

The potential for music to develop pronunciation in students with English as an Additional Language or Dialect (EAL/D)

Brittany A. McCormack, Christopher Klopper, Lisbeth Kitson, Marleen Westerveld
Griffith University

Abstract

Australia is a culturally and linguistically diverse country, with a large proportion of the population originating from non-English speaking countries. One of the significant challenges for non-English speakers living in Australia is the ability to verbally communicate in English. Twenty to 25% of children in Australian schools have English as an additional language or dialect (EAL/D) (Commonwealth of Australia, 2016; Hammond, 2014). These students can struggle in the classroom as they both learn the English language, whilst being taught in the English language which they may have little to no working function knowledge (Kibler, Valdés, & Walqui, 2014). Further, intelligibility of communication can be affected as a result of poor pronunciation in the target language. This research investigated the potential of an eight-week music intervention, which drew upon principles of audiation from Gordon's Music Learning Theory, for developing pronunciation in students with EAL/D. Results indicated that five of the six student participants with EAL/D demonstrated improvements in their pronunciation when speaking in English as a result of the intervention. This research indicates positive correlations between the use of a specific music intervention drawing on principles of audiation and the development of pronunciation for students with EAL/D. Recommendations for future research in this area have been presented.

Key words: EAL/D; music; pronunciation; audiation.

Background and significance

Australian Immigration Statistics

Australia is a melting pot of more than 2,000 different ethnicities (de Courcy, Dooley, Jackson, Miller, & Rushton, 2012), revealing how culturally and linguistically diverse our population has become as a result of international migration. As the total population continues to grow, so too does its international migrant population. The international migrant population of Australia has continued to increase since the 1960s (Migration Policy Institute [MPI], 2015). By 1990, 20% of Australia's total population were migrants, and over 25% of the population were migrants by 2010 (Migration Policy Institute [MPI], 2015).

Recent data captured by the Australian Bureau of Statistics (ABS, 2017) indicates 54% of immigrant arrivals in Australia were from a non-English

speaking country. Discounting the top two countries (the United Kingdom and New Zealand) whose native language is English, the remaining number of immigrants arriving to Australia from non-English speaking countries amassed to 52.9%. In particular, a number of these immigrants arrive to Australia and are enrolled in Australian schools (The Australian Government Department of Immigration and Border Protection, 2012). As of June 2012, the top ten sending countries of school-aged students were from non-English speaking countries. Data from the Australia Government Department of Education and Training (Commonwealth of Australia, 2016) states that there was an increase of 10.5% over a 12-month period. For the month of December 2016 alone, there were 23,325 international students enrolled in Australian schools, in which the top three countries of origin were reported as China (12,086), Vietnam

(2,193), and South Korea (1,276) (Commonwealth of Australia, 2016). These statistics indicate that a significant number of immigrants arrive to Australia from non-English speaking countries, and are being enrolled in our Australian schools. It cannot be assumed that these immigrant students know and understand the English language, and are proficient in communicating in English. This study addressed the development of pronunciation in students with English as an additional language or dialect (EAL/D).

Students with English as an additional language or dialect (EAL/D)

Students with EAL/D may come from a variety of linguistic and cultural backgrounds which will influence the way they learn to speak Standard Australian English (SAE) (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2017; de Courcy et al., 2012). Although a stereotypical description of these students' speech and language skills and competences is impossible to provide, studies have suggested there are certain characteristics evident in the speech of a person who has EAL/D that can potentially affect meaning and the way in which it is received by a native listener (Brown, 2001; Celce-Murcoa, Brinton, & Goodwin, 1996). Pronunciation is identified as one of the most difficult parts when learning another language, as sounds need to be categorised or conceptualised "in a way appropriate to English" (Gilakjani, Ahmadi, & Ahmadi, 2011, p.75). Consequently, this emphasises the need for teachers and researchers to target the development of this particular element of speech.

