An international survey of assessment and treatment practice for discourse in paediatric ABI

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Abstract

Purpose: Guidelines recommend routine discourse assessment and treatment in paediatric acquired brain injury (ABI) but provide little guidance for clinical practice. The degree to which this has influenced the nature of discourse assessment and treatment in clinical practice has not been examined in detail.
Method: Speech-language pathologists working in paediatric ABI (clients aged <18 years) in Australia, New Zealand, the UK, the USA, Canada, and the Asia Pacific region were invited to complete a survey of discourse assessment and intervention practices (n=77).
Result: Clinicians from Australia and New Zealand comprised over half of a responses (53%). The largest proportion had over 10 years' experience (60%), worked in the metropolitan area (58%), and with secondary school-age children (64%). Routine discourse assessment was undertaken by 80% of respondents, focussing on a limited range of genres. No preferred intervention approach was identified. One-quarter of clinicians routinely considered holistic factors during clinical decision-making. Limited normative data and treatment evidence, insufficient time and training were identified as clinical barriers.
Conclusion: Assessment practices were consistent with guidelines, yet interventions were highly variable, reflecting limited evidence, client heterogeneity, time constraints, and limited training. A biopsychosocial approach to practice was evident, yet a focus on impairment level factors was prominent. Findings support the need for standardised discourse assessment and discourse intervention methods. Translation into practice guidelines would promote consistency and confidence in clinical practice.
Keywords: *discourse; assessment; treatment*

Introduction

Acquired brain injury (ABI) affects around 2000 per 100 000 children and adolescents each year in first world countries such as Australia, the UK, and the USA (Crowe, Babl, Anderson, & Catroppa, 2009; Faul, Xu, Wald, & Coronado, 2010; National Institute for Health and Care Excellence, 2014). An ABI can lead to persistent and pervasive deficits in language and communication, making speech-language pathologists (SLPs) crucial members of the interdisciplinary rehabilitation team (Morgan et al., 2017). Children and adolescents with ABI are likely to present with cognitive-communication deficits (CCDs) post injury; these refer to impairments in any aspect of language and communication that result from a disruption of one or a combination of cognitive processes (Turkstra, Politis, & Forsyth, 2015). Following ABI, CCDs typically manifest in complex language functions such as pragmatics and social skills (Coelho, 2007). Discourse-level impairments, i.e. at the level of connected speech, in the presence of relatively spared word and sentence-level processes, are a hallmark characteristic of CCD following brain injury and have been attributed to disruption to executive function, memory, and attention, among other functions. (Coelho, 2007). This is noteworthy in the context of children

as the ability to use and manipulate language beyond the level of the sentence, for a range of purposes (i.e. genres; storytelling, persuasion, exposition), is critical for psychosocial and emotional development as well as academic and vocational participation (Schickedanz, Schickendanz, Forsyth & Forsyth, 2001).

During childhood and adolescence, proficient use of a variety of discourse genres facilitates the development of personal identity through sharing opinions and perspectives, the formation and maintenance of relationships, and the acquisition and demonstration of knowledge in the classroom (Schickedanz et al., 2001). Throughout childhood and adolescence, discourse-level language becomes more sophisticated, with developments in vocabulary, syntactic complexity, and text structure (Berman, 2007; Nippold et al., 2008). Together, these changes facilitate the use of discourse for more complex purposes, such as navigating new social situations where flexibility is required to rapidly switch between genres, as well as meeting the increasing academic demands as they evolve over time.

Unfortunately, children with ABI can "lag behind" (Hemphill et al., 1994, p. 122) their peers' discourse development, demonstrating protracted rates of language development, and continue to demonstrate impaired discourse into the late adolescent years (Chapman et al., 2001). This makes the assessment and treatment of discourse skills a clinical priority in young people to facilitate effective practice and delivery of targeted, and ecologically valid, interventions (Togher et al., 2014). A focus on discourse skills enables SLPs to identify and subsequently target impaired language "at the level of participation in everyday social life" (Togher et al., 2014, p. 361) and promote successful re-integration into communication contexts of the home, school, and community (Lundine & Hall, 2020).

Engaging in evidence-based practice (EBP) to target discourse-level language difficulties has been echoed by others (Coelho, 2007; Lundine & Hall, 2020). There are, however, recognised challenges associated with the clinical translation of research into CCDs, and their management, in ABI including population heterogeneity, inconsistent terminology, and variable methods for assessment, treatment, and outcome measurement (MacDonald & Wiseman-Hakes, 2010). Within the clinical practice, greater consistency may be assisted by clinical practice guidelines. For instance, guidelines from the College of Audiologists and Speech-Language Pathologists of Ontario ([CASLPO], 2018), and the Murdoch Children's Research Institute, in conjunction with the National Health and Medical Research Council Centre for Research Excellence on Psychosocial Rehabilitation in Traumatic Brain Injury (Morgan et al., 2017), on EBP for CCDs in paediatric brain injury (Steel & Togher, 2019) explicitly recommend the routine assessment and treatment of discourse skills. Overall, SLPs are recommended to integrate their knowledge and expertise with published recommendations and current evidence to guide discourse assessment and treatment practice in the context of individual client factors across demographic, psychosocial, cultural, and linguistic domains (MacDonald, 2017).

