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Evaluating narrative-level discourse in two languages in Singaporean English-Mandarin bilingual kindergarten children

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Abstract

The prevalence of language disorders in bilingual children is thought to be similar to that of monolingual children. However, speech and language therapists often do not have sufficient information about the language profiles of bilingual children, nor the tools specific to this population of children to effectively diagnose and provide intervention for language disorders. This can result in over- and under-diagnoses of language disorders, especially in multilingual societies such as Singapore. There are four official languages in Singapore: English, Mandarin Chinese, Malay, and Tamil. Some of these languages have dialects, such as Hokkien. Clinicians in Singapore working with bilingual children face challenges such as a lack of appropriate assessment tools normed on the local population as well as insufficient knowledge about local language and dialect norms and how these children develop language.

Data elicited from narratives via wordless picture books is very helpful in addressing clinical needs. Such narratives are accounts of events and experiences and they are effective diagnostic tools across cultures to assess children's language abilities. Most research on narrative skills is based on monolingual children, with some data on bilingual and multilingual children beginning to emerge. Currently, the only language assessments normed on Singaporean children are at the word level and sentence level, with a significant gap at the narrative level.

This body of work reports on an extensive investigation of the narrative language skills of Singaporean English-Mandarin bilingual children via secondary data analysis. A total of 36 Singaporean bilingual kindergarten children were sampled and assigned to one of two language dominance groups, English-dominant (EL1CL2) and balanced English-Mandarin based on parental reports of their language proficiency and performance on a receptive and expressive

vocabulary task in both languages. Audio samples were elicited from retell and recall tasks in English and Mandarin based on wordless picture books ‘Frog Goes to Dinner’ and ‘One Frog Too Many’ and analysed with Computerised Language ANalysis (CLAN) software. A rich dataset including more than 3000 datapoints was analysed in a variety of ways. Outcome measures included macrostructure and microstructure elements such as story grammar elements, mean length of utterance, lexical diversity, and specific grammatical markers in both languages. The outcome measures were analysed quantitatively with additional qualitative analysis of errors.

Contrary to hypotheses, both language dominance groups performed similarly on various English outcome measures. The balanced bilingual group, as expected, performed better than the EL1CL2 group on some macrostructure and microstructure outcome measures. Both groups demonstrated better performance in English than in Mandarin. The results suggest a trend of Singaporean children becoming increasingly English-dominant. In addition, the study also found some differences between productions from both groups, including the type of errors produced, reflecting the intricate interplay between language dominance, proficiency, and narrative development in bilingual contexts.

This research has direct implications for clinical practice as it informs clinicians about narrative-level skills in Singaporean bilingual children and the changing linguistic landscape of Singapore.

Declaration

I certify that this thesis:

1. Does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and
2. The research within will not be submitted for any other future degree or diploma without the permission of Flinders University; and
3. To the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text

Signed: Denise Ng

Date: 25th July 2024

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Chapter 1: Introduction

1.1 Background

The research presented in this thesis was conceptualised during my personal clinical practice as a speech and language therapist (SLT) in Singapore. The children I served in my practice were bilingual, and the biggest challenge I faced was that I was making clinical decisions based on best guesses. There are limited norms based on this particular group of children. Most commercially available assessment tools are normed on monolingual children growing up in predominantly Standard English-speaking environments, which is a population very different from the children with whom I worked. These difficulties were echoed by other SLTs in my local area. This body of research is thus a crucial first step towards helping us understand how language develops in the children we work with and to provide evidence-based practice and support.

Language skills are critical to a child's cognitive, psychosocial and behavioural development (McLeod & Verdon, 2014; Norbury et al., 2016). Language can be considered in terms of content (semantics and phonology), form (morphology and syntax) and use (pragmatics) (McLeod & Verdon, 2014). Children have to be proficient in all the different domains, receptively and expressively, to be effective users of language and effective communicators. Language disorders are diagnosed when a child has delayed or disordered language skills and may present as difficulties with understanding and using language at any of the domains (Gillam et al., 2017). This, in turn, has a significant impact on social interactions and mental health (Brownlie et al., 2016) and academic progress (Conti-Ramsden et al., 2018; Ziegenfusz et al., 2022). However, these difficulties sometimes go unnoticed unless the child's language skills are assessed formally.

Contrary to popular belief, the prevalence of language disorders in monolingual children is conceptualised to be similar to that observed in bilingual children (Kohnert et al., 2020). Bilingualism, in and of itself, does not cause language disorders. However, SLTs often do not have sufficient information about the language profiles of bilingual children. This often leads to misdiagnoses of bilingual children as having disordered language (Hemsley et al., 2014; Paradis et al., 2021) when they might just be language-different, which Langdon (1989) defined as a different pattern of language development.

This research focuses on bilingual kindergarten children in the context of Singapore, which is a vibrant multiracial, comprising ethnic Chinese, Malays, and Indians, and multilingual society with four official languages: English, Mandarin Chinese, Malay, and Tamil. As an ethnically and linguistically diverse country, it is unsurprising that the home languages of children growing up in Singapore are just as diverse. As of 2020, 75.5% of children aged 5 to 9 years either spoke only English or more frequently spoke English than their second language (if bilingual) at home, and 15.0% of the same age group spoke only Mandarin or spoke Mandarin more frequently at home as compared to their second language (Singapore Department of Statistics, 2021). In addition to speaking different home languages, the language profiles of Singaporean children are complicated by bilingualism. Singaporean children are exposed to at least two languages at the preschool level and this continues when they begin school, where bilingual education is compulsory (Ministry of Education, 2023): English is used to access the curriculum and the children's mother tongue (Mandarin, Malay or Tamil depending on the children's ethnic group) is studied to maintain ties to their specific culture and history.

There is a gap in the literature regarding the development of language skills in bilingual children, specifically for English-Mandarin bilingual children from this cultural and linguistic background. The implication is that SLTs in Singapore face difficulty in effectively identifying

children with language disorders (Teoh et al., 2018). This research aims to fill this gap by evaluating and identifying patterns in narrative skills in typically developing Singaporean English-Mandarin speaking bilingual children as the first step to developing a method of identifying children with language disorders in this population.

1.2 Scope of topic

Bilingualism is frequently used as an umbrella term for individuals who understand and use two languages (Kohnert et al., 2020). However, although researchers and clinicians often consider bilinguals as a group to compare against monolinguals (e.g., Hoff & Ribot, 2017; Serratrice & De Cat, 2020), the importance of evaluating and considering variance in bilinguals in research cannot be understated. The challenge faced when using 'bilingual' as an umbrella term is that it encompasses individuals with varying language proficiencies. This includes children who use two languages with relatively similar proficiencies as well as children who are more proficient in one language than the other (Baker, 2006). In this body of work, language dominance will be the main grouping variable. While research on bilinguals is developing, few studies have delved into the effect of language dominance and this collection of analyses aims to fill this gap in knowledge. It is logical to assume that English-dominant bilingual children with more English input would perform better than non-English-dominant bilingual children but clinicians do not know this to be true based on evidence. Clearly, confirming or denying this assumption will facilitate more culturally responsive practice.

The two main language dominance groups in this research are balanced English-Mandarin bilingual children (i.e., children with relatively similar proficiencies in English and Mandarin) and English-dominant bilingual children (EL1CL2, i.e., children with relatively higher proficiencies in English than in Mandarin). Participants were allocated to the language

dominance groups based on parental reports and performances on receptive and expressive vocabulary tests. This will be addressed in more detail in Chapter 3.

The population studied was kindergarten children. There are several differences between the schooling systems in Singapore and Australia. Preschools in Singapore provide services for children under seven years old, including childcare programmes and kindergarten education. Children enrol in Kindergarten 1 the year they turn 5 years or Kindergarten 2 the year they turn 6. These children then attend primary school the year they turn 7. In Singapore, kindergarten is not compulsory but primary school is. In Australia, different states have different educational systems. For example, in New South Wales, kindergarten refers to the first year of primary school. Children usually enrol in kindergarten the year they turn 5 and kindergarten is compulsory. Preschool refers to educational programmes for children from 3 to 5 years old and is not compulsory.

1.3 Language level examined in this body of research

This collection of analyses focuses on narrative skills in Singaporean bilingual children. Narratives are a type of oral discourse that communicates events. They are prevalent across different cultures and time periods and are important for functioning across different domains of a child's life, such as in the classroom (Spencer & Petersen, 2018) and developing relationships (Spencer & Petersen, 2020).

Analysis of narrative samples is an effective method of evaluation of bilingual children's language skills (Lindgren et al., 2023; Petersen et al., 2017; Winters et al., 2022). Specific components of narratives are categorised into macrostructure and microstructure elements (Kuvač Kraljević et al., 2020). Macrostructure refers to the overall coherence and organisation of a narrative and consists of story grammar elements, such as characters, setting, initiating event,

internal response, plan, attempt, consequence, and resolution of a story (Petersen et al., 2008). Microstructure refers to the sentence-level dimension of language content and use. This includes components such as vocabulary, morphology, length of utterances, and syntactic complexity (Altman et al., 2016; Hipfner-Boucher et al., 2015). These two broad categories will be discussed in more detail in Chapter 2.

1.4 Research aims and questions

The aim of this research is to evaluate the narrative language skills of and establish the basis for initial narrative norms for Singaporean English-Mandarin bilingual children. A secondary aim is to determine if dominant bilinguals have an advantage in their dominant language as compared to balanced bilinguals who lack an equivalent "dominant" language. The children were allocated to the balanced bilingual group or English-dominant bilingual group (EL1CL2). It also investigates the presence of differences between language dominance groups and between languages. The study addresses itself to the following research questions:

1. What are the characteristics of narrative performance (macrostructure and microstructure elements) on retell and recall tasks in English and Mandarin Chinese produced by Singaporean EL1CL2 bilingual children?
    a. What are the differences in narrative performances between the two languages on retell tasks produced by Singaporean EL1CL2 bilingual children?
    b. What are the differences in narrative performances between the two languages on recall tasks produced by Singaporean EL1CL2 bilingual children?
    c. What are the differences in narrative performances between the retell and recall tasks in English produced by Singaporean EL1CL2 bilingual children?

d. What are the differences in narrative performances between the retell and recall tasks in Mandarin Chinese produced by Singaporean EL1CL2 bilingual children?

2. What are the characteristics of narrative performance (macrostructure and microstructure elements) on retell and recall tasks in English and Mandarin Chinese produced by Singaporean balanced bilingual children?
    a. What are the differences in narrative performances between the two languages on retell tasks produced by Singaporean balanced bilingual children?
    b. What are the differences in narrative performances between the two languages on recall tasks produced by Singaporean balanced bilingual children?
    c. What are the differences in narrative performances between the retell and recall tasks in English produced by Singaporean balanced bilingual children?
    d. What are the differences in narrative performances between the retell and recall tasks in Mandarin Chinese produced by Singaporean balanced bilingual children?
3. What are the differences in narrative performances between Singaporean EL1CL2 bilingual children and Singaporean balanced bilingual children?

The following research hypotheses were generated.

First, it was hypothesised that there would be some differences in narrative macrostructure production between language dominance groups. Specifically, for the balanced dominance group there would not be a significant difference in performances between the two languages (Hypothesis 1A). However, the EL1CL2 children would perform better on the English tasks than on Mandarin tasks (Hypothesis 1B). A secondary hypothesis addressing the differences between groups was that the EL1CL2 group would produce more macrostructure

elements in English than the balanced bilingual group (Hypothesis 1C) and the balanced bilingual group would produce more macrostructure elements in Mandarin than the EL1CL2 group (Hypothesis 1D). Some research found narrative macrostructure to be fairly stable across bilingual children's languages (e.g., English-Spanish: Fiestas & Peña, 2018; English-Swedish: Gagarina & Bohnacker, 2022; Turkish-Swedish: Bohnacker et al., 2022), and it was theorised that this was because macrostructure makes up the overarching organisation of stories regardless of the language in which it was produced. Other researchers found cross-linguistic differences. For example, a study conducted with Cantonese-English speaking children found differences in narrative macrostructure production in English and Cantonese (Rezzonico et al., 2016). Similar results were found in other languages such as German and Swedish, with macrostructure skills more developed in the stronger language (Lindgren & Bohnacker, 2022). It should be noted that most studies did not distinguish between balanced bilinguals and subjects who were dominant in one of their languages. Bitetti et al. (2020) investigated narratives in balanced and Spanish-dominant Spanish-English bilingual preschoolers and found no correlation between English and Spanish macrostructure after controlling for microstructure within each language. They suggested that bilingual children needed more exposure and proficiency before cross-linguistic transfer of macrostructure knowledge can occur. This implied that an English-dominant English-Mandarin bilingual child might have knowledge of overall macrostructure across both languages but might lack the lexical knowledge needed to produce the narrative completely in Mandarin.

