

Clinical linguistics

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CLINICAL LINGUISTICS

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INTRODUCTION

Clinical linguistics involves the study of how language and communication may be impaired. In its narrowest and most applied sense it focuses on the use of linguistics to describe, analyse, assess, diagnose and treat communication disorders (e.g. Crystal, 1981). However, it is also commonly taken to include the study of how clinical language data can throw light on the nature, development and use of neuro-typical language, and thus to contribute to the advancement of linguistic theory (Ball et al., 2008). Indeed, it is sometimes only through the analysis of language breakdown that we become aware of hitherto unknown features of language structure and function, and this is part of the reason why the discipline has grown considerably over the last few decades. More recently, Cummings (2008) adopts a definition of clinical linguistics to include “disorders which result from disruption to the wider processes of language transmission and reception and disorders of the vegetative functions that are an evolutionary precursor to language” (p.1). This definition views clinical linguistics not only as an academic discipline but also as being part of clinical practice, which covers disorders that speech and language therapists encounter in different clinical contexts.

The scope of clinical linguistics is broad, to say the least. No level of language organization from phonetics to discourse is immune to impairment, with problems manifested in both the production and comprehension of spoken, written and signed language across the human

lifespan. The subject matter of clinical linguistics is thus amenable to study through virtually all branches of linguistics, and various sub-specialisms have been accorded their own distinct labels such as ‘clinical phonetics’, ‘clinical phonology’, ‘clinical pragmatics’ and ‘clinical sociolinguistics’. The fact that communication disorders may be manifested linguistically does not necessarily mean that they will always have a specifically linguistic cause, and thus if we are interested in explaining them fully, we are inevitably drawn beyond linguistics to its interfaces with other domains such as physiology, neurology, general cognition and social interaction. One might thus define clinical linguistics as ‘the study of communication disorders, with specific emphasis on their linguistic aspects (while not forgetting how these interact with other domains)’. This cross-disciplinary perspective is a key feature of clinical linguistics. Such a breadth of focus notwithstanding, establishing a clear causal link between behavioural symptoms and underlying deficits is not always easy. For example, there is no clear consensus regarding whether developmental language disorder (DLD, a condition found in otherwise healthy children who have problems with speech and language) is best attributed to underlying deficits in auditory perception, general cognitive processing, a dedicated language module or some combination of all of these (see below for further discussion). Nevertheless, it is still possible to characterise the *linguistic* features of DLD precisely enough to be able to design assessments and remedial programmes. It is this key grounding in linguistics - and in particular the focus on linguistic *behaviour* - which distinguishes clinical linguistics from related fields such as neurolinguistics and speech and language pathology, which accord primary importance to the underlying causes of communication disorders. This important distinction was first outlined by Crystal (1980) in terms of the ‘behavioural’ as opposed to the ‘medical’ model of language pathology.

HISTORICAL PERSPECTIVES

Our understanding of communication impairment has come a long way in the last hundred years. As late as the 1920s, Scripture (1923) was still attributing a particular variety of lisping to neurosis with a recommendation that it be treated using “[a]rsenic, quinine, strychnine, and other tonics, cold rubs, lukewarm or cold half-baths, sprays, moist packs, electrotherapy, massage, change of climate, and sea baths” (p.185). A major milestone in putting the study and treatment of communication disorders on a more scientific footing, based on the discipline of linguistics, was Roman Jakobson’s *Kindersprache, Aphasie und allgemeine Lautgesetze* (Jakobson, 1941) (later published in English as *Child Language, Aphasia and Phonological Universals* (Jakobson, 1968)) which emphasized the importance of studying systematic patterns of similarity and contrast in clinical language data, and relating these to linguistic theory. The assumption that atypical speech or language, however deviant, must still be systematic and rule-driven - and thus amenable to analysis - has remained an article of faith among clinical linguists ever since Jakobson’s work became more widely known in the 1970s.

Jakobson’s influence is evident in publications from the early 1970s particularly in the USA, UK and Scandinavia, though the development of clinical linguistics as a branch of applied linguistics was given a boost in the UK in particular by the publication of the *Quirk Report* (1972) which recommended that the training of speech therapists - whose exposure to linguistics had hitherto been largely restricted to phonetics - should be extended to embrace all levels of language organization, and that “the would-be practitioner of therapy, whether of speech or hearing, of

reading or of writing must in future regard language as the central core of his basic discipline” (6.60). Gradually from the mid 1970s, former two-year diploma courses were superseded by 3–4-year bachelor's degrees in speech and language therapy at a number of universities across the UK, which resulted in the emergence of a new generation of speech and language therapists who were not only more linguistically knowledgeable than their predecessors, but also had at their disposal an increasingly extensive linguistic toolkit for use in assessment, diagnosis and remediation. The linguists who were recruited to teach these students in turn became more knowledgeable about communication impairments, which in many cases influenced the subsequent direction of their linguistic research. The main driving force behind these developments in the 1970s and 1980s was David Crystal, who set up the first degree course in Linguistics and Language Pathology at Reading University in 1976. With his colleagues, Crystal developed an influential range of analytical procedures for ‘profiling’ the phonological, grammatical, semantic and prosodic characteristics of developmental and acquired communication disorders (Crystal et al., 1976, Crystal, 1982). Versions of *LARSP (Language Assessment, Remediation and Screening Procedure)*, the most widely used, are now available in many different languages (Ball, Crystal & Fletcher, 2012; Ball, Fletcher & Crystal 2019). A further milestone was the publication of *Clinical Linguistics* (Crystal, 1981), which consolidated and defined the field. Although the term ‘clinical linguistics’ had appeared in print earlier (e.g. Baltaxe, 1976), Crystal’s book had accorded the term official status, as it were, and clinical linguistics became more widely accepted as a distinct subdiscipline of linguistics.