Discourse assessment in paediatric ABI

Discourse assessment is recommended as a critical component of assessment to provide insight into daily communication competence and serve as an ecologically valid measure of change in therapy (Lundine & Hall, 2020). While current guidelines encourage discourse assessment as a practice standard in ABI, these documents provide limited information about how to elicit and analyse discourse skills. Earlier guidelines have endorsed standardised tests such as the Test of Language Competence – Expanded (TLC-E; Wiig & Secord, 1989), the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 2007), the Comprehensive Assessment of Spoken Language (CASL; Carrow Woolfolk, 1999), the Clinical Evaluation of Language Fundamentals – Fourth edition (CELF-4; Semel, Wiig, & Secord, 2003), and the Paediatric Test of Brain Injury (PTBI; Hotz, Helm-Estabrooks, Nelson, & Plante, 2009), to profile cognitive-communication in paediatric ABI (McCauley et al., 2012). Lundine and Hall (2020) recently

highlighted the paucity of standardised assessments of discourse skills in this population, which is an important caveat given clinicians rely heavily on developmental language batteries throughout the assessment process more generally (Frith, Togher, Ferguson, Levick, & Docking, 2014; Lundine & Hall, 2020). This preference for standardised tasks is likely related to their clear scoring guidelines and availability of normative data to guide goal-setting in this population (Frank et al., 1997; Frith et al., 2014). However, these batteries typically assess language form (i.e. phonology and grammar) and content (i.e. semantics, including vocabulary), as opposed to language use (i.e. pragmatics and social communication), which refers to the understanding and use of language for social, academic, vocational or other purposes (Lundine & Hall, 2020; Turkstra et al., 2005). Consequently, these assessments have been criticised for limited ecological validity and reduced sensitivity to CCDs that manifest in discourse and pragmatics (Coelho et al., 2005).

In the context of limited options for standardised discourse tasks, clinicians may turn to empirical literature to guide discourse assessment and supplement omnibus language batteries. For instance, clinicians may synthesise the methodological approaches in empirical studies seen in both paediatric ABI (e.g. Biddle, McCabe, & Bliss, 1996; Chapman et al., 2001) and adult ABI (e.g. Coelho, 2007), which could be a timely process due to methodological inconsistency and participant heterogeneity in studies of ABI (MacDonald & Wiseman-Hakes, 2010). The broader paediatric discourse literature provides published protocols for expository (Heilmann & Malone, 2014), persuasive (Heilmann, Malone, & Westerveld, 2020), narrative (Westerveld & Gillon, 2008), and multiple genres (Hill et al., 2021). These protocols offer clear instructions, an array of outcome measures and some normative data against which to profile the quality, quantity, and organisation of discourse content relative to 'typical' discourse following brain injury (Coelho et al., 2005). Not specifically designed for paediatric ABI, the extent to which they are utilised in clinical practice has not been documented. Between formal standardised assessment, published protocols, and empirical literature, there is potential for considerable inconsistency in clinical practice, yet the nature of current assessment practices for discourse in paediatric ABI have not been explored.

Discourse intervention in paediatric ABI

Existing clinical guidelines advocate for a range of approaches to the management of CCDs following paediatric ABI (CASLPO, 2018; Morgan et al., 2017). Guidelines for expressive language deficits identify word-level scaffolding (e.g. prompts, cueing, and priming) and semantic techniques (e.g. concept mapping), as well as strategies for pragmatics such as social skills training (e.g. use of TopicTalk™ resources; Pike, 2006), gesturing, and picture boards as evidence-based therapy options (Morgan et al., 2017). The use of compensatory strategies (e.g. environmental modifications and external aids) is also encouraged, alongside counselling and education, and communication partner training (e.g. Togher, McDonald, Tate, Rietdijk, & Power, 2013) and cognitive approaches, such as metacognitive strategy instruction and strategic learning. No references to specific treatment approaches for discourse skills are provided in the paediatric guidelines, which is not unexpected given the absence of evidence supporting the use of these approaches for discourse in this population; the evidence is only available for wordlevel skills (Thomas-Stonell et al., 1994), cognitive function (Oberg & Turkstra, 1998), and pragmatic behaviour (Wiseman-Hakes et al., 1998).

As there is "insufficient evidence to support effective treatment strategies of language disorders in paediatric ABI" (Morgan et al., 2017, p.37), clinicians may draw on the broader discourse intervention literature to formulate evidence-based management decisions for this population. For instance, there is some, albeit variable, support for direct treatments of narrative structure (Cannizaro & Coelho, 2002), multi-faceted approaches that combine meta-cognitive and -

linguistic approaches and scaffolding to improve word to text-level narrative features (Kintz et al., 2018), as well as cognitive rehabilitation to improve the informativeness of conversational discourse in adults with ABI (Youse & Coelho, 2005). There is evidence for oral narrative intervention in developmental language disorder (DLD; Glisson, Leitao, & Claessen, 2019; Spencer & Petersen, 2020), and direct conversation skills programs in adolescents with Autism Spectrum Disorder (Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012). The extent to which these treatment approaches, or others, are utilised for discourse deficits in paediatric ABI has not been explored.

Consideration of client factors

Guidelines encourage clinicians to consider the influence of multiple factors on the extent and nature of language and communication difficulties when formulating an evidence-based and client-centred approach to managing CCDs (Morgan et al., 2017). While developed for an adult ABI population, MacDonald's (2017) model of Cognitive Communication Competence following Brain Injury (see MacDonald, 2017) highlights a range of demographic and injury-related variables as well as cognitive, emotional, physical, and contextual factors that influence overall communicative competence. These factors would be applicable to a paediatric population. For instance, it is well-established that poorer language outcomes are observed in earlier-sustained, and more severe injuries (e.g. Chapman et al., 2001). Although general discourse assessment and treatment principles may be consistent across age groups or clinical populations, such as saliency, relevance, and the use of metacognitive and compensatory strategies as well as explicit modelling (see Glisson et al., 2019), the context and complexity of tasks and targets may change depending on the social participation and academic needs of the individual or the severity of impairment. Consequently, the consideration of a range of client and injury-related variables is important in clinical decision-making; however, there has been no exploration of what factors are routinely considered in practice in the context of paediatric ABI.