Second, similarly to macrostructure, the EL1CL2 group was hypothesised to produce longer and more complex utterances (general and fine-grained microstructure) in English than the balanced bilingual group (Hypothesis 2A). Conversely, the balanced bilingual group was predicted to perform better on these same measures in Mandarin than the EL1CL2 group

(Hypothesis 2B). The EL1CL2 group was also hypothesised to produce longer and more complex utterances in English than Mandarin (Hypothesis 2C) while the balanced bilingual group would perform similarly in both languages (Hypothesis 2D). Rezzonico et al. (2016) found similar performance on general microstructure elements in predominantly balanced Cantonese-English bilingual children, and this was theorised to be due to general microstructure elements being less sensitive to cross-linguistic differences. This was in contrast to fine-grained microstructure features, which involved language-specific grammatical markers.

Third, the EL1CL2 children were hypothesised to be more accurate in their usage of grammatical markers in English than the balanced bilingual children (Hypothesis 3A). In a similar vein, the balanced bilingual children would be more accurate in their usage of Mandarin grammatical markers than would EL1CL2 bilingual children (Hypothesis 3B). Thordardottir (2015) found a correlation between morphosyntactic development and input. In this study, based on parental reports, the English-dominant group was exposed to more English while the balanced bilingual group was exposed to similar amounts of English and Mandarin. There were no hypotheses relating to differences between languages, as the grammatical markers in English and Mandarin are not comparable.

Lastly, both language dominance groups were hypothesised to produce more complete narratives on the retell tasks as compared to the recall tasks (Hypothesis 4).

1.5 Advancing our understanding

There is an increasing amount of research focusing on bilingualism and multilingualism (e.g., Bialystok & Craik, 2022; Kroll et al., 2015). However, most of this research has involved participants who speak Indo-European languages, such as English, French (e.g., Fleckstein et al., 2018; Tuller et al., 2018), Italian (e.g., Roch et al., 2016) and German (e.g., Tuller et al.,

2018). Chomsky (1965) proposed the theory of Universal Grammar – that all languages, at some abstract level, share the same syntactic features. Extrapolating from this theory, one might assume that comparisons of language acquisition, function and use can be made across the different communities of speakers. Going a step further, one should be able to draw conclusions on bilingual children from communities that speak Asian languages from bilingual children from communities that speak European languages. However, it should be noted that there is considerable debate over the validity of the Universal Grammar theory. More recent literature has argued that languages are profoundly different from one another and that language should be considered in terms of diversity instead of universality (e.g., Dąbrowska, 2015). Currently, developmental and linguistic theories of bilingualism are based on research into Western communities and languages. It is unknown if the same theories are applicable to children from other linguistic and cultural backgrounds. Given the strong research demonstrating diversity between the structure of the world's languages and the accompanying task of acquiring them, further research into how bilingual children in Asia develop language is necessary.

Research into Singaporean bilingual children is emerging. Most of the recent research has investigated executive functioning in this population (e.g., Kang et al., 2023; Sun et al., 2020) and literacy (e.g., O'Brien et al., 2020). All the current available research investigating language abilities of English-Mandarin bilingual children living in Singapore has focused on word and sentence levels, mostly in English. At the word level, some studies evaluated the children's abilities to generate quantitative norms (e.g., Rickard-Liow et al., 2013; Singh et al., 2022) while others compared vocabulary skills of Singaporean bilingual children to monolingual English-speaking children (e.g., Teoh et al., 2012). However, most the research investigating vocabulary has been in relation to factors and predictors of acquisition of vocabulary skills (e.g.,

Sun et al., 2020) rather than how vocabulary develops per se. At the sentence level, Brebner (2010) and Teoh et al. (2012) identified possible clinical indicators of language disorders in children. At this point in time, there is a gap in the research involving Singaporean English-Mandarin bilingual children at the narrative level.

Linguistic research in Asia and into Asian languages is limited. As the literature specifically on Singapore is still sparse, understanding a similar population with a similar language profile would be beneficial. Singapore's geographical neighbour Malaysia is, like Singapore, a multicultural and multilinguistic society. Chinese Malaysians make up slightly less than a quarter of the Malaysian population (Department of Statistics Malaysia, 2020) and are the second largest ethnic group. At this time, there is limited but emerging literature on Malaysian English-Mandarin bilingual children specifically addressing development of language skills. One study proposed language sampling as a valid method of language assessment in this group of children: Ooi and Wong (2012) identified possible clinical indicators of language disorders, such as a shorter mean length of utterance and omission of grammatical structures. Grammatical errors in sentence repetition tasks were also identified as potential diagnostic indicators (Woon et al., 2020). Hong Kong is another linguistically diverse Asian country. A study evaluating language skills in Cantonese-English bilingual children in Hong Kong revealed that English (L2) morphological awareness facilitated Cantonese word reading and vocabulary growth (Tong et al., 2018). Most research has focused on Indo-European language pairs (e.g., Bitetti et al., 2020; Mendez et al., 2018). This study will also facilitate understanding as to whether language pairs consisting of an Indo-European language and a non-Indo-European language develop in a similar pattern to language pairs consisting of two Indo-European languages.

A considerable amount of the extant research on English-Chinese bilingual children is based on children living in English-dominant countries, such as the United States (e.g., Song et al., 2022) and Canada (e.g., Li et al., 2021; Rezzonico et al., 2015). However, given that these countries usually use Standard English while Singaporean speakers use a variant known as Singapore English, the difference in language profiles might not result in valid comparisons and specific research into this population is necessary.

1.6 Problem space

The global prevalence of language disorders is 7.5% (Norbury et al., 2016) but there is no data specific to Singapore. Diagnosing language disorders is challenging in Singapore's multilingual society given the lack of a comprehensive understanding of bilingual language development in the specific language environment (Teoh et al., 2018). Commercially available assessment tools have been shown to not provide accurate results for bilingual populations (Peña et al., 2016). Difficulties faced by SLTs include a lack of assessment tools developed and normed appropriately and specifically for local populations (Rethfeldt et al., 2024), which can lead to over-, under- or misdiagnosis of language disorders. Teoh et al. (2018) found that many SLTs in Singapore make clinical decisions about a child's language skills based on commercially available standardised assessments normed on monolingual English-speaking children, such as the Clinical Evaluation of Language Fundamentals 2: Preschool (CELF-P2) (Semel et al., 2004). However, the normed populations are exposed to different cultural and linguistic input from the target population (Singaporean bilingual children) and simply assessing Singaporean bilingual children based on these assessments will lead to misdiagnoses. This, in turn, will affect the efficacy of speech pathology services rendered. In order to accurately assess and provide intervention for Singaporean children, it is important for SLTs to understand how language skills develop in the local population. This body of work will provide insight into

narrative skills in the two languages of Singaporean English-Mandarin kindergarten children. There are currently no local tools to evaluate language skills at this level.

1.7 Potential impact of this research

This body of work will have significant theoretical and practical implications for speech pathology practice and services in Singapore. Firstly, there is no consensus on how language develops in typically developing Singaporean bilingual children. Professionals need to understand what constitutes typical development before they can confidently identify language disorders. Clinicians who do not have relevant information about how language develops in children with language deficits have insufficient evidence on which to base diagnoses. As observed by Teoh et al. (2018), this is a challenge faced by SLTs in Singapore. Research evaluating narrative skills in this group of children will help SLTs make more informed diagnostic decisions.

The barriers to reliable diagnosis also make it difficult to accurately determine prevalence rates of language disorders in Singapore. This has a ripple effect: without knowing the prevalence, policymakers cannot allocate services and resources appropriately, and this has resulted in limited funding and support for children with needs. A common challenge observed globally is long waitlists for speech pathology services. This has also been also observed clinically in Singapore. Provision of targeted resources will benefit the children who require more support. Another effect is limited awareness of communication disorders in the community. Although there is no literature specifically addressing this issue in Singapore, there is overall poor public awareness of language disorders (McGregor, 2020) and this is also observed in clinical practice. Educators and caregivers have incomplete understanding of language disorders and how language disorders can affect children functionally. Some adults may

misidentify language difficulties as challenging behaviours, with the result that some children are not only not being supported, but may actually be punished for their difficulties. By identifying norms and criteria, and increasing effectiveness of identifying children with language needs, this research can potentially increase awareness of language disorders within the community and provide more support for the children and their families.

Thirdly, this collection of analyses can potentially be used to develop a screening tool for children entering primary school. In Singapore, attending kindergarten is not compulsory. In addition, not all kindergarten-aged children follow up with paediatricians. In fact, research has shown that children from lower socioeconomic status (SES) families are less likely to follow up with health professionals (McGregor, 2020). Children from lower SES backgrounds are also at an increased risk of developing language and learning disorders (Sansavini et al., 2021), and lower SES families are more likely to face barriers to access to services (Goodwin, 2016). Thus, even if paediatricians are aware of indicators of language delays and disorders, they may not be able to identify all children who require support as they might not present themselves to paediatricians. However, all children in Singapore are required by law to attend primary school the year they turn seven, making this the most appropriate time to conduct screening to identify children at risk of language disorders for further investigation and support. This research will present preliminary findings for a sample of 5- to 6-year-old children, and these findings could potentially be used as a benchmark for screening Primary 1 students in Singapore.

It is crucial that children be screened in their first year of primary school. Currently, it is observed in clinical practice that school-aged children are often referred to SLTs when they require official documentation supporting their requests for accommodations for national examinations. This usually occurs in their fifth to sixth year of primary school, i.e., at 11–12 years of age. These children would have thus missed out on the benefits of early intervention

which may have been available had they been identified earlier. A screening tool would benefit the children by offering a way of identifying at-risk children and providing the support needed earlier. Given that research has identified that, in the absence of intervention, the gap between typically developing children and children with language disorders increases with age, children with language deficits should be identified as early as possible to reduce the negative effects of their difficulties as much as possible.

Finally, disability awareness is still developing in Asia. The results of this study could potentially lead to further advances in knowledge of norms in these communities and, by extension, a greater ability to identify children with language disorders and provide sufficient support. There is considerable stigma associated with children with special needs in Asian communities (e.g., Kayama & Haight, 2014; Mitter et al., 2019) and there are limited resources and support for these children and families (e.g., Riches et al., 2023). Education about and raising awareness of language disorders will benefit these children and their families.

1.8 Outline of thesis

This thesis consists of five sections comprising 12 chapters, as outlined in Figure 1. Section 1 spans Chapters 1 to 3. Following the introduction in this chapter, Chapter 2 presents a review of related literature about bilingualism and methods of assessments of bilingual children. It also describes in more detail Singapore's history, its effects on how the linguistic landscape and what the linguistic profile of Singapore looks like currently. Next, challenges relating to speech pathology practice in Singapore are presented, with specific discussion of assessment practices. The chapter will conclude with a discussion of narrative assessments. The methodology used for this research is presented in Chapter 3. The corpus for acquisition of secondary data is introduced, followed by the profile of the participants, parental reports and

language dominance group allocation. The data collection and data analysis procedures are outlined, as are the methodological challenges.

Chapters 4 to 11 are the central part of this thesis. Section 2 comprises Chapters 4 and 5 and focuses on the macrostructure outcome measures. Chapter 4 presents the results from the analysis of macrostructure elements and Chapter 5 discusses the findings in reference to available knowledge and research questions. Section 3 includes Chapters 6 and 7 and focuses on the general microstructure outcome measures. Chapter 6 presents the results from the analysis of general microstructure elements while Chapter 7 discusses the result. Language-specific fine-grained microstructure outcome measures are discussed in Section 4. Chapters 8 and 9 present and discuss the English fine-grained microstructure elements while Chapters 10 and 11 present the Mandarin fine-grained microstructure elements. Finally, Section 5 consists of the last chapter, Chapter 12, which concludes the thesis with a discussion of key clinical practice implications and outlines the limitations of the study. This chapter also suggests directions for further research on this topic.

Figure 1.1

Outline of thesis

Chapter 2: Literature Review

This chapter presents the current literature relevant to the research topic. I introduce bilingualism and contextualise the topic by discussing the Singaporean context, before outlining the current state of speech and language therapy in Singapore. Finally, I present literature on narratives, and specifically narratives in bilingual societies.

2.1 Bilingualism

Bilingualism is a "widespread global phenomenon" (De Houwer, 2021, p. 4). Researchers have defined bilingualism differently depending on their perspective (Rocha-Hidalgo & Barr, 2023). In this thesis, bilinguals are individuals who "need to learn to communicate in more than a single language in daily life" (De Houwer, 2021, p. 3) as this definition is most compatible with the target socio-linguistic environment and population. Different disciplines interpret and develop the available knowledge from their unique perspectives and intention to demonstrate the current state of understanding and pertinent issues that the discipline faces, as outlined below.

2.1.1 Social constructivism

Vygotsky and Cole (1978) suggested that social interactions make a significant contribution to language learning by emphasising a child's language learning capacity as well as environmental and innate motivation to develop language skills.