The first issue of the journal *Clinical Linguistics and Phonetics* (CLP) appeared in 1987, inviting submissions “either applying linguistic/phonetic analytic techniques to clinical problems, or showing how clinical data contribute to theoretical issues in linguistics/phonetics” (Ball and Kent, 1987: 2), thus acknowledging the reciprocal relationship between language pathology and linguistic theory. Growing awareness of the inability of the International Phonetic Alphabet (IPA) to capture a whole range of articulatory distinctions found in impaired speech led to the development of a supplementary set of phonetic symbols called ‘ExtIPA’ (extended IPA) (Duckworth et al., 1990) which were officially recognised by the *International Phonetic Association* and incorporated in its *Handbook* (International Phonetic Association, 1999). Various revision to the ExtIPA have been published, the latest being in 2018 (Ball et al., 2018). CLP became the official journal of the International *Clinical Phonetics and Linguistics Association* (ICPLA) (www.icpla.info) which was founded in 1990 and has since raised the global profile of clinical linguistics through its conferences around the world.

CRITICAL ISSUES AND TOPICS IN CLINICAL LINGUISTICS

Given the broad scope of clinical linguistics as a subdiscipline of linguistics, the topics and critical issues covered within clinical linguistics include phonetics and phonology, morphology, syntax, semantics, pragmatics and discourse.

Phonetics and phonology

The phonetic characteristics of atypical speech may be captured using **speech instrumentation** and **phonetic transcription**, both separately and in combination. Several instrumental methods

exist. Electropalatography, EMA (Electro-Magnetic Articulography) and ultrasound have each been used to explore aspects of articulator activity: tongue, lip and jaw movements and coordination in different speech disorders (Cleland, Scobie and Wrench, 2015; Lee, Bessell and Gibbon, 2019). Atypical patterns of nasal resonance, airflow and pressure, as encountered in speakers with neuromuscular difficulties associated with dysarthria and in speakers with structural abnormalities linked to a history of cleft palate have been investigated using nasometry and aerodynamic techniques (Whitehill and Lee, 2008). Recently, studies have emerged for less studied languages, providing normative data using nasometry which enables cross-linguistic comparisons in populations with and without cleft palate (e.g. Kim et al., 2016, for Mandarin; Martins Sampaio-Teixeira et al., 2019 for Brazilian Portuguese). Laryngography and videofluoroscopy allow the gathering of detailed and diverse information about vocal fold activity (Abberton and Fourcin, 1997) and spectrography has a long history of application to a wide range of aspects of atypical speech production from an acoustic perspective (Kent, 2003; Lundeborg et al., 2015).

Clinical phonetic transcription can be *broad*, when used to characterise a speaker's segmental or phonemic sound systems, and *narrow* when used to capture the fine phonetic detail of speech output in segmental and prosodic domains, which is often required when dealing with individuals with cleft palate (Harding & Grunwell, 1996), those with hearing impairment (Teoh & Chin, 2009) or those with diverse linguistic backgrounds (McLeod et al., 2017).

There are a range of challenges and pitfalls for anyone attempting to make a phonetic transcription of radically atypical speech production (Howard and Heselwood, 2002), and objections have often been raised regarding its validity and reliability. Some of these objections have been met by the development of consensus methods where a final version is reached through discussion among two or more transcribers (Shriberg et al., 1984) and through careful critiques of the flawed methodological approaches which have sometimes been used to challenge the value of transcription (e.g. Cucchiaroni, 1996). Recently, attempts have been made to use computerised tools to compare phonetic transcriptions, and some of these are freely available to use (e.g. Bailey et al., 2021; <https://aptct.auburn.edu>)

Compared with clinical phonetics, which has a pedigree dating back at least as far as Aristotle (Eldridge, 1967), clinical phonology emerged in the 1960s and 1970s at the time when linguistic approaches generally were beginning to be applied to communication impairments. Nonetheless, it has proved a hugely influential and creative force in clinical linguistics. Early phoneme and feature-based accounts of atypical sound systems gave way in the 1980s to the application of natural phonological process analysis to atypical speech production, particularly in developmental speech difficulties, with work by Ingram (1976) in the USA and Grunwell (1981) in the UK exerting a huge influence on phonological analysis in the clinical context which still endures today (see for example, Asad et al., 2018; Mayr et al., 2021). Current clinical phonological approaches are drawn from different theoretical perspectives including optimality theory (Gierut and Morrisette, 2005), non-linear approaches (Bernhardt and Stemberger, 1998), gestural phonology (Hodson and Jardine, 2009) and cognitive/usage-based phonology (Sosa and Bybee, 2008), with accompanying debate about the status of phonological accounts of atypical speech data: are they merely extremely useful descriptive devices, or do they reflect actual

psycholinguistic processes? Phonological accounts of speech impairment have shown, crucially, that they are not necessarily the product of articulatory constraints but reflect difficulties with the organisation and use of sound segments in words.