The current study

To date, no study has sought to describe both current assessment and treatment practices for discourse level language difficulties associated with CCDs in paediatric ABI. This study aimed to explore how SLPs currently assess and manage discourse deficits in this population in the context of current guidelines and empirical evidence. A critical understanding of practice is needed to identify gaps and understand compliance with current clinical guidelines. This will better inform future research efforts to support clinical decision-making with a view to promoting best outcomes for discourse-level language in this population and prioritise future research.

Method

This study involved an international survey of SLPs with experience working in paediatric ABI. Ethics approval for this study was obtained from the Curtin University Human Research Ethics Committee (#HRE2016-0349).

Participants

SLPs working in Australia, New Zealand, the UK, USA, Canada and the Asia Pacific region with experience in paediatric ABI were invited to participate via social media and publications of international speech language pathology bodies. Potential participants were also identified through databases of each respective international body as well as special interest groups. To improve readability and facilitate discussion of results, the data were collapsed in the following ways: countries were reduced to Australia/ New Zealand, the UK, USA/Canada, and Asia; years of experience were collapsed to 0–3 years, 4–10 years, 11–15 years, and >15 years; clinical contexts were grouped according to acute, inpatient rehabilitation, outpatient rehabilitation, private

practice, and school-based services, and the clinical setting was grouped according to urban/metropolitan, regional, rural, and remote.

Survey design

An online survey was developed to identify and describe the current assessment and treatment practices for discourse in paediatric ABI and disseminated via Qualtrics (see Supplementary Material for a survey). Prior to dissemination, the survey was piloted with an experienced SLP and a clinical psychologist for length, structure, content, and clarity of questions. The survey was modified and re-reviewed by both parties following feedback. Minor modifications were made throughout the survey and included simplification of sentences to enhance readability and the addition of free text response options throughout. The final survey included 28 questions (containing multiple items). Questions were separated into four categories, 'Demographic Information' (n=7), 'Assessment' (n=10), 'Intervention (n=8), and 'Theory and Literature' (n=3). All questions and response options were constructed to align with components of EBP and current practice guidelines, such as those published by the CASLPO (2018), the Murdoch Children's Research Institute (Morgan et al., 2017), and Togher et al. (2013). The survey took approximately 20–30 minutes to complete.

Demographic questions were included to elicit information on the geographic location and clinical experience of respondents (years and client demographics). Assessment questions included items relating to the nature of cognitive-communication assessment targets, such as the level(s) of expressive language (e.g. word, sentence, and discourse), and cognitive functions (e.g. attention, memory, processing speed) targeted in the assessment. The 'Assessment' questions were designed to obtain a broad profile of cognitive-communication assessment practice as part of a larger body of research. As a result, areas such as motor speech, literacy, and pragmatic behaviour were also included as potential response options. However, only the responses for oral receptive and expressive language (word to discourse-level) and cognitive functions will be reported in this paper. Respondents were surveyed as to standardised and non-standardised tools used to measure discourse skills. Targeted questions then sought information on views and content of discourse assessment practices, including genres, elicitation tasks, and analysis procedures. Similarly, Intervention items sampled frequent or routine targets of intervention, which included levels of expressive and receptive language, and cognitive functions, as well as broader areas of motor speech, literacy, and pragmatics. As with assessment, only responses for oral receptive and expressive language (word, sentence, and discourse level) and cognitive functions are reported in this paper. Respondents were also surveyed about the specific treatment approaches and outcome measurements used to track change in discourse skills. Both Assessment and Intervention also surveyed the frequency with which a range of client factors was considered in clinical decision-making and barriers to assessment and intervention. The final section on 'Theory and Literature' comprised three questions that sampled clinicians' consideration of specific theories or bodies of literature used in guiding clinical decision-making. Questions included a range of response types, including multiple choice options (based on empirical literature), Likert scales, and free text entries. Respondents were asked to respond to a series of multiple-choice options using Likert scales of frequency in which quantifiers included: 'Never'=0% of the time, 'Infrequently'=<25% of the time, 'Somewhat Frequently'=25–50% of the time, 'Frequently'=50–80% of the time, and 'Routinely' >80% of the time. Respondents were asked to provide free text entry responses to provide additional detail and where 'other' items were selected. To survey clinicians' attitudes towards assessment and intervention, participants were invited to rate their level of agreement in response to a series of statements based on existing literature. Questions that evaluated levels of the agreement involved a five-point scale: 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree', and 'Strongly Agree'. Responses were downloaded from

Qualtrics into IBM SPSS (version 21). As extreme responses are often less likely to be selected (Leung, 2011), 'Frequently' and 'Routinely' (Likert responses) as well as agree/disagree and strongly agree/disagree were combined in this study (as in Frith et al., 2014). Data were analysed using descriptive methods and are presented as frequency counts and proportions (%) of responses for each item.

Of the 128 SLPs who commenced the survey, data from 77 data sets could be included in the analysis based on sufficient data entry. All 77 clinicians provided demographic information, 53 completed the 'Assessment' section, and 36 completed the 'Intervention' and 'Theory and Literature' sections.

Demographic information

Respondents represented a range of clinical settings, geographic settings, experience levels, and ages of clients with ABI with whom they worked (see Table I). Half of the respondents practiced in Australia and New Zealand (*n*=41, 53%), with the remainder practicing in USA/Canada (*n*=17, 22%), UK (*n*=12, 16%), and the Asia Pacific region (*n*=7, 9%). Over 60% of clinicians (*n*=48) reported over 10 years' experience working with children and adolescents with ABI, with 38% (*n*=29) reporting less than 10 years' experience with this population. Most responses represented clinicians working within a metropolitan area (58%), community rehabilitation services (40%), and clinicians working with secondary school-age children (64%).