Nation and Newton (2009) stress the importance of pronunciation for students with EAL/D, as it can impede verbal communication, particularly in regards to the intelligibility of communication. Nation and Newton (2009) refer to a phonological loop that occurs in learners' minds whereby the brain continues to repeat a word within the mind so as to keep it within the working memory or transfer it to long-term memory. It is the working memory of students with EAL/D

that is challenged initially when learning English, as it is affected by their limited knowledge and understanding of pronunciation patterns and grammar (Nation & Newton, 2009). It is further noted that when learning an additional language or dialect, a student's native (or first) language can significantly impact on the learning of the sound system of that new language, substituting patterns of pronunciation (Nation & Newton, 2009). As pronunciation is a recognised difficulty for students with EAL/D, and music has been used as a vehicle to improve the speech of school-aged students with EAL/D in past research (McCormack & Klopper, 2016; 2017), it is suggested that teachers can facilitate the development of students' pronunciation ability through singing.

Music, song and pronunciation

Past research has demonstrated how the use of song can improve children's pronunciation levels (Gan & Chong, 1998). Medina (1990) and Krashen (1989) suggested that it is during the preschool years that children rely exclusively on oral language in order to acquire language. Song is a phenomenon that is seen to synthesise both linguistic and musical information; the elements of songs are found within oral stories, but delivered through music rather than speech (Fonseca-Mora, Toscano-Fuentes, & Wermke, 2011; Medina, 1990). Therefore, it is suggested that the use of song can develop elements of children's language development, more specifically pronunciation (Fonseca-Mora et al., 2011).

Lems (2001) explained that features of speech that affect pronunciation can be introduced to students through song – rhythm, intonation, and stress. Shen (2009) agreed that songs can effectively assist in teaching natural pronunciation to students with EAL/D. Further, the repeated listening, learning, and singing of songs can enable the errors that students make to be gradually corrected and a more native-like pronunciation to be achieved (Shen, 2009). A number of studies have been conducted that evidence the positive influence of music (and song)

on the development of pronunciation (Gan & Chong, 1996; Milovanov, Pietila, Tervaniemi, & Esquef, 2010; Milovanov & Tervaniemi, 2011; Palmer & Kelly, 1992; Slevc & Miyake, 2006). These studies emphasise the need to continue investigating the development of pronunciation through song for primary school aged students with EAL/D specifically, as it is suggested to be the one of the most effective and fastest ways to teach speech sounds (Leith, 1979). Recognising the benefits of song in the development of pronunciation, this research investigated the use of music in developing the pronunciation ability of students with EAL/D through a music intervention that drew on principles of audiation from Gordon's Music Learning Theory (MLT).

The focus of Gordon's MLT is to experience, engage and explore the elements of pitch and rhythm in order to attain MLT's instructional goal of audiation. Gordon (2005, p. 11) defines audiation as being able to "give meaning to music when sound is not physically present or may never have been physically present." With this understanding, audiation can be considered the music equivalent of being able to think in a language (Gordon Institute of Music Learning [GIML], 2017). Developing audiation is beneficial for students with EAL/D as it can help with their acquisition of the English language. The teaching of audiation focuses on developing tonal and rhythmic vocabularies and the ability to hear these sounds in the mind when they are not be physically present (GIML, 2017). Therefore, the development of an intervention that drew upon Gordon's principles of audiation was created and employed for this research. This focus on audition throughout the intervention when teaching Western songs was deemed appropriate, as it could assist students with hearing the sounds in their heads, which could potentially translate to spoken language, thus assisting with their pronunciation in the English language.

Research design

This research employed a single-subject experimental design (SSED), more specifically, an

A-B Withdrawal Design with an included follow-up maintenance phase. This methodological approach was chosen as it supported the exploratory nature of this study and the diversity of students, as student individualities have the potential to affect their learning. Further, using a SSED enabled students to act as their own control measure, and data to be collected at an individual level pre- and post-intervention, to ascertain the impact of the intervention on the development of students' pronunciation in the English language, and whether it was maintained weeks after its completion.

The intervention was implemented three times a week over a period of eight weeks (24 lessons) to six primary school aged participants with EAL/D who had recently arrived to Australia. Each lesson was about 30 minutes, and a total of 12 songs from Taggart, Bolton, Reynolds, Valerio and Gordon (2000) were used throughout the intervention. Of these 12 songs, three were used per fortnight, as the focus for each week would alternate between the song's tonality in one week, and then its rhythmic elements the next. This alternating focus aligned with the teaching of audiation.