Morpho-syntax

Compared to clinical phonetics and phonology, the body of research focusing on morpho-syntactic issues in clinical data is smaller though it has been steadily growing over the last couple of decades to include a wide range of languages and phenomena. One of the issues that has been debated is the extent to which morpho-syntactic impairments result from a deficit in linguistic knowledge, or from processing limitations, therefore inextricably linked with physiology and cognitive processes such as memory and attention. The kind of structural language deficits evident in Example 1 (e.g. omission of obligatory clause and phrase elements and problems with agreement and pronominal case marking), spoken by a 51-year-old person with agrammatic aphasia, are seen by some as the direct consequence of damage to a language module, in line with an innate modularity view (Clahsen, 2008), whereas others attempt to explain such deficits as a secondary consequence of processing limitations (Leonard, 2014)

Example 1

and then yeah . well . waste of time . cos mother . here everyday . sit down you know .
mm . go and . clean . forget about it . and then er . me said well rubbish that . rubbish . er
. doctor come for me ['.' = a short pause]

(from Perkins and Varley, 1996)

Similar debates have also been going on in research into Developmental Language Disorder (DLD), formerly referred to as Specific Language Impairment (SLI), where questions have been asked as to whether the language deficits seen in children with DLD result from lack of linguistic knowledge, or whether the language deficits result from non-linguistic/processing factors and the role played by the developmental process itself. Some argue, for example, that the purported modular independence of linguistic and cognitive functions found in adults is not present - at least to such a large extent - in infants and is largely a consequence of maturation. Thus early difficulties of non-linguistic nature may impact on other processing areas including language, setting in train a complex chain of compensatory adaptations with knock-on effects for the whole organism (Karmiloff-Smith, 1998). The initial trigger may be entirely unrelated to language - for example, a problem with auditory processing or procedural memory (Tallal and Piercy, 1973; Ullman and Pierpont, 2005).

Semantics

Clinical interest in semantics has focused mainly on gaps in the lexicon, problems with lexical access (or 'word finding') and thematic/semantic relations. The first is illustrated by the fact that it is not uncommon to find individuals with aphasia who are unable to name members of specific semantic categories such as vegetables, fruit, body parts and tools (Caramazza, 2000), although it is also common for individuals with aphasia to retrieve common words (Schuchard and Middleton, 2018). This is sometimes seen as the direct consequence of a lack of conceptual

knowledge, rather than as a purely semantic problem. In many cases, though, there is clear conceptual understanding but an inability to retrieve a word and link it to its referent, as in Example 2 from a conversation involving P who has anomic aphasia.

Example 2

- T can you tell me what you are wearing on your wrist? *[pointing to his watch]*
- P it's er - *[sighs]* what I put on my hair on . er not my hair . er - *[tuts]* put it right er .
[sighs] dear dear dear get it . I'll get it in a minute *[looks at watch and shakes his head]* it's not going through.

The issues that have been discussed in the literature include how theoretical models of lexical access can be applied to clinical data (Schwartz, Dell, Martin, Gahl, and Sobel, 2006). Within the literature on developmental language disorders, topics have revolved around the underlying nature of word finding difficulties such as phonological and semantic representations, the size and depth of the lexicon and how lexical skills are acquired compared to typically developing peers.

Pragmatics and discourse

Pragmatics and discourse analysis have proved particularly helpful in characterising the communication difficulties manifested in conditions such as autism spectrum disorders, traumatic brain injury (TBI) and right hemisphere brain damage (RHD), whose underlying causes are usually seen as being primarily neurological and cognitive, rather than linguistic. People with autism, for example, can find it difficult to work out precisely what others mean by what they say, as in example 3 below:

Example 3

Adult: can you turn the page over?

Child with autism: yes (*makes no move to turn the page*)

and individuals with TBI are known for wandering off topic, as in example 4:

Example 4

I have got faults and . my biggest fault is . I do enjoy sport . it's something that I've always done . I've done it all my life . I've nothing but respect for my mother and father and . my sister . and basically sir . I've only come to this conclusion this last two months . and . as far as I'm concerned . my sister doesn't exist

(from Perkins et al., 1995: 305)

The challenge for clinical linguists is to explain such behaviours in ways which are both theoretically coherent and practically useful. Extensive use has been made of constructs and concepts from pragmatic theories such as Speech Act Theory, Gricean Conversational Implicature and Relevance Theory to characterise pragmatically anomalous communication, but although these provide a useful set of descriptive labels for assessment purposes (e.g. we could describe Example 3 in terms of a lack of illocutionary uptake on the part of the child or a failure to derive the adult's intended implicature), in explanatory terms we are still only scratching the surface. For example, how do we differentiate between symptoms and causes for remedial purposes?

An alternative, non-reductionist approach is to see pragmatic and discourse impairment as being located in the social space constituted by communicating dyads and groups, rather than being solely attributable to an underlying deficit within an individual. A number of studies using Conversation Analysis, for example, have shown that people with neurological and/or cognitive deficits who have been diagnosed with pragmatic impairment on the basis of formal assessments in laboratory conditions are still, nonetheless, capable of considerable pragmatic sophistication outside the constraints of the testing situation (e.g. Schegloff, 2003). A related line of research, which gives equal weight to the contribution of the conversational partner, has demonstrated that in some cases, the effect of some supposed deficit within an individual may be exacerbated - or alternatively 'neutralised' - at the level of the dyad by the actions of the interlocutor (Muskett et al., 2010).

One way of integrating these various different perspectives is to see pragmatic/discourse impairment not as some unitary condition uniquely caused by an underlying neurological or cognitive deficit within the individual, nor as being a purely socially construct, but instead as an epiphenomenal consequence of all of these. The so-called 'emergentist' account sees pragmatic and discourse problems as a by-product of the way in which neurological, cognitive, linguistic and even sensorimotor difficulties play out in dyadic or group interaction (Perkins, 2008). Such an approach also acknowledges the fact that pragmatic impairment is not a unitary condition. Indeed, the label has been applied to a wide array of disparate behaviours in addition to those already illustrated, such as problems with fluency, prosody, lexical selection, cohesion, eye contact, turn taking, stylistic variation and sociolinguistic sensitivity (Perkins, 2007).