Language levels targeted in assessment and treatment in paediatric ABI

All levels of language (i.e. word-, sentence-, and discourse-level) were represented to a similar degree as targets in both assessment and intervention, with marginally greater frequency across the range of word to discourse levels in assessment practice. In terms of receptive language assessment, sentence-level skills were the most frequent or routine target (*n*=42, 80%), followed by a word (*n*=40, 76%), then discourse-level skills (*n*=36, 67%) (see Figure 1). A similar response pattern was observed for expressive language assessment, where sentence-level skills were the most frequent or routine target (*n*=45, 84%) followed by word-level (*n*=41, 78%), then discourse level skills (*n*=40, 76%). For receptive language treatment, sentence-level language was again the most frequent or routine target (*n*=25, 74%), followed by discourse (*n*=23, 63%), and word-level comprehension (*n*=22, 60%). For expressive language intervention, both sentence and discourselevel production was the most frequent or routine treatment target (*n*=27, 75%), followed by wordlevel language (*n*=24, 66%).

Non-linguistic factors considered in discourse assessment and treatment planning

From the list provided, respondents indicated a range of client factors that are frequently or routinely considered in assessment and treatment planning (see Figure 2). In assessment planning, factors most frequently or routinely considered by more than half of respondents include current age (*n*=39, 74%), cognitive processes including executive function (*n*=38, 71%), attention (*n*=36, 67%), memory (*n*=35, 65%), physical factors such as physical health (*n*=34, 64%), age at injury (*n*=22, 62%), injury aetiology (*n*=32, 61%), as well as mental health (*n*=30, 56%), the client's regular communication contexts (*n* ¼, 56%), education (*n*=28, 53%), gender and culture (both *n*=27, 50%). Factors frequently or routinely considered by less than half of respondents included the client's family situation (*n*=25, 48%) as well as cognitive factors including IQ (*n*=25, 48%), Theory of Mind (*n*=13, 25%), and processing speed (*n*=6, 12%). In treatment planning, over 80% of respondents reported frequent or routine consideration of demographic and injury-related factors such as age (current and at injury), cause and severity of the ABI, and level of education (all *n*=30, 83%). These were followed by gender, culture, and family structure (all *n*=25, 70%). Approximately half of the clinicians selected frequent or routine

consideration of the clients' daily communication contexts (*n*=30, 56%), education and culture (*n*=26, 50%), and family structure (*n*=25, 48%) in treatment planning. In contrast, for less than half of clinicians, Theory of Mind (*n*=13, 25%), processing speed (*n*=6, 12%), and their client's daily communication contexts (*n*=3, 9%) were selected as frequent or routine considerations in treatment planning.

Discourse assessment practices

Of the 53 respondents in the assessment section, 13 respondents (25%) indicated frequent or routine administration of standardised, norm-referenced assessments to assess discourse skills. Those tests identified included the CELF-4 (Semel et al., 2003) (*n*=5), the Measure of Cognitive and Linguistic Abilities (MCLA; Ellmo, 1995) (*n*=4), the PTBI (Hotz et al., 2009), the written expository task from the Functional Assessment of Verbal Reasoning and Executive Strategies – Student version (S-FAVRES; (MacDonald, 2016)), the Montreal Evaluation of Communication (MEC; Joanette et al., 2004) (all *n*=2), the Test of Narrative Language (TNL; Gillam & Pearson, 2004), and the RBS (Renfrew, 2010) (both *n*=1).

Just over 10% of respondents identified frequent or routine use of published discourse elicitation protocols *(n=7, 14%),* including Westerveld and Gillon's (2002) Language Sampling Protocol, the 'Rules of the Game' task (see Heilmann & Malone, 2014), TBIBank resources available via the TalkBank database (see MacWhinney, 2019), and published observation tools *(n=6, 11%).* Observation tools that were specifically identified in responses included the La Trobe Communication Questionnaire (LCQ; Douglas, 2010) and 'self-generated' checklists (both mentioned by one respondent). In contrast, 33 clinicians (63%) reported frequent or routine use of nonstandardised formal and informal tasks to assess discourse skills, such as conversation samples *(n=6),* picture descriptions *(n=5),* or 'self-generated' protocols *(n=3).*

Discourse-level language was most frequently or routinely sampled in conversation (*n*=45; 78%), followed by procedure (*n*=28, 53%), recount (*n*=26,49%), narrative generation (*n*=22, 42%) and narra-tive retell (*n*=21, 40%) (see Figure 3). Discourse skills were least frequently or routinely samples in expository (*n*=15, 29%) and persuasive tasks (*n*=11, 20%), but these genres were still identified by 20% or greater of the respondents.

FIGURE 3 HERE

Discourse treatment practices

Clinicians' frequent or routine approaches to discourse intervention were relatively evenly distributed across counselling and education (both *n*=21, 57%) and cognitive rehabilitation (*n*=20, 56%), as well as social skills training, conversation skills training, communication partner training, and metacognitive strategy instruction (all *n*=19, 54%) (see Figure 4). Approximately half of the respondents reported frequent or routine implementation of direct oral narrative intervention and role plays to target discourse skills (both *n*=15, 43%). A quarter of clinicians reportedly used a combination of approaches to target discourse deficits in this population (*n*=9, 26%). In terms of genre, discourse skills were most frequently or routinely targeted in conversation (*n*=23, 64%), followed by procedure (*n*=22, 60%), narrative generation and retelling (*n*=17, both 47%), recount and exposition (both *n*=16, 44%), then persuasion (*n*=10, 29%) (see Figure 3, above).