2.1.2 Interactive processing

Other researchers proposed interactive processing models that identify the processing of cognitive, sensory, and motor input required to develop language (e.g., Cowan, 2014; Ullman et

al., 2020). These models investigate the implications of cognition for language and efficiency of processing.

2.1.3 Functionalism

Functionalism argues that language is learnt through use and that language is the culmination of language form (i.e., morphosyntax) and language use (MacWhinney, 1997).

2.1.4 Connectionism

This theory posits that language is acquired through identification of patterns of connections of neural pathways in the brain and the application of these connections to novel situations (Joanisse, 2017).

2.1.5 Dynamic Systems Theory (DST)

Herdina and Jessner (2002) described language acquisition as an outcome of extensive interactions between the different language levels (i.e., word, sentence, and narrative) and between the socio-cognitive domains to which a language learner is exposed. These interactions lead to consistent inequilibrium, resulting in shifts within and between the language systems (De Bot et al., 2007)

2.1.6 Dynamic Interactive Processing (DIP)

Given that many of the disciplines share common themes, the commonly discussed theories are often related or share the same underlying themes. Following a comprehensive review of the currently-held theoretical perspectives mentioned above, some researchers (e.g., Kohnert et al., 2020) have argued against applying a single theory. Instead, they proposed a Dynamic Interactive Processing (DIP) theory, which combines elements and principles of the

above five theories. Kohnert et al. (2020, p. 5) defined language as “a dynamic system that emerges within a social context through interactions of cognitive, neurobiological, and environmental systems and subsystems across nested timescales”.

The DIP perspective focuses on two main interactions: that between language and the environment and that between language and the language learner. This is especially relevant to the Singaporean context given its unique linguistic environment. Firstly, DIP theorises that language develops through language use in a variety of communicative environments or contexts with a variety of communication partners (Kohnert et al., 2020). In some communities, a bilingual’s home language is used extensively in the community even though the language of operation is Standard English. For example, in Singapore, some school-aged children are exposed to their mother tongues and Singapore Standard English in the school setting but continue to use Singapore Colloquial English socially and in the community. This environment allows for continual development of the languages to which they are exposed. Literature from Canada supports this view, showing that English skills in Chinese-English bilingual children develop to become similar to their monolingual peers after 5.5 years of English exposure (Paradis & Jia, 2017).

2.1.7 Measuring bilingualism: language dominance and language proficiency

Bilingualism is a complex concept and it is difficult to quantify its multiple characteristics comprehensively with any one measure (Treffers-Daller, 2019). The complexity of accurately understanding bilingual language acquisition is compounded by the timing of acquisition of each language (Bylund et al., 2021), as well as fluidity of proficiency, which changes over time relative to factors such as exposure (De Cat, 2020). These factors can be evaluated through

quantitative and qualitative measures such as self-reports or parental reports (Pratt et al., 2022; Pua et al., 2017) and standardised assessments (e.g., Wiig et al., 2020).

Bilingualism can be viewed through the lenses of language dominance and proficiency in the domains of speaking, listening, reading, and writing. Most bilinguals do not have the same proficiency in both of their languages across all modalities (Baker, 2006; Treffers-Daller, 2019). Previous research demonstrated that language dominance is influenced by linguistic, sociolinguistic, and psycholinguistic parameters, and that it can change over time (Oppenheim et al., 2020; Yip & Matthews, 2006). Due to the multi-dimensional and complex nature of language dominance, it is unsurprising that it has various definitions. Argyri and Sorace (2007, p. 82) defined language dominance as "the amount of input the bilinguals receive in each language"; Kootstra and Doedens (2016, p. 711) defined language proficiency as "a measure of bilinguals' personal experience with both languages"; and Montrul (2016, p. 16) defined it as "a linguistic proficiency component, an external component (input), and a functional component (context and use)". For the purpose of this study, language dominance is defined as a measure of relative language proficiency in each language (Martin et al., 2020).

Language dominance and language proficiency can be measured directly or indirectly. A review of previous literature on measuring language dominance and proficiency in bilingual children showed that a combination of direct and indirect measures was usually used (e.g., Peña et al., 2021). Direct measures of language dominance and proficiency encompass assessment of language at word (vocabulary), sentence (morphosyntax), and narrative levels. To accurately measure language dominance and language proficiency in bilinguals, both languages should be assessed. Ideally, comparable assessments should be administered in both languages and comparison to the norms will provide information about proficiency. Commonly used vocabulary tests for bilingual children to assess both languages include the

Expressive One-Word Picture Vocabulary Test (EOWPVT-4, Brownell, 2010) and the Peabody Picture Vocabulary Test (PPVT-5, Dunn, 2019) and the corresponding versions in different languages (e.g., PPVT-R, Lu & Liu, 2002; Test de Vocabulario en Imágenes Peabody, Dunn et al., 1986). Results can also be compared between languages to derive relative language dominance. Other assessments have been developed to measure vocabulary to directly evaluate language dominance. For example, Gollan et al. (2012) developed the Multi-Lingual Naming Test (MINT), in which participants are tasked with naming pictures in both languages and their results are compared to determine relative language dominance.

There has been more recent research into more holistic evaluation of bilinguals' language skills beyond the word level, leading to development of assessments at the sentence and narrative levels. These assessments may be presented as an assessment battery or standardised tests that encompass these levels. For example, the Clinical Evaluation of Language Fundamentals Preschool-3 (Wiig et al., 2020) includes subtests which assess a child's ability to understand and use vocabulary, concepts and grammar at the sentence level. It also has a subtest that evaluates a child's ability to understand spoken paragraphs. The Spanish version of the CELF-P2 (Wiig et al., 2009) has parallel subtests that evaluate similar skills in Spanish. Norms in both languages based on parallel subtests allow for comparison of performance across languages at the subtest or domain level (Ebert et al., 2014).

At the narrative level, language samples can be obtained, analysed and compared in both languages. The CLAN (Computerized Language ANalysis) programme (MacWhinney, 2014) creates and analyses transcripts in the Child Language Exchange System (CHILDES) database. The programme analyses transcripts against its databank of linguistic information, including vocabulary, conjunctions and grammatical markers, for a variety of languages, which is essential for multilingualism research. A more structured alternative is the Multilingual

Assessment Instrument for Narratives – Revised (Gagarina et al., 2019). This assessment compares bilingual children's expression of macrostructure and microstructure elements in their narratives across both languages (Gagarina et al., 2016).

Indirect measures of language dominance and proficiency include information on a bilingual's language history and use. There is a considerable body of literature on using questionnaires to establish language dominance and proficiency (e.g., Peña et al., 2021; Teoh et al., 2012). Questionnaires usually use questions designed to obtain information regarding language history, which includes age of acquisition of each language. Secondly, researchers also sought information about language use to understand current use as well as change in use over time and setting (Kastenbaum et al., 2019; Oppenheim et al., 2020). Bedore et al. (2012) studied 1029 Spanish-English bilingual pre-kindergarteners and kindergarteners (mean age 5.25 years) to determine whether the specific language measures undertaken had an effect on the classification of language dominance and proficiency. These measures included parent interviews and language screening assessments in both languages. They found that current use of a language accounts for up to 65% of variance of language dominance and proficiency in young school-aged children, while cumulative use also contributes to the variance but to a smaller degree at 36%. Questions about current use can consist of identifying a percentage of relative use in each language and cumulative use can be derived based on percentage of relative use of each language over time (Peña et al., 2021).

Questionnaires intending to investigate proficiency often use self-ratings with a Likert scale (e.g., the Language Background Questionnaire, Yow & Li, 2015). While studies focusing on adults mostly used self-ratings, research focusing on children tended to use parental reports. For example, the LEAP-Q for children (Marian et al., 2007) obtains information from the child's parents regarding the child's language dominance, history, and use and proficiency in specific

contexts. The Inventory to Assess Language Knowledge (ITALK: Peña et al., 2018) is another indirect measure that evaluates a child's language proficiency in the domains of speaking, listening, reading and writing through parental reports. Language proficiency in each language is derived from averages of the ratings in this questionnaire. Another parental report questionnaire is the Bilingual Input-Output Survey (BIOS: Peña et al., 2018), which asks specific questions about cumulative language use as well as age of acquisition of both first and second languages. Considering that children spend a significant amount of time in school, the BIOS also seeks information from teachers.

Direct and indirect measures of language proficiency and dominance each have their own advantages and disadvantages. Although direct measurements through standardised assessments or language sampling provide the clearest indication of language proficiency, they have to be administered by trained professionals and take longer to administer, especially in two languages (Peña et al., 2021). In contrast, indirect measures such as questionnaires are more efficient to administer and validation studies have recognised that indirect measures are significantly correlated with direct measures of language proficiency (e.g., Bedore et al., 2011; Peña et al., 2018). Recognising the benefits of each method, some researchers have used both direct and indirect measures in their studies (e.g., Sheng et al., 2014).

2.1.8 The bilingual lexicon

Literature suggests that bilinguals have two distinct lexicons but there are contrasting views on how the lexicons are integrated. For example, Kroll and Ma (2017) proposed that both languages are activated concurrently when using vocabulary from each of the two languages and that the bilinguals can develop regulation of cognitive processes to express or inhibit a specific language. On the other hand, Williams (2015, p. 505) maintained that bilinguals are

“unable to simply switch off their non-current language” and that the two languages compete with each other for selection and expression. Further research is needed to unpack the intricacies of integration of a bilingual’s lexicons and this will have implications for how bilinguals control language activation and manage influences across the languages.

In many countries, the two languages are clearly distinguished by the setting in which they are used (i.e., a language of operation and a home language). However, there are also many countries in which linguistic transfers between the languages are common, even in the public domain. Despite the prevalence of bilingualism, there has been very limited research in this area. This is especially so in particular parts of Asia, such as Singapore, where English is taught in schools and used in the workplace but where many families retain their heritage languages and code-switching can occur frequently. In theory, understanding how the languages of a bilingual society interact and affect the development of the other language will facilitate better understanding of language development in bilingual children. With regard to clinical practice, the ability to evaluate norms in each language and evaluate possible linguistic transfers between languages will lead to better understanding of language differences and more effective diagnosis of language disorders.

2.2 Bilingualism in Singapore

Singapore’s first population census in 1824 showed that there were more than ten ethnic groups residing in Singapore, including Europeans, Malays, and Chinese, and this was followed by migration of other ethnic groups such as the Jews and Siamese (Bolton & Ng, 2014). Today, Singapore continues to be a multicultural and multilingual country, with 74.3% of its population being ethnically Chinese, 13.5% Malays, 9.0% Indians, and 3.2% categorised as ‘others’ (Singapore Department of Statistics, 2021). Most Singaporeans speak at least some English as

well as one of the other three official languages – Mandarin, Malay, and Tamil. The second language usually aligns with the speaker's ethnicity, with the majority of the population being English-Mandarin bilingual speakers.

The development of Singapore's unique linguistic profile has been shaped by its past, which can be largely split into six time periods, as proposed by Wang (2019):

(a) British colony (1819–1942) – English was first introduced when Sir Stamford Raffles settled in Singapore. This was followed by British colonisation, during which English was mostly used in Singapore in government and trade settings.

(b) Japanese occupation (1942–1945) – When Singapore was occupied by the Japanese during World War II, students were taught Japanese in school (Matsuoka, 2018).

(c) Post-war period (1945–1955) – After the war, Singapore became a place of commercial maritime trade due to its strategic location. With the presence of merchants and travellers from around the region, the linguistic profile of Singapore expanded further. During the 1950s, there were 33 recorded languages spoken by the various ethnic groups in Singapore (Kuo, 1980).

(d) Self-government (1955–1963) – Despite having been a British colony, only 1.8% of Singaporeans spoke English in 1958 (Cavallaro & Ng, 2014). The most commonly used languages at that time were Chinese dialects, Malay and Malay-based pidgin (Bazaar Malay), which the different ethnic groups used to communicate with one another. In 1959, the Singaporean government adopted a pragmatic multilingual approach to address diplomatic and racial needs. Malay was recognised as the national language of Singapore, and Mandarin, Tamil, and English, together with Malay, became the official languages (Wee, 2003). English was chosen for institutional use and the population of English-speakers increased as Singaporeans learnt English as their second language to improve their economic prospects

(Tan, 2006). The other three languages were chosen as official mother tongues to reflect the three major ethnic groups in Singapore (Wee, 2003).

(e) Merger with Malaysia (1963–1965) – Malay is the national language of Malaysia (Adelaar & Prentice, 1996) and with the merger, the general Singaporean population beyond the Malays was exposed to Malay in institutional settings, including schools (Kassim, 2008).