CURRENT CONTRIBUTIONS AND RESEARCH

Within the field of clinical phonetics and phonology, current contributions include work on how to use a psycholinguistic framework for the diagnosis and treatment of speech disorders.

Terband, Maasen and Mas (2019) propose a process-oriented approach which entails a distinction between developmental delay and developmental disorder. The approach assumes a very detailed analysis of speech production and perception, applying concepts from phonetics and phonology, such as phonological representations and phonotactic rules. These process-oriented approaches have been used successfully in recent studies (Iuzzini-Seigel et al., 2015; Terband et al., 2018; Geronikou and Rees, 2016).

The last couple of decades have also seen a significant increase in research on phonological profiles in typically and atypically developing children speaking different languages. For example, Putonghua (a standard spoken form of modern Mandarin Chinese) (Wu et al., 2020), Vietnamese (e et al., 2021). Other recent research developments include the creation of speech corpora of individuals with speech/language/communication disorders, which are invaluable resources for education and research. The DisorderedSPeechBank is a venture initiated by Nicole Müller and Martin Ball in 2015. The project was later renamed DELAD, (Database Enterprise for Language And speech Disorders), is currently in progress with researchers currently working on a number of languages including Catalan, Croatian, Dutch, English, Finnish, French, German, Irish, Norwegian, Polish, Spanish, Swedish, and Welsh (Lee et al., 2021).

Furthermore, while phonological analyses have traditionally focused on single word production, research over the past 15 years has pointed to the value of examining the phonetics and phonology of longer utterances and in particular how connected speech processes and the organisation of words into longer prosodic domains also demonstrates consistent patterns and strategies which can be directly related to speaker intelligibility, where a speaker's intelligibility in single words may differ radically from their intelligibility in longer utterances (Howard, 2007). Recently the Connected Speech Transcription Protocol (CoST-P) was developed and trialled on the transcription of speech of children with childhood apraxia of speech (Barrett et al., 2020). Although preliminary in nature, the protocol is promising and as it provides information on features unique to connected speech, such as the presence of inappropriate inter-word segregation and juncture but future research is needed to determine whether features such as juncture may be beneficial in the assessment and diagnoses of clinical cases.

Regarding current research into morpho-syntax and its clinical linguistic applications, the current state of affairs seems to be one of emerging new data from less studied languages and perhaps less focus on specific theoretical approaches and more emphasis and acknowledgement of the fact that impairments such as aphasia and DLD have non-linguistic underlying mechanisms. Although aphasia and DLD have attracted the most attention from clinical linguists because of the supposedly specifically linguistic nature of the impairment, they are in fact frequently accompanied by non-linguistic problems, and it would probably be more accurate to regard them as one end of a continuum of linguistic-cognitive disorders. For example, there has been a thriving body of research into deficits in phonological short-term phonological memory being one of the underlying mechanisms of the language difficulties of children with DLD and a possible clinical marker (Gathercole and Baddeley, 1990; Graf-Estes et al., 2007; Taha et al.,

2021). Furthermore, a growing body of research has also been documenting non-linguistic deficits in aphasia and correlations between linguistic and non-linguistic deficits (Gonzalez et al., 2020).

Recent research in the domain of pragmatics and discourse has been building further on the seminal work by Herbert Paul Grice, by focusing on communicative intentions of the speaker during communication where communicative intentions are situated in a model of mental state attributions. Using such a framework allows one to explain pragmatic impairments as limitations in the ability to attribute mental states (mentalising) essential for effective communication (Cummings, 2021). Mentalizing skills can be targeted in interventions and there is a growing body of evidence (Parsons et al., 2017) about the possible effectiveness of such interventions in children with autism spectrum disorder.

MAIN RESEARCH METHODS

The linguistics tradition

Because of its inherent interdisciplinarity, clinical linguistics embraces a wide range of research methods including the linguistic tradition, social and medical sciences. The core of the discipline, with its roots in the earlier work of Jakobson and Crystal, has been the qualitative research paradigms of mainstream linguistics. One strong tradition, typified by Crystal's language profiles (Crystal, 1982), is that of linguistic fieldwork and language description. In the case of clinical linguistics, the 'field' is typically the speech and language therapy clinic/or another clinical setting. In this tradition, the emphasis is on naturalistic language data, which is audio or video recorded and then transcribed and analysed. Analysis involves the identification of systematic

patterns in the data, making use of either predetermined or ad hoc categories as appropriate. In both cases, but particularly in the latter, hypotheses are commonly reached inductively, then subsequently tested and revised by returning to the data iteratively. Because clinical intervention usually focuses on the individual, there has been a strong tradition of individual case studies. However, larger diagnostic groups can also be identified based on their linguistic characteristics, and an increasing number of clinical language corpora are available in repositories such as CHILDES and TalkBank (<http://talkbank.org/>), as are increasingly sophisticated computational tools for their analysis, such as CLAN (MacWhinney, 2000).

In addition to the data-driven, naturalistic corpus approach, which focuses on language behaviour and its products, the theory-driven generative perspective on language as knowledge is also well represented in clinical linguistics (for an overview, see Clahsen, 2008). Over the years, various categories and concepts from generative grammar have been used as explanatory tools to account for atypical language patterns. For example, the difficulties experienced by people with Broca's aphasia in understanding passive sentences have been described by referring to the deletion of movement traces (Grodzinsky, 2000) under what is known as the Trace Deletion Hypothesis. The differences in the production of wh-questions and yes/no questions by people with aphasia speaking different languages has been explained by reference to the Tree Pruning Hypothesis (Friedmann, 2002). Difficulties with tense marking in children with developmental language disorder have been explained by referring to the Optional Infinitive hypothesis (Rice et al., 1995).

