, 145–156. doi:10.1044/jshr.3801.145

Olness, G. S. (2006). Genre, verb, and coherence in picture-elicited discourse of adults with aphasia. *Aphasiology*, *20*, 175–187. doi:10.1080/02687030500472710

Rochon, E., Saffran, E. M., Berndt, R. S., & Schwartz, M. F. (2000). Quantitative analysis of aphasic sentence production: Further development and new data. *Brain & Language*, *72*, 193–218. doi:10.1006/brln.1999.2285

Rose, M., Ferguson, A., Power, E., Togher, L., & Worrall, L. (2014). Aphasia rehabilitation in Australia: Current practices, challenges and future directions. *International Journal of Speech-Language Pathology*, *16*, 169–180. doi:10.3109/17549507.2013.794474

Rutter, B., & Cunningham, S. (2013). The recording of audio and video data. In N. Müller & M. J. Ball (Eds.), *Research methods in clinical linguistics and phonetics: A practical guide* (pp. 160–176). West Sussex: Wiley-Blackwell.

Sacks, H., Schegloff, E. A., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking for conversation. *Language*, *50*, 696–735. doi:10.1353/lan.1974.0010

Saffran, E. M., Berndt, R. S., & Schwartz, M. F. (1989). The quantitative analysis of agrammatic production: Procedure and data. *Brain & Language*, *37*, 440–479. doi:10.1016/0093-934X(89)90030-8

Sherratt, S. (2007). Multi-level discourse analysis: A feasible approach. *Aphasiology*, *21*, 375–393. doi:10.1080/02687030600911435

TalkBank.org. (2007). AphasiaBank protocol. *TalkBank*. Retrieved January 11, 2016, from http://aphasia.talkbank.org/protocol/

Togher, L. (2001). Discourse sampling in the 21st century. *Journal of Communication Disorders*, *34*, 131–150. doi:10.1016/S0021-9924(00)00045-9

Verna, A., Davidson, B., & Rose, T. (2009). Speech-language pathology services for people with aphasia: A survey of current practice in Australia. *International Journal of Speech-Language Pathology*, *11*, 191–205. doi:10.1080/17549500902726059

Westerveld, M. F., & Claessen, M. (2014). Clinician survey of language sampling practices in Australia. *International Journal of Speech-Language Pathology*, *16*, 242–249. doi:10.3109/17549507.2013.871336

Whitworth, A., Claessen, M., Leitao, S., & Webster, J. (2015). Beyond narrative: Is there an implicit structure to the way in which adults organise their discourse? *Clinical Linguistics & Phonetics*, *29*, 455–481. doi:10.3109/02699206.2015.1020450

World Health Organization. (2011). *ICF: International Classification of Functioning, disability and health*. Geneva: Author.

Worrall, L., Sherratt, S., Rogers, P., Howe, T., Hersh, D., Ferguson, A., & Davidson, B. (2011). What people with aphasia want: Their goals according to the ICF. *Aphasiology*, *25*, 309–322. doi:10.1080/02687038.2010.508530