(f) Independent republic (1965 to present) – Singapore separated from Malaysia in 1965. At that point, most Singaporeans were multilingual and spoke a range of dialects (Platt, 1980). Due to its lack of natural resources and small population, the Singaporean government considered language an essential socioeconomic factor for economic growth (Chew, 2015). From the 1970s, the government introduced language policies to shape the country's development, thereby changing its linguistic landscape. Specifically, the bilingual education policy directly connected language to the progress of the Singapore economy. Singapore's bilingual education policy aimed for students to achieve proficiency in English and their mother tongue, which corresponds to their ethnic group, to preserve cultural ties to their heritage. English was chosen as a "neutral language" to unite Singaporeans across all racial groups (Chua, 2011, p. 127) and as a language for economic growth as it offered a path to the world beyond Singapore (Chew, 2015).

In summary, Singapore's short history has seen much linguistic development in the form of increasing English speakers, conversion from Chinese dialects to Mandarin, and an increasingly bilingual society.

2.2.1 Singapore Colloquial English

To complicate matters further, Singaporeans speak two different variations of English (Gupta, 1989) depending on the context: Singapore Standard English (SStdE) and Singapore

Colloquial English (SCE). Gupta (1989) reported that SStdE has similar properties to Standard English in terms of morphosyntax but the differences between SCE and SStdE are more obvious. Over the last two decades, there has been an increase in literature investigating SCE. This is because English in Singapore is used differently from what is observed around the world. It interacts with other languages in new social and cultural domains and has transformed to reflect discourse within the Singaporean population.

SCE is the product of English in a multi-ethnic and multilingual society. As outlined above, Singapore was a melting pot in which natives, merchants, and travellers met. In order to communicate effectively between ethnic groups, each ethnic group had to learn the languages of others since there was no language denominator used by all groups (Tan, 2014). In addition, to maintain racial harmony and balance, a language outside those of the three major ethnic groups and languages had to be chosen to be used across all the ethnic groups, to demonstrate equality. English as the language to fulfil this need was an easy choice, given that Singapore was a British colony and that English was the language of economic progress. Mandarin, Malay, and Tamil all influenced the development of English into SCE, albeit with greatest influence from Mandarin as the Chinese were the ethnic majority and there were more Mandarin speakers compared to the other mother tongues. Singapore's unique multicultural and multilinguistic profile thus resulted in linguistic transfers from the other local languages to English, leading to the emergence of SCE (Gupta, 1994).

In Singapore, SCE is considered to be the lingua franca and a native language in the spoken form. While SStdE might be used in more formal settings or with English-speakers internationally, SCE is acquired by people living in Singapore informally through communication in the community and is primarily a spoken language (Gupta, 1992). Due to decades of interaction between English and the other languages used in Singapore, SCE has become the

most commonly used version of English in Singapore (Cavallaro et al., 2014). A language attitude study from 2008 conducted with 260 students from Singaporean public schools revealed that 85% of the participants spoke SCE and that it was the language of choice in social and home settings (Tan & Tan, 2008). The same group of participants also reported more kinship with speakers of SCE as compared to speakers of global standard English; that they enjoyed speaking SCE; and that they associated SCE with being Singaporean. Although the Singaporean government had previously attempted to reduce the usage of SCE via the Speak Good English campaign (Tan, 2023), SCE is now an important cultural identity marker for Singaporeans and especially so for younger Singaporeans, who are exposed to and speak English as their first language (Tan, 2014). Recognising this shift in emphasis, the government then sought to introduce Standard English to Singaporeans who spoke only SCE as an addition to SCE, rather than in an effort to displace it (Lim, 2015).

2.2.2 Features of Singapore Colloquial English

In addition to language use, SCE also differs from SStdE in terms of language form. The deviations are observed as differences in morphosyntax and presence of code-mixing and cross-linguistic transfers (Brebner, et al., 2016; Lee, 2022; Leimgruber et al., 2021). SCE has its own morphosyntactical characteristics that are highly obvious even to non-SCE speakers. While some of the features of SCE can be traced back to cross-linguistic transfers and interactions with Mandarin (Wu et al., 2009), other features are “indexical markers that distinguish one indigenised variety from another” (Bao, 2010, p. 1728-1729). Sheng (2007) reviewed studies exploring the patterns of SCE and identified SCE characteristics. These are outlined in Table 2.1.

Table 2.1

Features of SCE

Feature	Example	Clinical indicator of language disorders in bilingual children?
Omission of tense markers or overgeneralisation of root verb	• He help me yesterday. (He helped me yesterday.) • She eat the cake. (She ate the cake.)	Yes (Sheng et al., 2023)
Substitution of 'already' as a past tense marker	• She go to school already. (She went to school.)	N/A[1]
Omission of subject verb agreement marker	• She go to school everyday. (She goes to school everyday.)	Yes (Gutiérrez-Clellen et al., 2008)
Omission of auxiliary verb	• The boy jumping. (The boy is jumping.)	Yes (Gutiérrez-Clellen et al., 2008)
Tag questions	• She never help you, is it? (Did she not help you?)	N/A[1]

[1] These features appear to be specific to SCE. There is currently no research on these features as clinical indicators of language disorders in bilingual children.

In addition to the above, Lim (2007), Ler (2006), and Smakman and Wagenaar (2013) expanded on usage of discourse particles. SCE has a well-developed lexicon of discourse particles. Gupta (2006) ranked the eight most commonly used discourse particles by their strength of assertion (Figure 2.1). The meanings of these discourse particles are summarised in Table 2.2. The discourse particles in this table were ranked from most frequently to least frequently used based on information retrieved from Singapore corpus of the International Corpus of English collected at the National University of Singapore (Ler, 2006).

Figure 2.1

Major discourse particles by their strength of assertion (adapted from Gupta, 2006)

Least assertive → Most assertive		
Tentative	Assertive	Contradictory
Ah	Lah	What
Hah	Lor	Mah
Hor	Meh	

Table 2.2

English discourse particles and their indications

Discourse particle	Origin	Indicates	Example
Lah	Hokkien, Malay	• Emphasis or assertion	• Don't go lah
Ah	Hokkien, Malay	• Declarative (slight rising intonation)	• I wear your shoes ah
		• Interrogative (also slight rising intonation)	• Where is Drina going ah?
		• Vocative	• Debbie ah
		• Emphatic (neutral tone)	• Oh, the pen ah. I put here
Hah	Hokkien, Malay	• Interrogative with emphasis	• You drank the coffee hah?
What	Cantonese	• Disapproval	• Why did you scold him? He came what
Lor	Cantonese	• Attitude with a sense of obviousness, finality or resignation	• I told her lor

Hor	Cantonese	• Seeking confirmation or agreement (rising intonation)	• Kelvin bought the plant hor
		• Assertion with particle added to reduce harshness (falling intonation)	• Hilda baked that cake hor
Leh	Cantonese	• Uncertainty	• I don't know where the dinner is leh
		• Feelings of resignation	• I got go leh
Mah	Hokkien, Cantonese	• Obviousness	• I gave it to her mah
		• Justification	• I said thank you because you gave it to me mah
Meh	Cantonese	• Scepticism (rising intonation)	• You didn't know meh

Despite StdSE being formally taught in schools, SCE is more widely used and can be frequently heard in everyday conversations (Gupta, 1994), even in more formal settings. StdSE is taught in formal education (Leimgruber, 2011), which in Singapore starts from primary school. Therefore, kindergarteners, the population sampled in this study, would mostly be exposed to SCE as it is the main variant in their environment (Gupta, 1994). It is clear that both of these variants should be considered when evaluating language abilities of Singaporean bilingual children, in addition to the second language. This adds an additional layer of complexity in understanding the language profiles of these children and therefore affects clinicians' abilities to identify language disorders in this population.

2.2.3 Singapore Mandarin Chinese

Similarly to Singapore English, Mandarin was first introduced to Singapore in the 19th century, but by Chinese migrants. Unlike Singapore, China is a huge country where different regions speak different dialects of Chinese. The migrants arrived from different provinces such as Fujian and Guangdong (Soon et al., 2018). This migration tipped the racial makeup of Singapore at that time, changing Singapore from a Malay-majority to a Chinese-majority (Lim, 2008). While in the 1820s the Malay people constituted about 60% of the Singaporean population, by the 1880s Chinese people made up 56.2% of the population.

Ng and Cavallaro (2021) outlined four factors that affected the trajectory of Mandarin usage in Singapore.

1. **Chinese education**. In the 1800s, although Singapore was a British colony, there was limited British support for education of Chinese children (Tong, 2018; Wong, 2003). Resource-rich Chinese families and clan associations funded and organised schools (Kwan-Terry, 2000). These schools operated within each clan, which usually comprised people from the same region

who spoke the same Chinese dialect. However, in the 1900s, education in Chinese schools changed from a medium of different Chinese dialects into use of Mandarin as the language of instruction (Abshire, 2011). This had the direct result of a surge in usage of Mandarin. In addition, more Chinese schools were established in Singapore, influenced by the development of educational practices in China (Lee, 2006) and using educational materials from China (Abshire, 2011). As a result of the advantages that education provides, Mandarin became increasingly associated with educated elites, thereby altering the relative importance of dialects. At the tertiary level, Nanyang University was established in 1956 and was taught in Mandarin. Its founding promoted the visibility and importance of Mandarin in Singapore. The British eventually became concerned, given the close ties between Chinese schools and Chinese materials and educators, that Chinese schools would foster Chinese nationalism (Lee, 2006). Although the British government attempted to curb the development of Chinese schools, enrolment in these schools continued to eclipse that in schools using other languages (Tong, 2018).

2. **Official languages of Singapore with English as lingua franca**. English was selected to be the main language of operation and education while Mandarin, Malay, and Tamil were classified as mother tongues. The rationale for the choice of English as the lingua franca was threefold. Firstly, it was a neutral language as it was not tied to any specific ethnic group. Secondly, it was perceived that English would help Singapore keep up with and connect to the rest of the world (Curdt-Christiansen & Sun, 2016). Thirdly, it was important to the government to have mother tongues so as to retain cultural identity and values by anchoring the population to their Asian roots. Bilingualism was therefore aggressively promoted for economic and cultural heritage reasons.

3. **English education and implications for job prospects**. In the 1930s, Singaporeans started to demonstrate preferences for English education over other languages of instruction due to better employment opportunities and higher incomes (Kuo, 1985). Nanyang University, which was solely taught in Mandarin, also merged with University of Singapore to form National University of Singapore in 1980, eliminating the need for a Chinese education from primary to tertiary levels. Enrolment in Chinese schools began to decline and the last such school closed in 1987 (Lim, 2019).

4. **Speak Mandarin Campaign**. The Speak Mandarin Campaign was launched as an initiative of the Singaporean government in 1979 to encourage Singaporean Chinese to speak Mandarin instead of their various dialects. Initially, the Chinese population spoke different dialects depending on where their elders immigrated from. The campaign aimed to establish and promote Mandarin to unify the Chinese population while decreasing the usage of dialects in public domains (Ng, 2017). The campaign's focus changed as the Singaporean society progressed. In the 1990s, standards of Mandarin were falling and there were overall fewer Mandarin speakers as more of the population used English as their dominant language (Ng, 2021). There was then a shift of the campaign's focus away from eliminating dialects to encouraging English speakers to speak Mandarin.

In the 1950s, only about 0.1% of the population spoke Mandarin. This proportion eventually grew, and it had become the home language for about 34.9% of Singaporeans by 2015. Despite this increase in popularity of Mandarin, however, English as a dominant language has steadily increased in the population and it is now the most widely used language in Singapore, across all ethnic groups and even within the Chinese community (Cavallaro et al., 2020; Ng & Cavallaro, 2021).

2.2.4 Features of Singaporean Mandarin Chinese

Singaporean Mandarin Chinese (SMC) has distinctive deviations from Putonghua, which is the standard used in China (Lin & Khoo, 2018). Similarly to Singaporean English, Singaporean Mandarin is influenced by other native languages present in Singapore (Chua, 2003). A review of previous work (Kang, 2019; Khoo & Lin 2016; Lee, 2015; Lin & Khoo, 2018; Shang & Zhao, 2017) reveals the linguistic features of SMC which deviate from Putonghua (Table 2.3).