Complementing the focus on the treatment of individuals, clinicians also need to be able to allocate each individual to one or more larger diagnostic groups whose nature and characteristics are established using the methods of the social sciences, in particular psychology. These typically involve either small or large group studies using both clinical populations and neuro-typical controls in which hypotheses are tested through experimentation and the results analysed using statistical analysis.

More importantly, as the need for evidence-based speech and language therapy practice has increased, so has the focus shifted to creating more robust and higher quality evidence from speech, language and communication studies where experimental designs are higher up the evidence pyramid than individual case studies (Murad et al., 2016). Thus clinical linguistics also interacts with medical and health sciences. Furthermore, underlying anatomical, physiological and neurological ‘causes’ of speech, language and communication disorders have become increasingly amenable to analysis through technological advances in research methods such as neuroimaging (e.g., Friederici, 2017).

Another approach, which has been gaining ground in clinical linguistics in the past couple of decades is that of ethnography, which sees communication as an integral feature of contextualised social action. Rather than targeting underlying linguistic and cognitive deficits, analytical methods such as Conversation Analysis (Dindar, Korkiakangas, Laitila and Kärnä, 2016; Wilkinson, 2008) see communication impairment as a function of the way individuals orient to each other, and are based on fine-grained analysis of interaction, turn by turn, in usually non-contrived settings.

RECOMMENDATIONS FOR PRACTICE

Clinical linguistics has informed speech and language therapy practice since its emergence as a discipline. It has provided tools for linguistic analysis of clinical data, detailed description of the way speech/language/communication are impaired in different clinical populations and in different languages and theoretical frameworks which allow systematic data interpretation and explanation. For example, the theoretical framework of natural phonology (Stampe, 1969; 1973) has informed the assessment and clinical practice of phonological disorders. Many standardised speech, language and communication assessments have been designed based on research findings from clinical linguistics. For example, the Language Assessment, Remediation and Screening Procedure (LARSP) (Crystal et al., 1976, Crystal, 1982; Ball et al., 2012; Ball et al., 2019) has been used widely in different countries to inform clinicians about relative linguistic strengths and weaknesses and inform further assessment and treatment. The work by Susan Ebbels and colleagues on shape coding relies on clinicians using their extensive grammatical knowledge in order to select specific targets (whether that's tense marking, or noun phrases or verb phrases etc) to improve the grammatical skills of children and adolescents with developmental language disorder (Balthazar, Ebbels and Zwitserlood, 2020; Ebbels, 2014). The extensive work by Mabel Rice and colleagues on tense marking deficits found in children with DLD within domain-specific approaches to language disorders has resulted in the creation of the Test of Early Grammatical Impairment (TEGI) based on a domain-specific view of language, is a sensitive tool used in the clinical setting which allows the clinician to obtain detailed knowledge about a child's tense marking and importantly to be able to disentangle phonological from morphological problems (Rice and Wexler, 2001). Usage based approaches (domain-general) for

explaining clinical data have proven promising in the remediation of difficulties with passives in children with developmental language disorder (Riches, 2013). In summary, the literature suggests that research into clinical linguistics has gone almost hand in hand with the development of a range of assessment tools for speech/language/communication difficulties, with perhaps a bit of a lag in applying research findings to inform clinical interventions. Thus there is still plenty of scope in the field to develop and trial intervention protocols informed by current research.

FUTURE DIRECTIONS

Clinical linguistics has grown extensively as a discipline over the last few decades. While focusing primarily on the linguistic and phonetic characteristics of communication disorders, it is typified by an awareness of other inter-linked areas of processing such as neurology, cognition, social interaction. This inherent multidisciplinary nature is also evident in the variety of research methods used including linguistic, social and medical sciences. Among its many achievements, clinical linguistics has demonstrated that it is possible to enhance our understanding of language structure and use through an awareness of how it can go wrong.

Looking to the future, a number of sub-areas within clinical linguistics are likely to prove particularly influential in the years ahead. Work in genetics and neuroscience, aided by technological advances in brain imaging, has the potential to transform our understanding of communication disorders and the way that language is represented in the brain. Linked to this is a growing interest in focusing on the interfaces between different areas of linguistic and cognitive functioning rather than on their properties in isolation - i.e. on their *associations* rather

than their *dissociations*. This is very much in line with a recent proposal by Botting and Marshall (2017) in which they appeal to the research community to work together in amalgamating the strengths of the domain-specific and domain-general approaches to describe clinical impairment of language and communication.

A related growth area for the study of clinical populations is the way in which spoken language functions as an integral component of a multimodal signalling system together with other components such as gesture, posture and eye gaze, and the crucial role played by communication partners and the social context. Another expanding area of study which is helping to refine the distinction between universal and local properties of language is the way in which communication disorders vary across speakers of different languages, and how they may manifest differently in speakers of more than one language. Finally, corpora of disordered language have grown over the years thus affording the opportunity to understand how the same phenomena manifest in different languages informing differential diagnoses of communication disorders and intervention.