Context and participants

This research was conducted at a local school with a high percentage of students with EAL/D. This school was highly diverse and multicultural; its student body comprised of dozens of nationalities. Approximately one-fifth of the students at the school were born overseas. It is alleged that around one-third of the student body at the case site received EAL/D support, in which a proportion of them were required to attend the school's Intensive English Centre (IEC) for further more intensive support.

One staff member (Mrs X) and six students (four boys and two girls) participated in this research, and were purposefully recruited through criterion sampling. The six students were selected in consultation with Mrs X based on the inclusion criteria (Table 1).

Mrs X was currently employed to teach the mixed

Year 1/2 class in the school's IEC facility, the class in which all six student participants were in. The only selection criteria for Mrs X to be included was that she taught and interacted with the six participants within the IEC on a regular basis. She provided information regarding her perceptions of the six student participants' pronunciation development.

Data collection

To measure students' pronunciation skills in English, data was collected before and after the delivery of the intervention in the format of spontaneous speech samples using a digital voice recorder. The collection of students' speech samples involved asking them individually the same open-ended question at the same time each week. The question asked of all students was, "What did you do yesterday?" This acted as a control measure, and provided a natural communicative setting for students where they could discuss past events without having to meet a set criteria.

Semi-structured interviews were also conducted with Mrs X. These interviews allowed her to voice her perceptions on the development of each students' English pronunciation before and after their participation in the eight-week intervention. Each interview was recorded and transcribed by hand by the researcher as it occurred. The recordings were listened to and typed up on the researcher's computer later that day, and hand written notes were referred to throughout this transcription phase in case anything was inaudible during the interview.

Data analysis

A blind analysis was conducted on students' de-identified spontaneous speech samples. One pre- and post-intervention voice recording for each participant was randomly selected and analysed by six independent raters: three registered Australian teachers and three speech language pathologists (SLP). The independent raters did not know which speech samples were pre- and post-intervention for each participant. This analysis was conducted using the Student Oral Language Observation Matrix [SOLOM] (California Department of Education, 1981), and the EAL/D Rating Scales designed by the research team. Both SOLOM and the EAL/D Rating Scales score similarly to a Likert scale. The lowest score (1) indicates that student's pronunciation problems are severe and speech unintelligible. A score of 5 is the highest and indicates a student's pronunciation is basically native-like. Through this method of analysis, participants' pronunciation development could be perceived and assessed by native English speakers who were independent from this research. All data was triangulated to provide a holistic understanding of the development of the six participants' pronunciation when speaking English.

Results

SOLOM

From the scores provided by each of the six independent raters, an average score was calculated for each participant's level of pronunciation pre- and post-intervention. These

Table 1: Inclusion criteria for recruitment of student participants within this study.

Inclusion Criteria	Description/Requirement
Age	Student will be either six, seven or eight years old.
Year Level	Student will be in Year One or Two throughout the duration of initial data collection, progressing into Year Two or Three when a follow-up data collection occurs.
English speaking ability	Diagnosed as possessing limited speaking ability by the specialist teachers at the Intensive English Centre at the research site.
Sociocultural background	Student is from a sociocultural background in which English is not the mother tongue of that country or region.

Table 2: SOLOM results – level of pronunciation

Participant	Pre-	Post-	Difference
Abraham	2.66	3.16	+0.5
Alex	3.06	2.66	-0.4
Ashleigh	2.33	2.66	+0.33
Marcus	1.66	3.0	+1.34
Megan	3.33	3.83	+0.5
Michael	2.66	3.33	+0.67

averages are presented in Table 2. Pseudonyms have been used for participants to maintain anonymity.

From the SOLOM, Table 2 illustrates that five of the six participants improved their pronunciation after participating in the eight-week music intervention. This is evident when looking at the difference between students' pre- and post-intervention scores. Five participants demonstrated varying levels of improvement, with two participants (Abraham and Michael) moving from level two to three, and one participant (Marcus) moving from a level one to three. Alex, however, was the only participant who did not improve his level of pronunciation in English after eight weeks of the intervention. As evident in his pre- and post-intervention scores, he moved from a level three to level two post-intervention.

EAL/D Rating Scales

Similarly to SOLOM, an average score for the EAL/D Rating Scales was calculated for each participant's level of pronunciation pre- and post-intervention (Table 3).