Discourse analysis methods

In analysing discourse skills, almost two-thirds of clinicians reported the frequent or routine use of text level measures of structure (*n*=34, 64%), followed by sentence-level measures (*n*=18, 34%) such as syntactic complexity, and word-level measures (*n*=6, 12%) such as lexical diversity. Only one clinician reported frequent or routine use of software such as Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2018) to analyse

discourse samples.

Barriers to discourse assessment and treatment

Participants were asked to identify their perceived barriers to discourse assessment and intervention from a list of evidence-informed options. Free text response options were also provided for clinicians to describe additional barriers and facilitators experienced in their practice. The paucity of discourse specific clinical guidelines, standardised discourse assessments, and evidence-based intervention approaches was each identified by 21 clinicians (58%) as barriers to the assessment and treatment of discourse skills in this population. A similar proportion of respondents indicated the lack of normative discourse data to interpret assessment findings (*n*=18, 51%) and motivate intervention planning (*n*=17, 46%), as well as insufficient time to assess and analyse discourse (51%), as additional barriers. Less than half of participants indicated that their clients' comorbid cognitive impairments were barriers to discourse assessment (*n*=12, 34%) and intervention (*n*=16, 46%), as were other assessment and treatment priorities that competed for clinical time (*n*=13, 37%).

Beliefs, knowledge, and confidence in managing discourse in paediatric ABI

Using Likert scales to rate responses, most clinicians agreed that discourse-level language was a valuable component in clinical assessment (*n*=35, 98%), particularly an assessment of skills across multiple genres (*n*=32, 90%). Despite this, fewer than two-thirds of clinicians (*n*=23, 64%) agreed that they were confident in eliciting discourse samples, and only 14 (38%) agreed they were confident in the analysis and interpretation of assessment data. Half of the respondents (*n*=18, 50%) agreed that they were aware of how discourse assessment guides intervention planning, with a similar proportion (*n*=19, 54%) agreeing that discourse intervention was successful.

Theory and literature in clinical decision-making

Less than 20% of clinicians referred to specific theoretical models or frameworks that guided their clinical decision-making. Seven clinicians (19%) referred to Stein and Glenn's (1979) Story Grammar, followed by MacDonald's (2017) Model of Cognitive Communication Competence (*n*=4, 11%), the World Health Organization International Classification of Functioning, Disability and Health (WHO ICF) (*n*=3, 8%; World Health Organization, 2007), Baddeley and Hitch's (1974) memory model and theories of social-cognitive demand (e.g. Byom & Turkstra, 2012; both *n*=2, 6%). In terms of the empirical literature, three respondents (8%) referred to studies in adult ABI related to discourse assessment (e.g. Coelho, 2007), communication partner training (*n*=2, 6%; Togher et al., 2013), and use of behavioural and social interventions (*n*=1, 3%; Ylvisaker, Turkstra, & Coelho, 2005). Two clinicians (6%) referred to juvenile justice literature (Snow & Powell, 2007), and one clinician (3%) identified work in the area of cognition and neuropsychology (Cicerone, Levin, Malec, Stuss, & Whyte, 2006).

FIGURE 4 HERE

Priorities for future research

In line with components of EBP, most clinicians (*n*=30, 84%) identified treatment efficacy studies to be the highest priority for future research, followed by the development of standardised discourse assessments (*n*=24, 68%), normative data (*n*=20, 55%), and exploration of the influence of client factors on discourse outcomes (*n*=19, 52%). Client factors identified related, in particular, to psychosocial (*n*=17, 48%) and cognitive (*n*=16, 45%)

considerations.

Discussion

This study explored how SLPs currently assess and treat discourse-level language difficulties in children and adolescents with ABI. When interpreting the results of this survey, it is important to consider the country of practice, as half of the responses received were from clinicians in Australia and New Zealand, with the remaining from the USA, Canada, UK and Asia, reflecting a likely variability in models of service delivery. Most respondents had considerable experience in paediatric ABI, which is consistent with this being a specialised area of clinical practice (Frith et al., 2014; Turkstra et al., 2015). Primary and secondary-school age clients were the most frequent group seen by SLPs. This is consistent with the frequent incidence of moderate to severe ABI in later childhood and into adolescence (Araki, Yokota, & Morita, 2017), when those with ABI may not be identified for services until the academic, social, and environmental demands on diminished communication skills become less manageable (MacDonald, 2017). The wide age range of clients seen by respondents underscores the importance of understanding how to best identify and manage discourse impairments across childhood and adolescence.