Table 2.3

Features of SMC

Category	Feature	Example
Lexical	Borrowing from other languages in Singapore	• Influence from English: 巴士 *ba shi* (bus) • Influence from Malay: 巴刹 *ba sha* (market, 'pasar' in Malay)
	Reduplication of nouns, verbs, adjectives, and auxiliaries to indicate simulation, augmentation, and attenuation	• 他凶凶的 *ta xiong xiong de* (he is fierce, with emphasis on 'fierce')
	Code-switching from Mandarin into English or lexical items from Southern Chinese dialects	• 'sian' from Hokkien, meaning lethargic or bored
	Discourse particles similar to SCE	• See Table 2.2
Morphosyntax	Adverbs occurring after the verb (influenced by English prepositional phrases)	• 拿起 *na qi* (take/pick up)
	Interchangeable position of verbal predicates and adverbials	• 我走先 *wo zou xian* and 我先走 *wo xian zou* (both meaning 'I'll go first')

Overuse of adverb 才 *cai* to indicate events that will happen after a specific event (再 *zai* in Putonghua)	• 我吃了才走 *wo chi le cai zou* (I'll go after I eat)
Overgeneralisation of classifiers	• 他看到一个狗 *ta kan dao yi ge gou* - overuse of general classifier *ge* instead of 只 *zhi* (used to indicate that the noun is an animal)
Usage of aspect markers is discretionary	• 他穿鞋子 *ta chuan xie zi* (he wear shoes) and 他穿了鞋子 *ta chuan le xie zi* (he wore shoes). The perfective aspect marker 了 *le* is optional in SMC
Conditional clause 等一下 (literally 'wait a second') to indicate 'if'	• 你没有去 等一下他会生气 *ni mei you qu deng yi xia ta hui sheng qi* (you don't go, he will be angry)

	Omission or mismatch of second half of conjunction pairs	• 不但 *bùdàn*…而且 *érqiě* (not only…also) e.g., 他不但忘了铅笔 __ 还忘了书本 *ta bu dan wang le qian bi hai wang le shu ben* (‘he not only forgot pencil, also forgot book’ with omission of second half of conjunction pair)

2.3 Language disorders

Language disorder (LD) has a global prevalence rate of 7.5% (Norbury et al., 2016). Despite its higher prevalence, LD is less known, and correspondingly receives less attention and research, than more visible and researched developmental disorders such as Down Syndrome and Autism Spectrum Disorder (Bishop, 2010; McGregor, 2020). With all other factors remaining constant, the higher prevalence implies that children with LD should be the largest group of children with special needs that SLTs and other paediatric professionals work with. There is, therefore, an urgent need for a more comprehensive understanding of this disorder so that processes surrounding assessment and intervention can be refined to reduce or eliminate the persistent and pervasive negative impact on these children.

2.3.1 Language difference versus language disorder

The increase in bilingualism globally is also reflected in SLTs' caseloads as a result of an increase in bilingual children presenting with language concerns. This can be a challenge for SLTs, who have to differentiate between children who present with a language difference and children who present with LD. Langdon (1989) defined language difference as a different developmental trajectory of language acquisition in bilingual children, which differs from that of monolingual children. Clinicians need to understand typical language acquisition in bilingual children before they can differentiate between language difference and LD.

A lack of knowledge of typical language development in bilingual children can lead to misdiagnoses of language disorders. In fact, research has shown that bilingual children are disproportionately under- and overdiagnosed with language disorders (Bedore & Peña, 2008). Underdiagnosis will lead to well-established effects of language deficits, while overdiagnosis results in inefficient resource allocation and contributes to the negative association between

multilingualism and deficits. Given that there are long waitlists to access speech therapy services, it is crucial that language disorders are not misdiagnosed.

How, then, can SLTs accurately distinguish between a language disorder and a language difference? This challenge is compounded if the SLT does not speak the same language pair as the child and is therefore unable to assess them in both languages. Given that most SLTs are monolingual (Williams & McLeod, 2012), this is a common occurrence. One solution is to allow time for the bilingual children to 'catch up' with their monolingual peers and provide intervention to children who do not catch up. However, due to varying methodologies, there is not yet consensus about whether there is convergence and, if there is, when it will occur. Burgoyne et al. (2011) identified divergence between monolingual and bilingual children on receptive and expressive vocabulary measures. In contrast, Paradis and Jia (2017) estimated that bilingual children converged with monolingual children on receptive language measures after about 4.5–6.5 years of English exposure. They also found that convergence was less obvious on expressive language measures. Dixon et al. (2023) concurred, identifying a convergence on receptive vocabulary measures – albeit an incomplete closing of the gap, indicating that bilingual children were not performing as well as monolingual children when they transition to secondary school at 11 years of age.

In the best case, the bilingual child catches up with their monolingual peers without intervention and avoids the long-term negative outcomes of language deficits. On the other hand, in the worst-case scenario, the bilingual child misses out on earlier intervention and continues to present with persistent language deficits that are not remediated by exposure to L2. Given the uncertainty and previous research demonstrating that convergence can take years, it is obvious that simply waiting to see if the bilingual child will catch up is not an acceptable option. Research into developmental trajectories of both languages in the target

population is urgently needed. In the case of Singapore, where this information is not yet fully established, this study aims to fill the gap at the narrative level.

2.4 Diagnosing language disorders in Singaporean bilingual children

Diagnosing language disorders is particularly challenging in multilingual societies (Teoh et al., 2018). Diagnosis is only valid when difficulties are observed in all languages (Peña et al., 2016). Markers of language proficiency are spread across all languages and proficiency in one language does not provide comprehensive picture of a bilingual child's language abilities.

2.4.1 Identification of language disorders in Singaporean bilingual children

In Singapore, standardised assessments are the preferred instruments (Teoh et al., 2018). However, these assessment tools used are often normed on monolingual English-speaking children living in predominantly English-speaking communities, and there are few standardised assessments compatible with or normed on the Singaporean bilingual population. In addition, commonly used standardised language assessments often contain cultural biases. A bilingual Singaporean child is likely to have different linguistic and cultural experiences from, for example, a monolingual English-speaking child growing up in a Western society.

Given that these biases result in disadvantages for, and are incompatible with, bilingual children (Hemsley et al., 2014; Orellana et al., 2019), it is possible that Singaporean bilingual children are over-diagnosed with language disorders based on these assessment tools. Considering the strong evidence against using standardised assessments normed on monolingual English-speaking children with Singaporean bilingual children, it is imperative to reconsider how these children's language skills are assessed to ensure that the assessment results are reliable and valid. Moreover, as discussed above, it is difficult to compare SCE to the Standard English on which standardised assessments are normed, and this should be taken

into account when assessing children's language acquisition within the linguistic context of Singapore.

Identifying language difficulties in bilingual children should be based on population-specific developmental norms and assessment tools designed for each particular bilingual population. Where this necessary information is yet to be identified, clinicians may face difficulties conducting assessments that truly reflect bilingual children's abilities.

2.4.2 Developmental norms based on Singaporean bilingual children

Considering the Singaporean language landscape, SCE's unique linguistic patterns must be considered when diagnosing language disorders in Singaporean children (Gupta, 1994). It is therefore critical that researchers have sufficient information on typical language development before identifying clinical markers of language disorders in this population. Developmental norms for language development in Singaporean bilingual children are scarce and there are few locally developed language assessment tools normed on Singaporean children (Brebner, 2010; Teoh et al., 2012). There are few studies that specifically address characteristics of the English language produced by Singaporean bilingual children (e.g., Brebner, 2010), but there is limited information for their Mandarin language skills. This often leads to SLTs making instinctive guesses about a child's language abilities by relying on their own understanding and personal experiences with typical development of SStdE and SCE (Brebner et al., 2000).

Brebner (2010) outlined the language characteristics observed in three- to six-year-old Singaporean English-Mandarin bilingual children and Mandarin-English bilingual children on an English task at the sentence level. She found that at 5 years old, the English-dominant bilingual children were using grammatical markers more frequently (e.g., regular plural markers, third person singular markers, present progressive and regular past tense markers, possessive

markers) than the Mandarin-dominant bilingual children. The English-dominant children were also observed to use prepositions, irregular verb forms, subjective and possessive pronouns and simple coordinating conjunctions more consistently than the Mandarin-dominant children. For Mandarin-dominant bilingual children, the author identified a large increase in mean length of utterances (MLU) and root words at 5 years old, after which there was a plateau and performance on these outcome measures remained fairly consistent. This group of children also made more grammatical errors compared to the English-dominant group, including omission of third person singular markers, regular past tense markers, and conjunctions. Reduced code-switching was also observed in this group, as compared to younger children.

In addition, Brebner (2010) identified possible clinical indicators for language difficulties in Singaporean English-Mandarin bilingual preschool children. These are outlined as a group in Table 2.4 and by language dominance group in Table 2.5.

Table 2.4

Possible clinical indicators of language disorders in English in Singaporean preschool and kindergarten bilingual children (Brebner, 2010)

English-dominant and Mandarin-dominant bilingual children	Examples
• Inappropriate object omission	• The boy kicked (object omitted) then jumped ('the boy kicked the the ball then jumped')
• Errors in use/omission of present progressive 'ing' marker	• The boy is jump ('the boy is jumping')
• Errors in use of auxiliary and copula 'is'	• He sad ('he is sad') • He going to school ('he is going to school')
• Errors in use/omission of definite and indefinite articles	• He kicked ball ('he kicked the ball')
• Errors in use of pronouns 'he' and 'his'	• He told he mummy ('he told his mummy)
• Errors in use of coordinating and subordinating conjunctions	• He cried. He fell down (he cried because he fell down)

Table 2.5

Possible clinical indicators of language disorders in English in Singaporean preschool and kindergarten bilingual children by language dominance groups (Brebner, 2010, p. 280)

English-Mandarin bilingual children	Mandarin-English bilingual children
• Absence of plural markers (by quantifier or plural 's' marker) by 4 years old • Absence of errors with plural 's' markers after 6 years old • Errors in use of past participle after 5.5 years old • Errors in use of prepositions after 5.5 years old • Errors or absence of possessive marking after 6.5 years old	• Continued code switching after 5 years old (when speaking to a non-Chinese adult) • No increase in MLU by 5.5 years old • Continued use of mainly single word utterances from 4.5 years old • No marking of plurality using quantifier by 5.5 years old

Most of the research coming out of Singapore has focused on the word (Brebner, 2010; Rickard Liow et al., 2013; Teoh et al., 2012) and sentence (Brebner, 2010) levels, and mostly in English. Other research has shown narrative skills to be stronger predictors of later language and literacy proficiencies than abilities at the word level or sentence level (Wetherell et al., 2007). At this point, there is limited information on Singaporean bilingual children's Chinese language abilities and a dearth of information about their abilities at the narrative level in both English and Mandarin.

2.5 Perspectives of SLTs in Singapore

A recent study by Teoh et al. (2018) explored assessment practices and measures used in Singapore as well as challenges faced by local SLTs in Singapore. Out of the 26 SLTs surveyed in this study, 84.6% of the sample were SLTs who spoke at least two languages with at least functional competencies in both languages. It is reasonable to expect that bilingual therapists would be better equipped to counter the difficulties faced by monolingual English-speaking therapists working with the bilingual Singaporean population. However, the sampled bilingual therapists reported similar difficulties to monolingual therapists working with a multilingual population (e.g., Mulgrew et al., 2022; Williams & McLeod, 2012). The majority of those surveyed faced many challenges in their clinical practice, with these challenges falling under two broad themes: lack of appropriate assessment measures and lack of information regarding acquisition of languages spoken by the local Singaporean population.

2.5.1 Lack of appropriate assessment measures

(a) Mismatch between languages spoken by SLTs and population. Singapore's population is multilingual, with most Singaporeans speaking some English and one of the three other official languages (Mandarin, Malay, and Tamil). Thus, the children with whom SLTs work reflect this diverse language profile. This means that even though SLTs are bilingual, they may not speak the same two languages as the child with whom they are working. This was also seen in Teoh et al.'s (2018) study. In that study, all surveyed SLTs reported that the children on their caseload used different languages and that they have had to assess the children in a language they were not sufficiently proficient in. Fifty per cent of the sampled bilingual SLTs reported that this mismatch between the languages they were proficient in and the languages that the children spoke was a challenge to the assessment process. This indicated that even though

both the assessor and the child may speak a common language (English), there is still an increased risk of inaccurate diagnosis if the common language is not both parties' dominant language and if the second language is not aligned. To support the diagnostic process, clinicians, in collaboration with interpreters if they do not speak the same languages as the children, need to have access to and understand the norms in the relevant languages for this specific population.

(b) Lack of standardised assessments for local population. Currently there are only two published assessment tools normed on Singaporean bilingual children: the Bilingual Language Assessment Battery (BLAB; Rickard Liow et al., 2013) and the Singapore English Action Picture Test (SEAPT; Brebner, 2002). The BLAB includes a subtest evaluating receptive and expressive vocabulary abilities. In the receptive section, the child is tasked with pointing to the named picture (this can be done in both first and second languages). In the expressive section, the child is tasked with naming the picture in their dominant language. This assessment tool value-adds to the available assessments in that it has norms for kindergarten children who speak any of the four of the official languages in Singapore. There is no other assessment tool in Singapore that caters to this variety of languages. However, the limitations of this assessment are that it only assesses children's abilities at the word level and there are no norms for children beyond kindergarten age.

The SEAPT assesses for content and grammar at the sentence level with norms for both English-dominant and Mandarin-dominant English-Mandarin bilingual children. While it offers insight into a more complex level of language ability than the BLAB, the obvious limitation of this assessment tool is that it is only normed for English-Mandarin bilingual children. In addition, as with the BLAB, the normative data only applies to kindergarten-aged children, and at best inferences can be drawn for children outside that age range.