RELATED TOPICS

Neurolinguistics; Psycholinguistics; Medical communication, Grammar; Lexis, Phonetics and Phonology

FURTHER READING

- Ball, M. J., Perkins, M. R., Müller, N. and Howard, S. (eds) (2008). *Handbook of Clinical Linguistics*. Oxford: Blackwell. (The most comprehensive overview of clinical linguistics to date, with authoritative contributions from leading researchers in the field.)
- Cummings, L. (ed) (2008) *Clinical Linguistics*, Edinburgh: Edinburgh University Press. (A great collection of chapters which document the wider scope of clinical linguistics, incorporating linguistic description within speech and language therapy clinical practice.)
- Damico, J. S., Ball, M. J. and Müller, N. (eds) (2021) *The Handbook of Language and Speech Disorders*, 2nd edition. Oxford: Wiley-Blackwell. (A linguistically well-informed overview of a comprehensive range of communication disorders.)

REFERENCES

- Abberton, E. and Fourcin, A. (1997) 'Electrolaryngography', In M. J. Ball and C. Code (eds) *Instrumental Clinical Phonetics*, London: Whurr.
- Asad, A.N., Purdy, S. C., Ballard, E., Fairgray, L., and Bowen, C. (2018) 'Phonological processes in the speech of school-age children with hearing loss: Comparisons with children with normal hearing', *Journal of Communication Disorders*, 74: 10-22.
- Ball, M. J. and Kent, R. D. (1987) 'Editorial'. *Clinical Linguistics and Phonetics*, 1: 1-5.
- Ball, M. J., Perkins, M. R., Müller, N. and Howard, S. (eds) (2008) *Handbook of Clinical Linguistics*, Oxford: Blackwell.
- Ball, M. J., Crystal, D. and Fletcher, P. (eds) (2012) *Assessing Grammar: The Languages of LARSP*, Abingdon: Multilingual Matters.

- Ball, M. J., Howard, S. J. and Miller, K. (2018) 'Revisions to the extIPA chart', *Journal of the International Phonetic Association*, 48: 155-164.
- Ball, M. J., Fletcher, P. and Crystal, D. (eds) (2019) 'Grammatical Profiles: Further Languages of LARSP', Bristol: Multilingual Matters.
- Baltaxe, C. A. M. (1976) 'Clinical linguistics', *Sixth California Linguistics Association Conference Proceedings*, San Diego, CA: San Diego State University.
- Barrett, C., McCabe, P., Masso, S. and Preston, J. (2020) 'Protocol for the connected speech transcription of children with speech disorders: an example from childhood apraxia of speech', *Folia Phoniatrica et Logopaedica*, 72(2): 152–166.
- Bailey, D. J., Speights Atkins, M., Mishra, I., Li, S., Luan, Y. and Seals, C. (2021) 'An automated tool for comparing phonetic transcriptions', *Clinical Linguistics & Phonetics*, 1-20.
- Bernhardt, B. and Stemberger, J. (1998) *The Handbook of Phonological Development*, New York: Academic Press.
- Botting, N. and Marshall, C. (2017) 'Domain-specific and domain-general approaches to developmental disorders', in L.C. Centifanti and D. M. Williams (eds) *The Wiley Handbook of Developmental Psychopathology*, London: Wiley, pp.139-159
- Caramazza, A. (2000) 'The organization of conceptual knowledge in the brain', in M. S. Gazzaniga (ed) *The New Cognitive Neurosciences (Second Edition)*, Cambridge, MA: MIT Press.
- Clahsen, H. (2008) 'Chomskyan syntactic theory and language disorders', in M. J. Ball., M. R. Perkins., N. Müller and S. Howard (eds) *Handbook of Clinical Linguistics*, Oxford: Blackwell, pp. 165-182

Cleland, J., Scobbie, J. M. and Wrench, A. A. (2015) 'Using ultrasound visual feedback to treat persistent primary speech sound disorders', *Clinical Linguistics and Phonetics*, 29(8): 575–597.

Cummings, L. (2008) *Clinical Linguistics*, Edinburgh: Edinburgh University Press

---- (2021) 'Pragmatic impairment' in J. S. Damico, M. J. Ball and N. Müller (eds) *The Handbook of Language and Speech Disorders*, 2nd edition. Oxford: Wiley-Blackwell, pp. 192-208.

Crystal, D. (1980) *Introduction to Language Pathology*, London: Edward Arnold.

---- (1981) *Clinical Linguistics*, London: Whurr.

---- (1982) *Profiling Linguistic Disability*, London: Arnold.

Crystal, D., Fletcher, P. and Garman, M. (1976) *Grammatical Analysis of Language Disability*, London: Arnold.

Cucchiari, C. (1996) 'Assessing transcription agreement: methodological aspects', *Clinical Linguistics & Phonetics*, 10, 131-156.

Dindar, K., Korkiakangas, T., Laitila, A. and Kärnä, E. (2016) 'Building mutual understanding: how children with Autism Spectrum Disorder manage interactional trouble', *Journal of Interactional Research in Communication Disorders*, 7(1): 49–77

Duckworth, M., Allen, G., Hardcastle, W. and Ball, M. (1990) 'Extensions to the International Phonetic Alphabet' *Clinical Linguistics and Phonetics*, 4:273-283.

Ebbels S. (2014) 'Effectiveness of intervention for grammar in school-aged children with primary language impairments: a review of the evidence', *Child Language Teaching and Therapy*, 30(1):7-40.

Eldridge, M. (1967) *A History of the Treatment of Speech Disorders*, Edinburgh: Livingstone.