The results presented in Table 3 demonstrate

Table 3: EAL/D Rating Scale results – level of pronunciation

Participant	Pre-	Post-	Difference
Abraham	2.0	3.0	+1.0
Alex	2.5	2.0	-0.5
Ashleigh	1.16	2.33	+0.67
Marcus	0.66	2.0	+1.34
Megan	2.0	2.75	+0.75
Michael	3.0	3.33	+0.33

that the same five participants improved their pronunciation after eight-weeks of participation in the music intervention. This level of improvement in students' pronunciation is evident in the pre- and post-intervention scores. Abraham moved from a level two to three, Ashleigh moved from a level one to level two, and Marcus demonstrated the greatest improvement when he moved from below a level one to level two post-intervention. Although improvements were recorded, Michael and Megan remained within the same level post-intervention. It also highlighted that Alex, again, was the only participant whose pronunciation did not improve after his engagement in the music intervention.

From the blind ratings presented in Tables 2 and 3, it can be established that all students demonstrated poor pronunciation skills when speaking in English prior to their participation in the eight-week music intervention (Table 2 and 3). However, both post-intervention rating results (Tables 2 and 3) indicate five of six participants' pronunciation had improved, even though nominal, after the music intervention.

Semi-structured interviews with Mrs X

Statements from the semi-structured interviews with Mrs X supported the positive results presented by both SOLOM and the EAL/D Rating Scales, but refute the scores provided for Alex. Although further practise and improvements were stated as necessary for all students to reach native-like proficiency, Mrs X emphasised that all students had absolutely improved their pronunciation levels in English after participating in the eight-week music intervention, including Alex. Further, Mrs X mentioned that students were now demonstrating particular mannerisms when they spoke in English. The results from the blind analyses (Tables 2 and 3) indicate that Alex did not improve his pronunciation. However, the semi-structured interviews with Mrs X suggested otherwise with her stating that Alex was now verbally communicating more frequently, and had absolutely improved in his pronunciation when speaking in English.

Summary of results

Results from both SOLOM and EAL/D Rating Scales revealed that five of the six student participants demonstrated improvements, to varying degrees, in their pronunciation of English after their participation in the eight-week music intervention. Alex, however, did not demonstrate improvements to his pronunciation post-intervention. Mrs X's statements supported the SOLOM and EAL/D Rating Scale results in regards to the five students demonstrating improvements in their pronunciation. However, her statements regarding Alex's pronunciation levels refuted what was presented in both rating scales. Her perception was that he too made noticeable improvements to his pronunciation in the English language.

Discussion & recommendations

Through the triangulation of interview and SOLOM and EAL/D Rating Scale data, it can be suggested that the average ratings calculated for both the SOLOM and EAL/D Rating Scales did not reflect the full extent of students' pronunciation development. This is as a result of the statements made by Mrs X as she perceived more significant and noticeable differences in all participants' pronunciation when speaking in English. While it is unknown why Alex's score decreased in both the SOLOM and EAL/D Rating Scales, it can be suggested that this may have been due to the provision of limited speech samples to the independent raters. One pre- and post-intervention speech sample for each participant was provided to all raters. Therefore, the particular samples, selected at random by the researcher, could have been days where Alex was not particularly talkative, or was overly excited about something that caused him to rush and blur his speech. Consequently, the provision of only one pre- and post-intervention speech sample may not have best represented Alex's pronunciation. This explanation could be reflective of all participants; the fact that they did not demonstrate

improvements to the extent that Mrs X believed and explained. Therefore, it could be suggested that the statements from Mrs X regarding students' pronunciation abilities are more reliable due to her interacting with all students on a daily basis, and thus being presented with multiple opportunities to observe students' pronunciation and across a variety of academic and social contexts.

Data confirmed that post-intervention all students had demonstrated varying levels of improvement in their pronunciation when speaking English. Although students' native accent was retained, their speech was described as more coherent post-intervention in comparison to their pre-intervention results. Lems (2001) explained that rhythm, intonation and stress are features of speech that influence pronunciation, and are effectively introduced to students through song. Shen (2009) agreed with the use of song when teaching students with English as an additional language or dialect, as it can effectively assist in the natural pronunciation of words in the English language. It can be suggested that from the data collected that the repeated listening and singing of the songs throughout the music intervention provided students with a greater opportunity to "gradually correct their errors and achieve a more native-like pronunciation" (Shen, 2009, p. 92). The focus on developing specific tonal and rhythmic patterns throughout the intervention encouraged students to concentrate more specifically on the pronunciation of English words, the phonological rules, as well as the particular stress and intonation patterns (Shen, 2009). Therefore, the data from this study indicates the potential this music intervention holds in developing the pronunciation for students with EAL/D, especially if conducted over a longer period of time.