Clearly, even with the two available assessment tools, measures available to assess Singaporean bilingual children's language skills are insufficient. In the 2018 study by Teoh et al., SLTs surveyed reported that standardised assessments were used more frequently than non-standardised assessments. This was despite the less-than-ideal practice of using inappropriate measures. These assessment methods' ability to compare a child's language abilities to their age-matched peers in quantifiable and objective ways (Kwok et al., 2022) may explain their popularity for use overseas. More recent research exploring perspectives of SLTs from Australia, the United States, and the United Kingdom showed that SLTs felt "required" to use norm-referenced assessment tools (Jackson et al., 2023, p. 868), regardless of whether the normative data was valid and reliable for generalisation to the population they worked with. Owens and Pavelko (2017) found that these standardised assessments form the majority of assessments available to diagnose language disorders, and it is thus easy to understand why they are the clear and obvious choice for many SLTs.

Although standardised assessments were reported to be frequently used, the sampled SLTs from Singapore raised concerns over administering them. The most obvious concern was that the assessments were not normed on Singaporean children, which invalidates the comparison and standard scores. Despite this, most of the SLTs sampled reported that they would still compare the children's performance on the assessment to the data in the manual. This finding is not limited to Singaporean SLTs. Studies from other countries have found that instruments based on normative data for monolingual children are unsuitable for assessing bilingual children (Altman et al., 2022; Bedore & Peña, 2008; De Lamo White & Jin, 2011). Studies have shown that adapting standardised assessments to the target population might not be an appropriate option as there is significant variability in bilingualism even within the same population (De Lamo White & Jin, 2011). Language dominance and language proficiencies

among children also change over time according to their experiences, which adds to the heterogeneous nature of the linguistic profile. Despite the known challenges of using commercially available assessment tools standardised on a dissimilar population, however, there is still an over-reliance on these measures, for which reasons further explored below.

(c) Lack of guidelines on assessment protocols for local bilingual children. Given the challenges with administering unsuitable standardised assessments, many researchers have recognised the need for other assessment measures to accurately evaluate a bilingual child's language abilities (Altman et al., 2022; Hemsley et al., 2014). This includes dynamic assessments and language sampling. In countries where the discipline of speech pathology is more established, the governing bodies of SLTs have published clinical guidelines on assessment of children from culturally and linguistically communities (e.g., Speech Pathology Australia, 2015).

In Singapore, there is currently no such governing body specifically tailored to guide practice of speech pathology. In addition, most of the SLTs practising in Singapore graduated from overseas universities and may not have been exposed to populations with as diverse a linguistic profile as Singapore's, resulting in reduced awareness of the need for non-standardised assessments. This gap could potentially lead to SLTs practising in Singapore failing to recognise the need for assessment specific to this population.

(d) Limited awareness of and limited availability of standardised assessments normed on Singaporean children. A number of researchers have argued for using informal assessments as a reliable and valid way to accurately differentiate between language disorders and language disorders in the bilingual population, in preference to using standardised assessments normed on monolingual children (Hasson et al., 2012; Hemsley et al., 2014). Although there is an

increasing shift in the speech pathology community towards using more dynamic or informal tools to assess language abilities (Orellana et al., 2019), this has not been widely observed in clinical practice in Singapore. A Singaporean study (Teoh et al., 2018) showed that SLTs practising in Singapore more frequently used the commercially available standardised assessments, even though they were not normed on the local bilingual population. The researchers hypothesised that Singaporean SLTs had reduced confidence in non-standardised assessments and preferred to administer more familiar and globally recognised assessment tools. It was suggested that this lack of confidence may also be attributable to the lack of adequate information regarding Singaporean bilingual children's language development trajectories that could to be used to conduct informal or dynamic assessments.

2.5.2 Lack of normative data in Singaporean bilingual children

(a) Limited information available on developmental trajectories of language learning in Singaporean children. In Teoh et al.'s (2018) study, 92.3% of SLTs surveyed indicated that the lack of norms for the Singaporean bilingual population and cultural biases were key challenges to providing equitable services for local children. Other challenges with high responses included linguistic biases (88.5% of participants). In the absence of available data, these SLTs chose to compare the local children's scores to the normative data from the manuals, coupled with their own clinical judgement. However, it should be noted that SLTs' clinical judgement can change with experience and can be subjective. Using clinical judgement alone without basis or prior knowledge of normative data, although possibly the easiest method of interpreting results, is also not evidence-based, which is a fundamental principle of clinical speech pathology practice (Greenwell & Walsh, 2021). In addition, there is no basis for evaluation of whether there are deficits in a child's language skills or if the child's language skills reflect the linguistic community.

This lack of information of language acquisition and developmental of local languages may also contribute to the reluctance to use informal assessments with this population. Administering informal assessments requires established knowledge of the language patterns of the target population. Without this knowledge, it is not unexpected that practising SLTs would prefer to use standardised assessments for which there are some norms to be interpreted and transferred to the local population in preference to informal assessments with no reliable or valid norms.

(b) Lack of norms for other ethnic groups besides the Chinese majority. Given that majority of the children in Singapore are English-Mandarin bilinguals, it is unsurprising that most of the available normed data is on this population (e.g., Brebner, 2002; Brebner, 2010). However, survey data (Teoh et al., 2018) indicated that SLTs in Singapore service children from a range of linguistic backgrounds. The absence of normed data makes it more challenging to accurately diagnose language disorders, especially if the SLT is unfamiliar with the non-English language that the bilingual child speaks.

This does not appear to be a difficulty peculiar to SLTs working with Singaporean bilingual children. There is ample research investigating attitudes and service provision globally (e.g., Australia: Denman et al., 2021; New Zealand: Newbury et al., 2020; international: Rethfeldt et al., 2024) and their findings all seem to converge: there is insufficient knowledge about how to assess and support bilingual and multilingual children.

2.6 Narratives

Narratives are sequential accounts of events and experiences of the past and future, or of fiction, and reflect the stories relevant to the children's lives (MacLeod & Pesco, 2023; To et al., 2010). Narratives can take many forms: they can occur in conversations when children

produce narratives based on past or imagined events (Westby & Culatta, 2016) or as part of academic work (Dipper & Pritchard, 2017).

Producing narratives requires strong cognitive and linguistic skills. Narrative generation is achieved through a naturalistic process of structuring, sequencing and sharing individual experiences into a complete and cohesive event (Petersen et al., 2008). A considerable linguistic demand is placed on the speaker in simultaneously combining and using all the domains of language. It is therefore little surprise that the ability to produce complete narratives is correlated with linguistic development (Lucero, 2015), academic development (Spencer & Petersen, 2018) and development of social skills (Davidson et al., 2017). In accessing the academic curriculum, children are often required to produce narratives (Gillam et al., 2018). Narrative skills also predict later reading comprehension skills (Babayiğit et al., 2021), which are crucial to academic success (Ziegenfusz et al., 2022).

Research has shown that narrative-level deficits are unlikely to resolve without intervention (Gillam & Gillam, 2016). Given the necessity of developing strong narrative skills to excel academically, narrative skills are emphasised during assessment for language deficits and providing language intervention (Kaderavek, 2015).

2.6.2 Narratives in bilingual societies

Narratives typically provide information regarding a child's language skills based on macrostructure and microstructure. As narratives tend to retain overall structure across cultures and societies, they are effective tools for comparisons across different populations (Boerma et al., 2016). Due to macrostructure development being independent of linguistic skills, the ability to produce a complete narrative is not specific to a single language (Tsimpli et al., 2016). Macrostructure has been found to be stable across different pairs of languages (e.g., English

and Mandarin: Hao et al., 2019; English and Swedish: Bohnacker, 2016), which also makes it a useful tool to measure differences in skills between languages in bilingual children.

There is currently no consensus on whether there are cross-linguistic transfers or influences between languages in bilingual kindergarteners, even when similar language pairs were studied. It is unclear whether a bilingual child's macrostructure skills in one language support the production of macrostructure elements in the other language taking into consideration differences in microstructure skills in the two languages. Some studies identified correlation between the languages (e.g., Norwegian and Russian: Rodina, 2017; English and Hebrew: Altman et al., 2016; Spanish and English: Mendez et al., 2018) while others did not find such correlations (e.g., Korean and English: Kang, 2012; Spanish and English: Bitetti et al., 2020). This difference in findings is possibly due to differences in methodologies and the features of the particular languages studied. There is therefore a need to further investigate this early stage of narrative development.

Research on bilingual children of various ages revealed that narrative macrostructure skills are supported by development of microstructure abilities (Bitetti et al., 2020). Studies on monolingual children revealed a strong correlation between macrostructure analysis and microstructure analysis, and this association was theorised to be due to the children's ability to express macrostructure elements being reliant on their vocabulary skills (Heilmann et al., 2010). Studies of bilingual children suggested a similar developmental trajectory, in which they applied the microstructure forms to macrostructure elements (Iluz-Cohen & Walters, 2012; Lucero, 2015). On review of studies conducted on different language pairs, narrative cohesion was found to be related to use of morphosyntax and lexicon in various languages (Bitetti et al., 2020; Bohnacker et al., 2022). Again, this was unsurprising as narratives comprise words pulled together with lexical items such as conjunctions.

More recent studies specifically evaluating the relationship between microstructure and macrostructure features in bilingual children speaking Asian languages produced divergent results. A study conducted with Cantonese-English bilingual preschoolers identified that macrostructure skills in the dominant language were a predictor for macrostructure abilities in the non-dominant language when microstructure elements in the non-dominant language were controlled for (Rezzonico et al., 2016). In contrast, Kang (2012) reported that in Korean-English bilingual children, the macrostructure skills in the dominant language (Korean) were not a valid predictor of macrostructure skills in the non-dominant language (English) when microstructure features in the non-dominant language were controlled for. Similarly to earlier research, there was a correlation between microstructure skills and macrostructure skills, even in the non-dominant language (Kang, 2012). The differences in findings may be attributable to the differences in language dominance, which will be explored in this study.

2.6.2 Analysis of narratives: macrostructure

As described by Petersen et al. (2008), narratives usually start with 'setting' the scene, which includes background information on the characters and their environment and motivations. The narrative then transitions through a series of chronological happenings based on the setting. An 'initiating event' is usually a problem or event that prompts the narrative. The 'internal response and plan' reflects the characters' motivations and planning in starting the problem-solving process. The narrative then moves into the 'attempt' at executing the problem-solving and ends in 'consequence', which describes whether the problem-solving was successful. Complete narratives include these elements and causal relations that weave them together cohesively. Previous studies have showed that the production of story grammar elements in generation of narratives have been used to differentiate between children with

language impairment and children without language impairment (Boerma et al., 2016; Govindarajan & Paradis, 2019; Tsimpli et al., 2016).

2.6.3 Analysis of narratives: microstructure

Analysis of language samples is an effective way to explore indicators of development of microstructure development in bilingual preschoolers (Ebert, 2020). Microstructure refers to measures of cohesion, syntax complexity and lexical diversity and complexity at word- and sentence-levels, and requires more specific knowledge of language to be produced competently (Govindarajan & Paradis, 2019). Narrative microstructure elements support the cohesiveness of the story grammar elements. These include lexicon (e.g., vocabulary, conjunctions), morphosyntax (Peña et al., 2020), measures of lexical diversity (e.g., number of different words used), and complexity of the narrative (Bitetti et al., 2020).

Morphosyntax has also been shown to be a strong predictor of language disorders in children (Peña et al., 2020). Difficulty acquiring grammatical markers is another established clinical marker of language disorders in in English monolingual and bilingual English as second language (ESL) children (Paradis et al., 2008; Peña et al., 2020; Rezzonico et al., 2015). Research determined that monolingual and bilingual children with language disorders tended to use fewer grammatical markers such as third person singular markers, pronouns, plural markers, tense markers and possessives (Bedore et al., 2018; Paradis, 2016). Research on typically developing bilingual children showed that they acquire microstructure elements differently from their monolingual peers (Hipfner-Boucher et al., 2015; Jacobson & Yu, 2018). This was also found to be true for Singaporean bilingual children, who had a distinct developmental pattern (Brebner et al., 2016).

Evaluating grammar in the Singaporean context is more complex due to the two different types of English used. In SCE, which is the variant to which kindergarteners are more frequently exposed, it is acceptable for speakers to omit grammatical markers indicating tense and number (Leimgruber, 2011).

Similarly, difficulty acquiring grammatical markers is also an indicator of language disorders in Chinese-speaking children (e.g., Chen et al., 2022; Dai et al., 2022). Previous studies have established that Chinese-speaking children with language disorders demonstrate difficulty with aspect markers (Chen et al., 2022), passive sentence structure (Durrleman et al., 2024), negation, active sentence structure, and classifiers (e.g., Dai et al., 2022; Liu et al., 2023). These studies have focused on monolingual Chinese-speaking children; there is a dearth of literature on bilingual Chinese-speaking children. In Singapore specifically, this area appears to be understudied.