- Friederici, A. (2017). *Language in Our Brain: The Origins of a Uniquely Human Capacity*, Cambridge, MA: MIT Press
- Friedmann, N. (2002). 'Question production in agrammatism: The tree pruning hypothesis', *Brain and Language*, 80(2):160–187.
- Gathercole, S. E. and Baddeley, A. D. (1990) 'Phonological memory deficits in language disordered children: is there a causal connection?', *Journal of Memory and Language*, 29(3): 336–360
- Geronikou, E., and Rees, R. (2016) 'Psycholinguistic profiling reveals underlying impairments for Greek children with speech disorders', *Child Language Teaching and Therapy*, 32(1): 95–110.
- Gierut, J. and Morrisette, M. (2005) 'The clinical significance of optimality theory for phonological disorders', *Topics in Language Disorders*, 25: 266-280.
- Gonzalez, R., Rojas, M. and Ardila, A. (2020) 'Non-linguistic abilities in aphasia', *Journal of Neurolinguistics*, 56:100916.
- Graf Estes, K., Evans, J. L. and Else-Quest, N. M. (2007) 'Differences in the nonword repetition performance of children with and without Specific Language Impairment: a meta-analysis', *Journal of Speech, Language, and Hearing Research*, 50(1):177–195.
- Grodzinsky, Y. (2000) 'The neurology of syntax: language use without Broca's area', *Behavioral and Brain Sciences*, 23: 1-71.
- Grunwell, P. (1981) *The Nature of Phonological Disability in Children*, London: Academic Press.
- Harding, A. and Grunwell, P. (1996), 'Characteristics of cleft palate speech', *International Journal of Language and Communication Disorders*, 31(4): 331–357.

- Hodson, S. and Jardine, B. (2009) 'Revisiting Jarrod: application of gestural phonological theory to the assessment and remediation of speech sound disorder', *International Journal of Speech-Language Pathology*, 11: 122-134.
- Howard, S. J. (2007) 'The interplay between articulation and prosody in children with impaired speech: observations from electropalatographic and perceptual analysis', *Advances in Speech-Language Pathology*, 9: 20-35.
- Howard, S. J. and Heselwood, B. C. (2002) 'Learning and teaching phonetic transcription for clinical purposes', *Clinical Linguistics and Phonetics*, 16: 371-401.
- Ingram, D. (1976) *Phonological Disability in Children*, London: Edward Arnold.
- Iuzzini-Seigel J, Hogan T.P., Guarino A.J. and Green JR. (2015) 'Reliance on auditory feedback in children with childhood apraxia of speech', *Journal of Communication Disorders*, 54: 32-42.
- International Phonetic Association (1999) *Handbook of the International Phonetic Association: A Guide to the Use of the International Phonetic Alphabet*, Cambridge: Cambridge University Press.
- Jakobson, R. (1941) *Kindersprache, Aphasie und allgemeine Lautgesetze*, Uppsala, SE: Almqvist and Wiksell.
- Jakobson, R. (1968) *Child Language, Aphasia and Phonological Universals*, The Hague: Mouton.
- Karmiloff-Smith, A. (1998) 'Development itself is the key to understanding developmental disorders', *Trends in Cognitive Sciences*, 2: 389-398.
- Kent, R. (ed) (2003) *MIT Encyclopedia of Communication Disorders*, Cambridge, MA: MIT Press.

- Le, X.T.T., McLeod, S. and Phạm, B. (2021) ‘Consonant accuracy and intelligibility of Southern Vietnamese children’, *Speech, Language and Hearing*, 1-10
- Lee, A., Bessell, N., van den Heuvel, H., Saalasti, S., Klessa, K., Müller, N. and Ball, M. J. (2021) ‘The latest development of the DELAD project for sharing corpora of speech disorders’, *Clinical Linguistics & Phonetics*, 1-9
- Leonard, L. (2014) (2nd edition) *Children with Specific Language Impairment*. Cambridge, MA: MIT Press
- Lundeborg, I., Nordin, E., Zeipel-Stjerna, M. and McAllister, A. (2015) ‘Voice onset time in Swedish children with phonological impairment’, *Logopedics Phoniatrics Vocology*, 40(4):149-155.
- MacWhinney, B. (2000) *The CHILDES Project: Tools for Analyzing Talk, Third Edition: Volume 2: The Database*, Mahwah, NJ: Lawrence Erlbaum.
- Martins Sampaio-Teixeira, A.C., De Oliveira, D. N., Yamashita, R, P., Fukushiro, A. P. and Kiemle Trindade, I. E. (2019) ‘Normative nasalance scores in the production of words and syllables for Brazilian Portuguese speakers, *Clinical Linguistics & Phonetics*, 33(12): 1139-1148.
- Mayr, R., Siddika, A., Morris, J. and Montanari, S. (2001) ‘Bilingual phonological development across generations: segmental accuracy and error patterns in second- and third-generation British Bengali children’, *Journal of Communication Disorders*, 93:106140
- McLeod, S., Verdon, S., Baker, E., Ball, M. J., Ballard, E., Ben David, A. M. B. B., Bérubé, D., Blumenthal, M., Bowen, C. and Brosseau-Lapré, F. (2017) ‘Tutorial: speech assessment for multilingual children who do not speak the same language(s) as