English is the dominant language of Australia, and as recent statistics have presented (ABS, 2017; Commonwealth of Australia, 2016; MPI, 2015), there are a significant number of non-English speaking immigrants arriving to the country and being enrolled in schools where their ability to effectively

communicate in English is deemed a necessity. McCormack and Klopfer (2016) state, "most facets of education incorporate a verbal medium, in conjunction with non-verbal communicative techniques, to promote learning" (p. 429). By connecting the principles of audiation (GIML, 2017) throughout the eight-week music intervention, all students demonstrated increases in their level of pronunciation to varying degrees. Pronunciation has been identified as one of the most challenging aspects when learning an additional language (Gilakjani et al., 2011), and the positive findings from this research demonstrate the potential of using song as a pedagogical tool to improve the pronunciation levels of students learning EAL/D.

The results from this research display the potential this particular music intervention has to develop the English pronunciation of students with EAL/D. Recommendations for further research can be proposed. The first is that a longitudinal study of this research be conducted so the potential and extent to which this particular intervention can develop the pronunciation of students with EAL/D can be investigated. Additionally, it is recommended that a greater number of participants who identify as having EAL/D are recruited to ensure the further investigation of this music intervention on students with a wide range of individual backgrounds and experiences. A final recommendation from this research is that a control group of students with EAL/D be included who do not receive the intervention. This is recommended so similarities or differences between the two groups can be noted in regards to the development of students' pronunciation levels.

References

- Australian Bureau of Statistics (ABS). (2017). 3412.0 – Migration, Australia 2015-16. Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3412.0/>
- Australian Curriculum, Assessment and Reporting Authority (ACARA). (2017). *English/Foundation Year/Literacy/ Interpreting, analysing, evaluating/ACELY1694*. Retrieved from <http://www.australiancurriculum.edu.au/english/curriculum/f-10?layout=1#cdcode=ACELY1649&level=F>
- Australian Government Department of Immigration and Border Protection. (2012). *Net overseas migration*. Retrieved from <https://www.border.gov.au/ReportsandPublications/Documents/statistics/nom-jun-2012.pdf>
- Brown, H. D. (2001). *Teaching by principles: An interactive approach to language pedagogy* (2nd ed.). New York: Longman
- California State Department of Education. (1981). *Student Oral Language Observation Matrix*. Sacramento, CA: Office of Bilingual Bicultural Education.
- Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (1996). *Teaching pronunciation: A reference for teachers of English to speakers of other languages*. Oxford, England: Oxford University Press.
- Commonwealth of Australia. (2016). *International Student Enrollment Data 2016*. Retrieved from https://internationaleducation.gov.au/research/International-Student-Data/Documents/INTERNATIONAL%20STUDENT%20DATA/2016/2016Dec_0712.pdf
- de Courcy, M., Dooley, K., Jackson, R., Miller, J., & Rushton, K. (2012). *PETAA Paper 183: Teaching EAL/D learners in Australian Classrooms*. Retrieved from http://www.petaa.edu.au/imis_prod/w/Teaching_Resources/PETAA_Papers/w/Teaching_Resources/PPs/PETAA_PAPER_183.aspx
- Fonseca-Mora, C., Toscano-Fuentes, C., & Wermke, K. (2011). Melodies that help: the relation between Language Aptitude and Musical Intelligence. *International Journal of English Studies*, 22(1), 101-118.
- Gan, L., & Chong, S. (1998). The rhythm of language: fostering oral and listening skills in Singapore pre-school children through an integrated music and language arts program. *Early Child Development and Care*, 144(1), 39-45.
- Gilakjani, A., Ahmadi, S., & Ahmadi, M. (2011). Why is pronunciation so difficult to learn? *English Language Teaching*, 4(3), 74.
- Gordon, E. E. (2005). Vectors in My Research. In M. Runfola and C. C. Taggart (Eds.), *The Development and Practical Application of Music Learning Theory* (pp. 3 – 50). Chicago: GIA Publications, Inc.
- Hammond, J. (2014). An Australian perspective on standards-based education, teacher knowledge, and students of English as an additional language. *Teaching English to Speakers of Other Languages (TESOL) Quarterly*, 48(3), 507-532, DOI: 10.1002/tesq.173.
- Kibler, A., Valdés, G., & Walqui, A. (2014). What does standards-based educational reform mean for English language learner populations in primary and secondary schools? *Teaching English to Speakers of Other Languages (TESOL) Quarterly*, 48(3), 433-453.
- Krashen, S. (1989). *The Input Hypothesis: Issues and Implications*. New York: Longman Group Limited.
- Leith, W. D. (1979). Advanced French conversation through popular music. *The French Review*, 52(4), 537-551.