Discourse assessment practices in paediatric ABI

Current published recommendations were generally reflected in respondents' assessment practices and sentiments towards assessing discourse skills. The proportion of clinicians that reported frequent use of omnibus standardised language assessments was smaller than those reported in previous survey studies (Frank et al., 1997; Frith et al., 2014). This may be evidence of enhanced awareness of the value of discourse assessment and/or the limited ecological validity and sensitivity of these batteries to CCDs. Some respondents specifically identified standardised language assessments that were not referenced in published guidelines, such as the TNL (Gillam & Pearson, 2004) and the RBS (Renfrew, 2010), alongside recommended batteries such as the PTBI (Hotz et al., 2009) and the CELF-4 (Semel et al., 2003). While these standardised assessments assess lexical and grammatical language features alone or are limited to a single genre (predominantly narrative), they may remain a frequent choice for clinicians due to their clear guidelines, availability of normative data, and translation to therapy goals (Coelho et al., 2005). Almost two-thirds of clinicians reported routine use of less formal or non-standardised discourse tasks, which suggests that SLPs acknowledge the value of these assessments and may be consulting the broader discourse literature to inform assessment planning. Despite this, only a small proportion of respondents described specific use of published protocols or observational tools or assessment that covered a range of genres. The respondents' routine assessment of discourse in conversation is consistent with their preference for informal observation and behavioural checklists, which enable profiling of verbal and non-verbal pragmatic behaviours in conversation context (such as the LCQ, Douglas, 2010; and the Protocole Montr,eal d',evaluation de la communication [D-MEC]; Joanette, Ska, & C◊te, 2004). The routine elicitation of procedural discourse was unexpected given the lack of literature on this genre in paediatric ABI, although procedures are utilised in aphasia (Pritchard, Dipper, Morgan, & Cocks, 2015) and described in educational resources relating to literacy development (Ministry of Education Western Australia, 2013). The relative infrequency of narrative assessment was unexpected given its dominance in the literature related to paediatric ABI (Chapman, 1992, 1997) and discourse development more broadly (e.g. Karlsen et al., 2021; Stein & Glenn, 1979; Suggate et al., 2018). This could reflect that the majority of clinicians reported frequently servicing secondary school-age children. That being said, respondents reported infrequent assessment of expository and persuasive discourse genres, which was also surprising given these more complex genres are increasingly prevalent across academic and social contexts in the secondary school years and that clients'

current age was a routine consideration in assessment planning (Lundine & Hall, 2020; Nippold et al., 2008).

These results may reflect limited awareness of published literature that guides the elicitation and analysis of these genres (e.g. Heilmann & Malone, 2014) or be due to other established barriers such as time or training (Westerveld & Claessen, 2014). Since this survey was conducted, additional protocols have been published to guide discourse assessment (e.g. Heilmann et al., 2020; Hill et al., 2021), and our findings suggest that efforts to raise awareness of these protocols may facilitate their increased use in practice. With regards to discourse analysis, findings were in keeping with current recommendations to profile word to whole-text language features (Coelho et al., 2005; Lundine & Hall, 2020). The dominance of text-level structural measures is consistent with the frequency with which speakers with CCDs present with difficulties in text organisation and the tendency for clinicians to use informal or observational checklists that tend that focus on the use of complex language in context (i.e. pragmatics) (Coelho, 2007). Only one clinician reported using language analysis software, which reflects sampling practices and the likely need for training in the broader paediatric literature (Westerveld & Claessen, 2014).

Discourse treatment practices

Clinicians identified no single preferred approach to discourse intervention in this population, highlighting variability in clinical practice. This is consistent with the uncertainty reported by participants in this study regarding how best to treat discourse skills and how discourse assessment guides intervention planning. Those approaches that were most frequently implemented by clinicians are explicitly described in current guidelines for CCDs in paediatric ABI. For instance, CASLPO (2018) and Morgan et al. (2017) refer to cognitive approaches, counselling and education, and social skills and communication partner training.

Approaches incorporating language-based targets that are supported in the broader paediatric literature, such as oral narrative intervention (e.g. Glisson et al., 2019), were less frequently used despite also being identified as a treatment option for clients with ABI (Cannizzaro & Coelho, 2002; Coelho, 2007). Generally, clinicians' treatment practices reflect the need to scaffold impaired cognition to support discourse-level language production, which differs from direct language-based therapies utilised with language delayed or disordered children (e.g. Glisson et al., 2019). Our results may relate to the demographic of the majority of clinicians' caseloads being secondary school age, as language-based discourse interventions, such as oral narrative approaches, are typically supported for primary school-age children. This finding could also reflect clinicians' preference for observational and behavioural checklists to assess discourse-level language skills, which would best inform behaviour-based conversational and social skills interventions over direct language-based approaches that are not currently supported for CCDs in paediatric brain injury (CASLPO, 2018; Morgan et al., 2017). Overall, the results provide emerging evidence that guidelines are translated into clinical practice in paediatric ABI. The use of the approaches reported by clinicians to target discourse level language remains, however, problematic as there is no empirical evidence available for these approaches to support working with discourse in this population.

Considering client factors

In adherence to current guidelines, a range of client factors was routinely considered in assessment and treatment planning. Given the impact of ABI on both discourse and cognitive development, the routine consideration of the client's age at injury and separately at assessment reflects an important aspect of clinical decision-making in the selection of appropriate assessment and treatment approaches. In addition, having attention paid to cognitive, physical, and injury-related factors reinforces an established knowledge of the relationship between the extent of the injury and cognitive impairment and their overall influence on communication outcomes and their

management (Meulenbroek et al., 2019; Sohlberg et al., 2019; Turkstra et al., 2015). In contrast, the less frequent consideration of education, culture, language, and the client's daily communication contexts, is inconsistent with current guidelines (Morgan et al., 2017; Turkstra et al., 2005).

Limitations

Due to focusing on a specific clinical population, the sample size of this study was smaller than previous survey studies (Frith et al., 2014; Westerveld & Claessen, 2014). The study outcomes were therefore limited to a descriptive analysis of responses. Surveying a larger number of participants would allow for statistical analysis of relationships between assessment and treatment patterns and provide insight into clinical decision-making processes in this population. Most survey questions asked clinicians to rate the frequency of use or consideration of a predetermined list of tools, approaches, or factors in assessment and treatment planning informed by existing theory and literature. Multiple choice responses were chosen to enhance the feasibility and efficiency of survey completion, and to be consistent with similar studies (e.g. e.g., Frith et al., 2014) yet deeper insight into practice patterns may have been obtained by relying more heavily on free text responses. This would be an important consideration for future survey studies.