MLU measures linguistic productivity by totalling the number of morphemes and dividing them by the number of utterances in the sample (Brown, 1973) and has been found to be a valid and reliable tool to evaluate language development (Bitetti et al., 2020). Brown (1973) further reported that a child's longest utterance is a reliable indicator of their overall language development and complexity. MLU is also commonly used to identify language disorders in bilingual children (Hernandez et al., 2024). Lexical diversity is a measure of how many different words are in a sample and is another marker used to describe language development (Rezzonico et al., 2015). It is also a reliable indicator of language disorders in bilingual children (Bedore & Peña, 2008; Kapantzoglou et al., 2017). In addition, Rezzonico et al. (2015) indicated that, for preschoolers, lexical diversity could potentially be more effectively used to identify language disorders when combined with other measures like utterance length.

2.6.4 Narratives and language disorders

Narratives are effective diagnostic tools to assess children's language abilities, as the ability to produce complete and cohesive narratives demands linguistic competence (Boerma et al., 2016) and is correlated with higher-level language and cognitive skills, particularly for children with language difficulties (Spencer & Petersen, 2018). Other studies found that children with language deficits associated with other developmental disorders (e.g., autism spectrum disorder) demonstrated deficits in narrative skills (Baixauli et al., 2016), particularly in terms of macrostructure.

Narratives generated by children with language disorders (LD) may differ from narratives generated by typically developing (TD) children at word, sentence and discourse levels. At word level, children with LD were found to tend to use fewer words and fewer different words and have a less complex lexicon than TD children (Govindarajan & Paradis, 2019; Tsimpli et al., 2016). Abilities at word level have implications for production of sentences. Children with LD were observed in previous studies to produce less complex sentences (Govindarajan & Paradis, 2019) in comparison to TD children. Sentence-level abilities, in turn, have implications for discourse-level abilities: simple sentence structures or sentences with morphosyntax errors with inaccurate usage of vocabulary will result in overly simple or incomplete and incohesive narratives. Research studies finding that children with LD present with deficits in linguistic and morphosyntax markers were fairly consistent (Bishop et al., 2017; Peña et al., 2020; Sansavini et al., 2021). Studies investigating macrostructure elements also found that children with LD produce more poorly organised narratives, with deficits in macrostructure story grammar elements, resulting in reduced overall cohesion (Hao et al., 2018; Winters et al., 2022).

Much of the research findings on narrative abilities are based on monolingual children, with emerging data on bilingual children. Bilingual children can only be diagnosed with LD when deficits are observed in both languages. Assessment and analysis of bilingual children's narrative skills are therefore more complex, as deficits in narrative abilities have to be observed in all the languages used. Narrative assessments allow for effective assessment and identification of language disorders in bilingual children (Ebert, 2020). Research on narrative skills in bilingual children with LD and bilingual TD children revealed similar narrative performances across both languages within each group (Boerma et al., 2016). More specifically, bilingual children with LD generally showed similar deficits in macrostructure elements across both languages (Bohnacker, 2016). Although stable findings in macrostructure elements can be attributed to cross-linguistic transfer of narrative macrostructure skills from their first language into their second language, evaluation of bilingual children's narrative performance is further complicated by the differences in levels of proficiency in both languages, and this is especially evident in the difference between production of macrostructure and microstructure elements (Hipfner-Boucher et al., 2015).

2.7 Summary

In summary, SLTs should strive to assess multilingual children in all the languages they use in order to accurately identify language deficits and avoid interpreting language differences as language disorders (Marinis et al., 2017; Teoh et al., 2018). Data on acquisition of English language skills in bilingual children is developing (Duncan & Paradis, 2020; Nicoladis et al., 2020); however, globally there is a dearth of information regarding non-English languages, which makes it challenging to create standardised assessment tools for other languages in non-English-speaking countries and communities with bilingual speakers.

SLTs in Singapore face similar difficulties and have limited choice of assessment tools with appropriate normative data, as well as limited information on development of language skills in the bilingual population. Currently, there is limited understanding of language patterns at the narrative level in Singapore. It is thus of paramount importance to obtain a clearer understanding of the language patterns based on the local population; however, the absence of adequate norms for Singaporean bilingual children, especially at the narrative level, leads to difficulty in accurately identifying language disorders and, subsequently, provision of appropriate intervention. This study aims to contribute to current knowledge by exploring and describing Singaporean English-Mandarin bilingual kindergarten children's performance on narrative tasks in English and Mandarin. It will advance the field by filling a gap in current knowledge of Singaporean bilingual children's language patterns and contribute to more effective detection of language disorders in this population.

Chapter 3: Methodology

3.1 Ethical clearance

An application for ethical approval for this research was approved by the Flinders University Human Ethics Low Risk Panel (HEG4520-2).

3.2 Data source

Secondary data was used for this study. A team of researchers in Singapore obtained audio samples from 36 Singaporean English-Mandarin bilingual children in narrative retell and recall tasks. The population sampled included typically developing Singaporean bilingual children, taken from a research project which evaluated fluency in Singaporean bilingual kindergarten children. Data was collected from 2016 to 2019 by trained researchers and research assistants. The researchers and research assistants were trained in the narrative elicitation protocol and were proficient English-Mandarin speakers.

3.3 Participants

Although Singapore is a multilingual and cultural society, only Singaporean Chinese children who were bilingual in English and Mandarin were included in this study, as the majority of the population is ethnic Chinese and are bilingual English-Mandarin speakers. Participants were recruited from three Singaporean kindergartens. The primary researchers disseminated consent forms through the kindergartens and parents indicated their interest and consent through completing the consent forms. Children with previous diagnoses of developmental or cognitive delays were excluded.

The sample included 36 participants who were assigned to one of two language dominance groups (EL1CL2 and balanced) based on parental reports of their language usage

and proficiency (Appendix 1) and their performances on the English and Mandarin receptive and expressive vocabulary tasks (Rickard Liow et al., 2013). Of these 36 participants, 16 (44.4%) were balanced English-Mandarin bilinguals and 20 (55.6%) were English-dominant English-Mandarin bilinguals (EL1CL2). 17 out of 36 participants (47.2%) were female and 19 (52.8%) were male. All participants were native speakers of English and Mandarin and were Kindergarten 2 children aged 5 to 6 years old attending local government kindergartens. In addition, they were all rated to be typically developing by their parents and rated to have adequate proficiencies in the relevant languages. This was done to control for confounding variables. Table 3.1 details information of participants included in the study.

Table 3.1

Participant information

	Age (in months)		Gender		BLAB English Receptive[1]		BLAB English Expressive[1]		BLAB Chinese Receptive[1]		BLAB Chinese Expressive[2]	
	M	*SD*	Male	Female	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2 (n = 20)	71.7	5.2	12	8	90.5	6.2	82.3	6.7	72.7	11.9	37.9	9.3
Balanced (n = 16)	72.1	4.2	7	9	84.8	10.7	75.3	15.0	88.5	8.9	53.5	12.6

	English Understanding[3]		English Speaking[2]		English Reading[2]		English Writing[2]		Chinese Understanding[2]		Chinese Speaking[2]		Chinese Reading[2]		Chinese Writing[2]	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2 (n = 20)	6.6	0.7	6.2	0.8	5.2	1.0	5.1	1.0	4.9	1.2	4.3	0.9	3.6	1.4	3.5	1.1
Balanced (n = 16)	5.9	1.0	5.6	0.8	4.5	1.0	4.2	1.0	6.0	0.7	5.8	0.7	4.7	1.1	4.3	1.3

[2] Raw score as a percentage
[3] Language proficiency as rated by parents on a scale of 1 (“not good”) to 7 (“very good”)

3.4 Materials

Prior to the elicitation of the narrative samples, the participants' caregivers completed a language questionnaire (Appendix 1). The questionnaire included questions about demographic information and language input and output, such as the caregivers' use of English and Mandarin with the participants and with one another as well as the participants' language proficiency and frequency of use in each language. The participants completed the receptive and expressive vocabulary components of the BLAB in English and Mandarin. The vocabulary scores from the BLAB were not analysed relative to other outcome measures as the validity of the BLAB is outside of the scope of this study. In addition, as presented in Chapter 2, omission of free morphemes is a feature of SCE but specific vocabulary deficits are not (i.e., Singaporean bilingual children with strong language skills could potentially have high vocabulary scores and still omit free morphemes as this profile would reflect the linguistic environment). The vocabulary scores were considered in the process of allocating participants to the different language dominance groups and were not part of the investigation into the children's narrative language skills per se.

Mercer Mayer authored a series of wordless picture books centred around a boy and a frog, and these stories have been found to be valid tools to elicit narrative language samples from children from culturally and linguistically diverse backgrounds (Ebert, 2020). The books *Frog Goes to Dinner* (FGTD; Mayer, 1974) and *One Frog Too Many* (OFTM; Mayer & Mayer, 1975) were used to obtain expressive language samples in English and Mandarin. Both of these books provided opportunities for elicitation of macrostructure elements, grammatical markers, lexical diversity and utterances.

3.5 Procedure

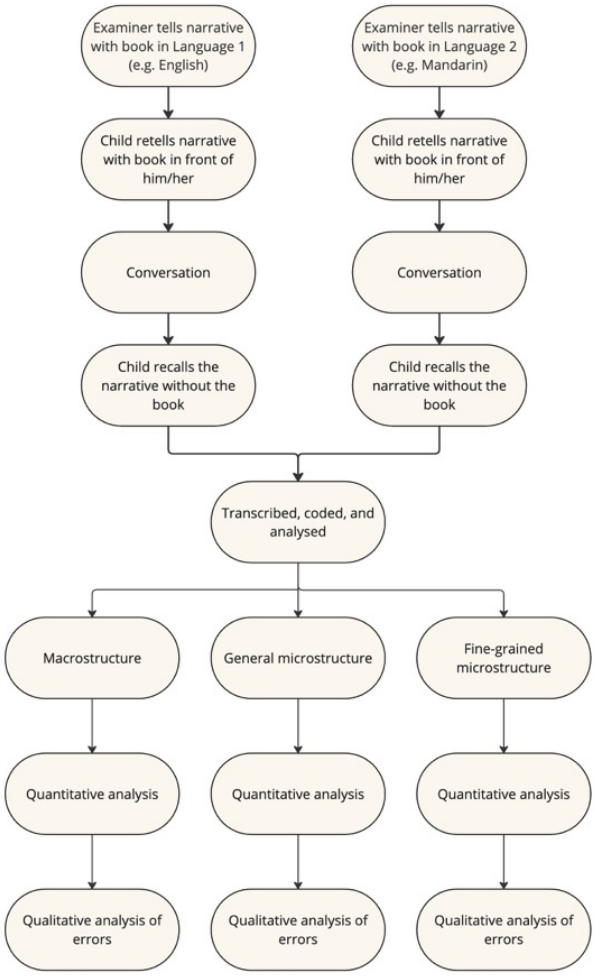
Figure 3.1 demonstrates the process of data collection and analysis. Participants attended two testing sessions about a week apart in a quiet area in their kindergarten or in a place convenient to the family (e.g., at home). In the first session, participants were first told a story based on FGTD or OFTM in English or Mandarin. The scripts for both stories in both languages are included in Appendix 2. They were then tasked with immediately retelling the narrative with the book in front of them. Then the participants were instructed to tell the narrative a second time without the book. In the second testing session, the participants were tasked with doing the same but with the other book in the other language, i.e., if a participant was tasked with retelling and recalling FGTD in English in the first testing session, they would then retell and recall OFTM in Mandarin in the second testing session.

These samples were audio-recorded for subsequent transcription and analysis. I, being an English-Mandarin bilingual SLT, transcribed all narrative samples as CHAT data files, coded and then analysed quantitatively with the Computerised Language Analysis (CLAN; MacWhinney, 2024) software. After transcription, a currently practising Singaporean English-Mandarin bilingual SLT listened to a randomly selected 10% of the narrative transcripts in English and Mandarin while checking the transcripts for accuracy of utterance segmentation, lexical items, and morphemes. Discrepancies were noted (less than 0.1% of the transcripts) and resolved at this level. The macrostructure and microstructure outcome measures were analysed manually; another Singaporean English-Mandarin bilingual SLT scored macrostructure and microstructure elements on 10% of the transcripts against the scoring rubric (explained in more detail below). These were also checked against my scoring. Cohen's kappa of .999 was achieved, indicating almost perfect agreement.