- Lems, K. (2001). *Using Music in the Adult ESL Classroom*. ERIC Digest.
- McCormack, B. A., & Klopper, C. (2016). The potential of music in promoting oracy in students with English as an Additional Language. *International Journal of Music Education, 34*(4), 416-432. DOI: 10.1177/0255761415619066
- McCormack, B. A., & Klopper, C. (2017). The development of prosody in students with English as an additional language or dialect through music. In *Proceedings of Research: The Canada International Conference on Education (CICE 2017)*.
- Medina, S. L. (1990). *The Effects of Music upon Second Language Vocabulary Acquisition*. Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages, San Francisco, CA.
- Migration Policy Institute (MPI). (2015). *Trends in International Migrant Stock: Migrants by Destination and Origin*. Retrieved from <http://www.migrationpolicy.org/programs/data-hub/charts/international-migrants-country-destination-1960-2015?width=1000&height=850&iframe=true>
- Milovanov, R., Pietilä, P., Tervaniemi, M., & Esquef, P. A. (2010). Foreign language pronunciation skills and musical aptitude: a study of Finnish adults with higher education. *Learning and Individual Differences, 20*(1), 56-60, DOI: 10.1016/j.lindif.2009.11.003
- Milovanov, R., & Tervaniemi, M. (2011). The interplay between musical and linguistic aptitudes: a review. *Frontiers in Psychology, 2*(321), 189-217, DOI: 10.3389/fpsyg.2011.00321.
- Nation, I. S. P., & Newton, J. (2009). *Teaching ESL/EFL Listening and Speaking*. New York: Routledge.
- Palmer, C., & Kelly, M. H. (1992). Linguistic prosody and musical meter in song. *Journal of memory and language, 31*(4), 525-542. DOI: 10.1016/0749-596X(92)90027-U
- Shen, C. (2009). Using English songs: An enjoyable and effective approach to ELT. *Journal of English Language Teaching, 2*(1), 88-94.
- Slevc, L. R., & Miyake, A. (2006). Individual differences in second-language proficiency does musical ability matter? *Psychological Science, 17*(8), 675- 681, DOI: 10.1111/j.1467-9280.2006.01765.x
- The Gordon Institute for Music Learning (GIML). (2017). *Audiation*. Retrieved from <http://giml.org/mlt/audiation/>

Dr Brittany McCormack is a sessional academic (lecturer and tutor) in the School of Education and Professional Studies at Griffith University on the Gold Coast, Australia. Her teaching, research and publications are in the field of Arts Education, specifically Music Education, and how principles of audiation can improve the English speaking and listening skills in students with English as an Additional Language or Dialect (EAL/D).

Associate Professor Christopher Klopper is Director, Griffith Centre for Creative Industries, Griffith University. His research is in the fields of global practices of learning and teaching in Higher Education; exploitation of digital technologies to enhance learning; and creative arts education models, approaches and professional practice.

Dr Lisbeth Kitson is a Lecturer at Griffith University. She teaches primary and junior secondary undergraduate and postgraduate courses in Literacy and English education. Her research has focused on literacy and multiliteracies, curriculum literacies with a focus on the integration of information and communication technologies and multimodal texts into teaching practices. She is President of the Australian Literacy Educators' Association Meanjin Local Chapter.

Dr Marleen Westerveld is a Senior Lecturer in Speech Pathology at Griffith University. Her research focuses on the relationship between spoken and written language development and disorders in children and adolescents, including children with autism spectrum disorders, Down syndrome, developmental language disorders and children from culturally and linguistically diverse backgrounds.