Clinical implications and future directions

This study has described current assessment and treatment practices for discourse-level language in paediatric ABI. The results have implications for the dissemination and direction of future research. The findings indicate the need for enhanced awareness of existing protocols that can guide elicitation and analysis of discourse skills in this population and enhance consistency in clinical practice. One critical way to progress an increased awareness among clinical staff is by incorporating relevant literature into accessible clinical guidelines for this population. Collaborative efforts between clinicians and researchers can be directed towards reducing barriers associated with discourse assessment such as time and training and interpretation of results in light of client-specific factors. This would be further assisted by a deeper understanding of how current assessment and treatment practices are influenced by client characteristics such as age (current and at injury) and injury-related factors. Future assessment practices would then be informed by a more detailed understanding of how discourse assessment can guide individualised intervention planning, and subsequently inform re-assessment of discourse skills to track change in therapy. The incorporation of discourse-level outcome measurement for those interventions that are routinely used by SLPs would be a promising starting point, along with research to explore the effectiveness of treatments that are routinely adopted in other clinical populations (e.g. DLD, adult ABI). This would lead to the regular updating and monitoring of detailed clinical recommendations that provide specific guidance for discourse-level language. Building the evidence base for discourse interventions in this population will then underpin efforts to translate research to clinical practice.

Conclusion

Guidelines exist to support the assessment and treatment of CCDs in this population, yet there is limited information available related to the management of discourse-level language. The results of this study suggest that clinical guidelines are generally reflected in current practice; however, approaches to assessment and treatment are highly variable and practice patterns are not aligned with supporting empirical evidence for discourse in paediatric ABI. A focus on both raising awareness of available discourse assessment protocols and obtaining normative data is needed to increase consistency in assessment practice. Equally, treatment efficacy research for discourse-level language intervention in paediatric ABI will assist in the ongoing development of clinical

guidelines to inform the management of discourse skills and promote positive communication outcomes for this population.

Declaration of interest
No potential conflict of interest was reported by the authors.

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Supplementary material
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Table 1

Respondents' demographic information

Question	Responses	*n* of responses (*N* = 77)	% of responses
Country/Region	Australia / New Zealand	41	53
	USA/Canada	17	22
	UK	12	16
	Asia Pacific	7	9
Years of experience	< 3	13	17
	4 to 10	16	21
	11 to 15	34	44
	>15 years	14	18
Clinical setting (includes combined clinical settings)	Inpatient (acute)	16	21
	Inpatient (rehab)	24	31
	Community outpatient	31	40
	Private practice	21	27
	School-based	11	14
	Home-based	3	4
	Other	4	5
Geographical setting (includes combined locations)	Urban/metropolitan	54	70
	Regional	17	22
	Rural	5	6
	Remote	1	1
Age of client with ABI (includes combinations)	Infant (0 to 2y)	25	32

	Young child (3 to 5y)	34	44
	School-age Primary (6 to 12y)	45	58
	School-age Secondary (13 to 18y)	49	64

Note: NZ = New Zealand; USA = United States of America; UK = United Kingdom.

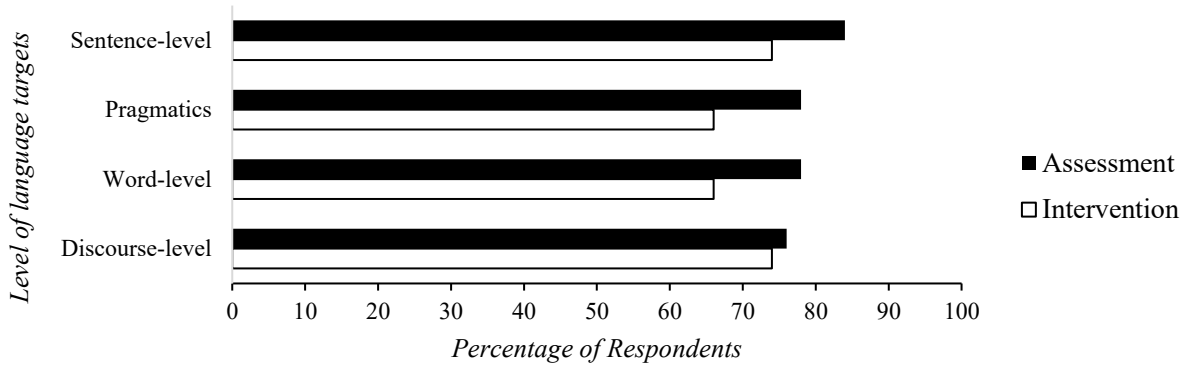

Figure 1. Levels of language identified as frequent/routine targets of assessment versus intervention.