- the speech-language pathologist', *American Journal of Speech-Language Pathology*, 26(3): 691–708.
- Murad, M.H., Asi ,N., Alsawas, M. and Alahdab, F. (2016) 'New evidence pyramid', *BMJ Evidence-Based Medicine*, 21(4): 125-127.
- Muskett, T., Perkins, M. R., Clegg, J. and Body, R. (2010) 'Inflexibility as an interactional phenomenon: using conversation analysis to re-examine a symptom of autism', *Clinical Linguistics & Phonetics*, 24 (1): 1-16.
- Kim, H-K., Yu, X., Cao, Y., Liu, X. and Huang, Z-M. (2016) 'Dialectal and gender differences in nasalance for a Mandarin population', *Clinical Linguistics & Phonetics*, 30(2): 119-130.
- Lee, A. Bessell, N. and Gibbon, F. E. (2019) 'Tongue-palate contact for nasal versus oral stops in speakers with repaired cleft palate', *Clinical Linguistics & Phonetics*, 33 (9):831-853
- Parsons, L., Cordier, R., Munro, N., Joosten, A. and Speyer, R. (2017) 'A systematic review of pragmatic language interventions for children with autism spectrum disorder', *PloS one*, 12(4): e0172242.
- Perkins, M. R. (2007) *Pragmatic Impairment*, Cambridge: Cambridge University Press.
- Perkins, M. R. (2008) 'Pragmatic impairment as an emergent phenomenon' in M. J. Ball., M. R. Perkins., N. Müller and S. Howard (eds) *Handbook of Clinical Linguistics*, Oxford: Blackwell, pp. 79-92
- Perkins, M. R., Body, R. and Parker, M. (1995) 'Closed head injury: assessment and remediation of topic bias and repetitiveness', in M. R. Perkins and S. J. Howard (eds) *Case Studies in Clinical Linguistics*, London: Whurr, pp. 293-320

- Perkins, M. R. and Varley, R. (1996) *A Machine-Readable Corpus of Aphasic Discourse*, University of Sheffield, Department of Human Communication Sciences/Institute for Language, Speech and Hearing (ILASH).
- Quirk Report (1972) *Speech Therapy Services*, London: H.M.S.O.
- Rice, M. L., Wexler, K. and Cleave, P. (1995) 'Specific language impairment as a period of extended optional infinitive', *Journal of Speech and Hearing Research*, 38: 850-863.
- Rice, L. and Wexler, K. (2001) *Test of Early Grammatical Impairment*. United States: The Psychological Corporation
- Riches, N. G. (2013) 'Treating the passive in children with specific language impairment: a usage-based approach', *Child Language Teaching and Therapy*, 29(2): 155-169.
- Schegloff, E. A. (2003) 'Conversation analysis and communication disorders', in C. Goodwin (ed) *Conversation and Brain Damage*, New York: Oxford University Press.
- Scripture, E. W. (1923) *Stuttering, Lispings and Correction of the Speech of the Deaf*, New York: Macmillan.
- Schuchard, J. and Middleton, E. L. (2018) 'Word repetition and retrieval practice effects in aphasia: evidence for use-dependent learning in lexical access', *Cognitive Neuropsychology*, 35 (5-6): 271-287.
- Schwartz, M. F., Dell, G. S., Martin, N., Gahl, S. and Sobel, P. (2006) 'A case-series test of the interactive two-step model of lexical access: evidence from picture naming', *Journal of Memory and Language*, 54 (2): 228-264.
- Shriberg, L. D., Kwiatkowski, J. and Hoffman, K. (1984) 'A procedure for phonetic transcription by consensus', *Journal of Speech and Hearing Research*, 27: 456-465.

- Sosa, A. V. and Bybee, J. (2008) 'A cognitive approach to clinical phonology', in M. J. Ball., M. R. Perkins., N. Muller and S. Howard. (eds) *The Handbook of Clinical Phonetics*, Oxford: Blackwell, pp. 480-490.
- Stampe, D. (1969) 'The acquisition of phonetic representation', *Proceedings from the Annual Meeting of the Chicago Linguistic Society*, 5(1): 443-454, Chicago Linguistic Society.
- (1973). *A Dissertation on Natural Phonology*, Doctoral dissertation, The University of Chicago.
- Taha, J., Stojanovik, V. and Pagnamenta, E. (2021) 'Nonword repetition performance of Arabic-speaking children with and without Developmental Language Disorder: a study on diagnostic accuracy', *Journal of Speech, Language, and Hearing Research*, 64(7): 2750-2765.
- Tallal, P. and Piercy, M. (1973) 'Developmental aphasia: impaired rate of non-verbal processing as a function of sensory modality', *Neuropsychologia*, 12: 83-93.
- Teoh, A. P. and Chin, S. B. (2009) 'Transcribing the speech of children with cochlear implants: clinical application of narrow phonetic transcriptions', *American Journal of Speech and Language Pathology*, 18(4), 388–401.
- Terband, H., Spruit, M. and Maassen, B. (2018) 'Speech impairment in boys with fetal alcohol spectrum disorders', *American Journal of Speech and Language Pathology*, 27 (4): 1405–25.
- Terband, H., Maassen, B. and Maas, E. (2019) 'A psycholinguistic framework for diagnosis and treatment planning of developmental speech disorders', *Folia Phoniatica et Logopaedica*, 71: 216-227.

- Ullman, M. T. and Pierpont, E. I. (2005) 'Specific Language Impairment is not specific to language: the procedural deficit hypothesis', *Cortex*, 41: 399-433.
- Whitehill, T. L. and Lee, A. (2008) 'Instrumental analysis of resonance in speech impairment', in M. J. Ball., M. R. Perkins., N. Müller and S. Howard (eds) *The Handbook of Clinical Linguistics*, Oxford: Blackwell, pp. 332-343.
- Wilkinson, R. (2008) 'Conversation analysis and communication disorders', in M. J. Ball., M. R. Perkins., N. Müller and S. Howard (eds) *The Handbook of Clinical Linguistics*, Oxford: Blackwell, pp. 92-106.
- Wu, H., Lu, F., Yu, B., and Liu, Q. (2020) 'Phonological acquisition and development in Putonghua-speaking children with Autism Spectrum Disorders', *Clinical Linguistics & Phonetics*, 34(9): 844-86

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