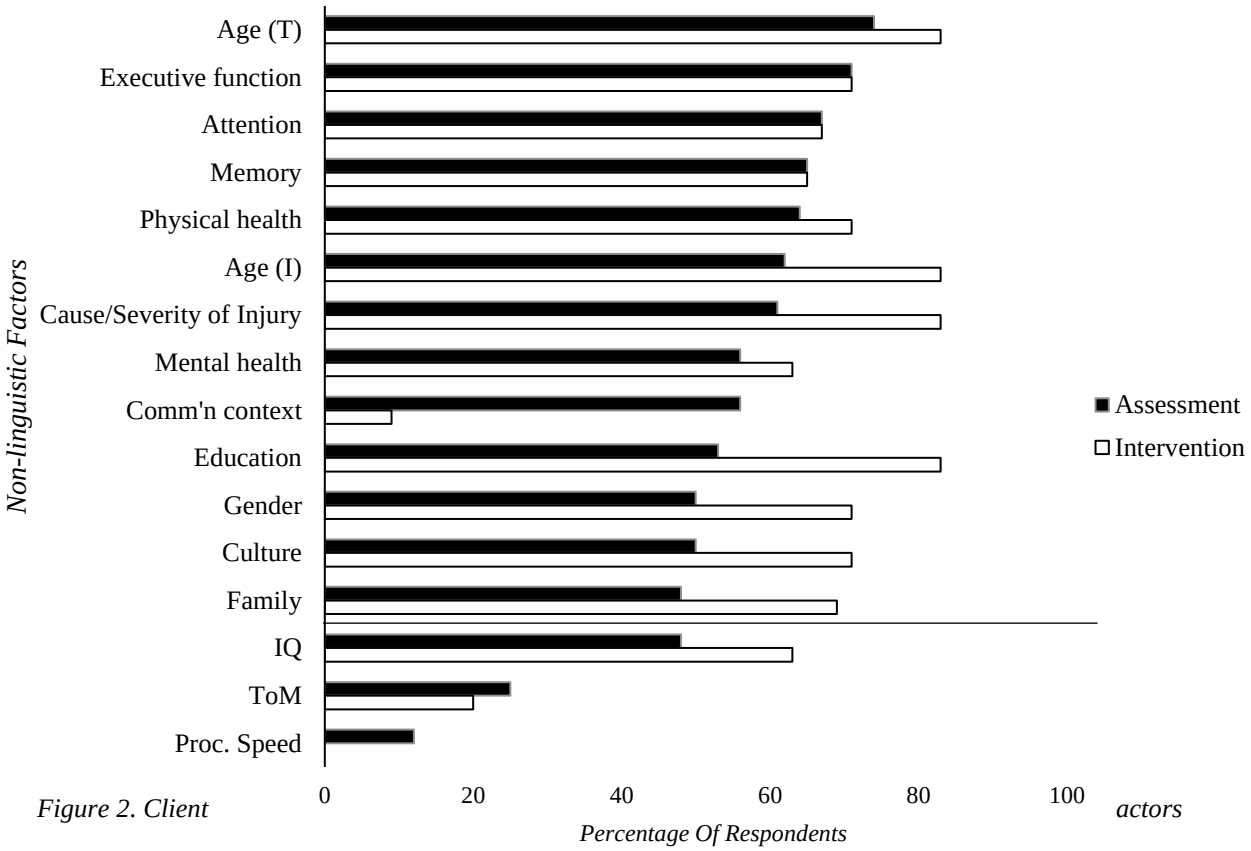

Figure 2. Client actors frequently/routinely considered in assessment versus intervention planning. Note: Age (I) refers to age at injury; Age (T) refers to age at test.

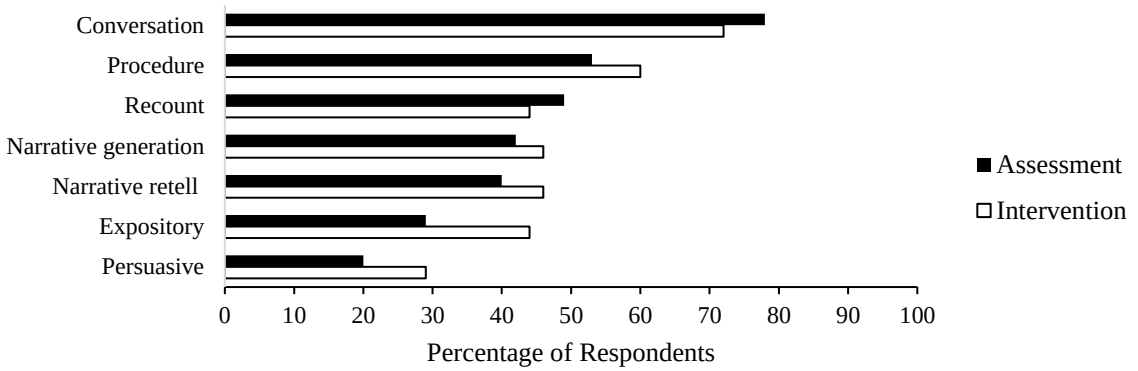

Figure 3. Genre contexts of assessment and intervention

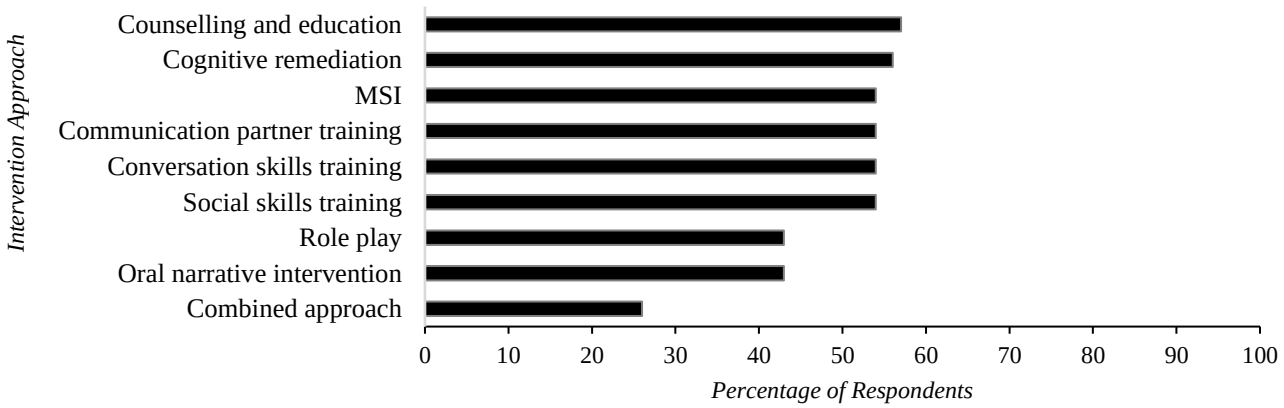

Figure 4. Intervention approaches implemented by SLPs for discourse in paediatric ABI