It was noted that the narrative samples were elicited by three different examiners. There were slight differences in the elicitation process (e.g., amount and type of prompts), which resulted in samples from three participants being excluded from macrostructure analyses. Narrative samples which had the target response embedded in the examiners' prompts were excluded because the targets would have been modelled for the participants. Other open-ended general prompts to encourage the participants to continue their narratives were accepted. It was challenging to identify why (and consequently exclude) some examiners provided more prompting (e.g., attention issues) because only audio samples were available. The selection criteria will be addressed in more detail in sub-chapters 3.6.3 and 12.6.

Figure 3.1

Process of data collection and analysis



I then assisted with uploading of audio and narrative samples to TalkBank (http://talkbank.org) (MacWhinney, 2019), a system for sharing and studying conversational interactions and includes stores of data on language acquisition in children. This included ensuring that the CHAT files passed CLAN's CHECK program, creating a web page for creation of the corpus, and sending files through WeTransfer. A web page for the corpus was then created (https://sla.talkbank.org/TBB/childes/Biling/Lim).

3.6 Data analysis

The data obtained was analysed to identify patterns in production of macrostructure and microstructure elements in English (EL) and Mandarin (CL) on retell and recall tasks. The independent variable was language dominance. Parametric analyses were run to evaluate the effect of language dominance, language, and task type on macrostructure elements. Parametric and non-parametric tests were run to evaluate the effect of these factors on microstructure elements.

3.6.1 Macrostructure

Macrostructure elements were coded and analysed separately. The transcripts were coded and macrostructure was initially analysed using the Index of Narrative Complexity (INC; Petersen et al., 2008). Macrostructure elements include character, setting, initiating event, internal response, plan, action/attempt, complication and consequence. Each element was scored on a scale from 0 to 3 based on adherence to INC's description. Point assignment varied for each element. Elements with a total possible score of two were setting, internal response, action/attempt, and complication. Elements with a total possible score of three were characters, initiating event, plan, and consequence. Participants could earn a maximum of 20 points for macrostructure.

Based on preliminary analysis, it was noted that many participants achieved the maximum score on various elements (e.g., initiating event, consequence) despite differing in completeness of responses. This was likely to be because more events could be elicited from the stimuli than events required to achieve the maximum score on a specific element on the INC. For example, to achieve the maximum score on the 'Initiating Event' element, a sample would have to demonstrate two or more distinct events that elicited a response. However, for

both the FGTD and OFTM stimuli, there were six possible events that could elicit a response. Therefore, a scaffold adapted from the INC was created and the transcripts were also coded on this scoring rubric. On this scoring rubric, character, setting, internal response and attempt could be awarded a maximum score of two. The maximum scores for these elements were not expanded because most participants demonstrated ability to produce all the relevant information or there was only one target response for the specific element. For example, all participants identified the relevant characters so expanding the scoring would not change the results. In addition, for the 'attempt' element, there was one target key action relating to the main event. There were six initiating events, each with a maximum score of two, which resulted in a maximum score of 12. There were also four events of consequences, each with a maximum score of two, bringing the maximum score for this element to eight. Participants could earn a maximum of 28 points for macrostructure based on this adapted scoring rubric. Table 3.2 demonstrates the scoring rubric. The scoring rubrics for narrative elements corresponding to each point for both narratives are illustrated in the Appendix 3.

Table 3.2

Proposed scoring rubric

Narrative element	1 point	2 points
Character (maximum score = 2)	Reference to a single character	Mentions both main characters
Setting (maximum score = 2)	Any other place reference (e.g., water)	Specific place reference where main event occurred (e.g., pond, boat in OFTM)
Initiating event (IE) – x6 for each stimulus (maximum score = 12)	Event e.g., The boy has a (small) frog	new+ corresponding response e.g., 'the big frog didn't like it'
Internal response (maximum score = 2)	Any emotion vocabulary	Emotion vocabulary related to an event
Action/attempt (maximum score = 2)	N/A	Action directly related to main event
Consequence – x4 for each stimulus (maximum score = 8)	N/A	Result directly related to main event

Specific criteria were established when scoring the samples:

1. Only spontaneous responses were considered when scoring, i.e., narrative elements produced in response to prompts whereby the target vocabulary was modelled were not considered to be spontaneous and therefore were not considered in the scoring of the overall macrostructure score
2. Non-specific vocabulary (e.g., 'here', 'jumped there') was not awarded scores

3. For narratives elicited in Mandarin, English responses were not considered to be accurate even if they were semantically accurate (e.g., produced ‘restaurant’ instead of 餐厅 *can ting*).

3.6.2 Microstructure

The microstructure elements analysed in this project were mean length of utterance in word (MLUw), lexical diversity, and specific grammatical markers. These variables were chosen as research has found that they are measures frequently and successfully used to identify language disorders in monolingual and bilingual children based on language sampling (Altman et al., 2016; Rezzonico et al., 2015).

The following microstructure elements produced in both English and Mandarin in the language samples were analysed:

- Mean length of utterance
    - Mean length of utterance in words (MLUw)
    - Mean length of five longest utterances in words (MLU5w)
- Lexical diversity
    - Number of different words (NDW)

Although CLAN also provides other lexical outcome measures, such as total number of words (token) and type–token ratio (TTR), only the total number of unique words was examined in this study. Previous research has shown that there are factors that affect TTR, such as sample length (McCarthy & Jarvis, 2007), and that TTR is not always sensitive for the age group evaluated in this study (Watkins et al., 1995).

Teoh et al. (2012) observed that Singaporean bilingual children omitted tense markers and noted that how Singaporean children acquire language and corresponding grammatical markers is not yet well understood. This study aims to add to current knowledge by describing these characteristics at the narrative level.

The following English grammar elements were analysed:

- Past tense (regular and irregular forms)
- Plurals (regular and irregular forms)
- Possessive noun marker
- Pronouns (subjective, objective, and possessive)
- Subject and object omissions
- Auxiliary and copula verb errors
- Prepositional phrase errors
- Conjunctions

The following Mandarin grammar elements were analysed:

- Perfective aspect marker
- Imperfective aspect marker
- Negation
- Passive sentence structure
- Active sentence structure
- Classifiers
- Pronouns (subjective, objective, and possessive)
- Subject and object omissions
- Prepositional phrase errors
- Conjunctions

3.6.3 Selection criteria

On review of the raw data, it was noted that there were discrepancies in the samples which would result in unequal comparisons. Thus not all the samples were deemed appropriate for analysis and selection criteria were established.

1. Participants were allowed opportunities to produce the narratives independently before prompting (e.g., binary choice, modelling) from the examiners
2. There were no challenging behaviours or refusal to participate

The selection criteria resulted in some participants being excluded from the dataset used for different outcome measures depending on the prompts given affecting the specific outcome measures. If any sample within the set did not meet the selection criteria, it was considered a missing datapoint. The percentage of missing data and the reasons for their exclusion are presented in Table 3.3. The selection criteria only affected the macrostructure outcome measures, as the provision of prompts did not affect the general and fine-grained microstructure elements.

On reviewing the raw data, another observation was that there were no opportunities for production of certain fine-grained microstructure elements in the narrative samples from some of the participants. However, due to the nature of the narrative tasks, no minimum threshold was set. Outcome measures with few opportunities were not removed from the dataset because they still provided important information. The finding that the sampled population did or did not spontaneously produce some target markers supports a more holistic understanding of their skills, juxtaposed against the current literature landscape of a lack of research at the narrative level for this population. In addition, there is a need to know how the population is performing on

these markers to help clinicians make decisions regarding making diagnoses, given that some of these are clinical indicators of language disorders (e.g., Sheng et al., 2023).

Table 3.3

Breakdown of missing cases on macrostructure outcome measures

Outcome measure	Number of cases with missing data (out of 36)	Percentage of missing data	Number of cases with complete data (out of 36)	Percentage of cases with complete data	Reason for exclusion
Total macrostructure	3	8.3%	33	91.7%	Examiner provided a binary choice prompt (i.e. modelled target element) before opportunity for spontaneous productions
'Initiating event' element	3	8.3%	33	91.7%	Examiner provided a binary choice prompt before opportunity for spontaneous productions
'Consequence' element	3	8.3%	33	91.7%	Examiner provided a binary choice prompt before opportunity for spontaneous productions

3.6.4 Treatment of Missing Data

A range of measures to manage the missing data was undertaken and analysed. There is a variety of methods for managing missing data, with some more appropriate than others. As only a relatively small percentage of data was missing, analysis with the missing data will be presented in Chapter 4. Two plausible models to manage the missing data explored were the maximum likelihood methods using the expectation maximisation algorithm (EM) and the multiple imputations (MI) model. This study used the EM model, for the reasons outlined in the following paragraphs, and the statistical analysis from the EM model is presented in Appendix 4, in addition to additional sensitivity measures, including running of analysis with the complete dataset without consideration of the selection criteria (i.e., all obtained datapoints would be used). Convergence between the different methods implies that the results presented in the main body of the thesis are robust.

MI is a popular method of managing missing data and in most statistical software operates on the assumption that the missing data is missing at random (MAR) (Schafer & Graham, 2002); however, it can also manage data missing completely at random (MCAR) and missing not at random (MNAR) (Van Buuren, 2018). The statistical theory of MI is beyond the scope of this thesis but further detailed description can be found in the literature (e.g., Baraldi & Enders, 2010; Carpenter & Kenward, 2013). Simply put, the MI method deals with missing data by creating multiple complete versions of the original incomplete dataset by using a specific model that describes the data. The complete versions are then analysed and combined into an overall statistical analysis (Little & Rubin, 2019).

However, MI was deemed to not be suitable for managing missing data for this study. Firstly, based on the exclusion criteria from this study, the degree of missing data was found to be 8.3% on the macrostructure outcome measures. There is some disagreement in the

literature regarding the benefits of using the MI model based on the proportion of missing data. Some researchers suggested that MI is unsuitable if the dataset is missing a maximum of 5% of the data (e.g., Alice, 2018) while others have found that MI is not appropriate if less than 5% of the data is missing (Schafer, 1999). Other researchers have addressed the likelihood of producing biased results: Bennett (2001) argued that bias is likely to be present if more than 10% of the data is missing, while Jakobsen et al. (2017) suggested that results can only be considered hypothesis generating if more than 40% of the data is missing. However, it is acknowledged that the argument of the proportion of missing data affecting the reliability of management of missing data can be made for other models and therefore other reasons should be considered.

Secondly, the sample size for the current study is small, with a total of 36 participants. MI was originally designed as a method of managing missing data in large samples (Rubin, 1987). Finally, this study has two within-factors: language elicited (English and Mandarin) and task type (retell and recall). MI does not accommodate within-factors in its analysis automatically (Rubin, 1987).

The expectation maximisation (EM) algorithm is an iterative procedure which identifies the maximum likelihood (ML) estimates when missing data is present by using other variables to impute a value (expectation) then maximising the likelihood function; a new more likely value is re-imputed until the most likely value is reached, thereby assuring convergence between the estimated values and actual missing data (Dempster et al., 1977). More details and application of the EM algorithm are included in works by, for example, Little and Rubin (2019) as well as Ng et al. (2012). The EM model is more appropriate for this analysis as it allows for analysis with repeated measures ANOVA with within-factors.

Chapter 4: Results – Macrostructure

This chapter presents the results from the macrostructure outcome measures. For each outcome measure, results are ordered to align with the research questions, i.e., first discussing performances by the EL1CL2 group, then the balanced bilingual group, and finally comparing the two language dominance groups.

Only the total macrostructure, IE and 'consequence' outcome measures were observed to have variance in the data (e.g., all participants achieved the same full score on the 'character' element) and so they were the only macrostructure outcome measures analysed quantitatively with parametric analyses. These will be discussed in this chapter. The other macrostructure elements lacked variance and non-parametric analyses were employed. The analysis will be discussed briefly towards the end and the discussion is presented in the next chapter.

The same analysis was run for the 'total macrostructure', 'initiating event' and 'consequence' outcome measures. A three-way repeated measures ANOVA was run on the sample of 33 participants to examine the effect of and interaction between language dominance, language and task type. Language dominance included two levels (balanced bilinguals and English-dominant); language included two levels (English and Mandarin); and task type included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each three-way ANOVA analysis (Feise, 2002).

4.1 Total macrostructure

4.1.1 EL1CL2

Descriptive data is detailed in Table 4.1 and the results of statistical analysis in Table 4.2. Of interest was the finding that the EL1CL2 group produced more complete narratives in English than Mandarin and retained more macrostructure elements in their stronger language. The former was evidenced by a significantly higher percentage accuracy on the English tasks than the Mandarin tasks, supporting Hypothesis 1B. A similar pattern was also observed when the retell and recall tasks were analysed separately. The latter was demonstrated by a significantly lower percentage accuracy on the Mandarin recall task than the retell task. No significant difference was observed between the English retell and recall tasks. The results were as expected, given that this group was English-dominant.

4.1.2 Balanced

The balanced bilingual group produced significantly more complete narratives in English than in Mandarin. This pattern was also observed on the retell and recall tasks specifically. This finding was surprising and did not support Hypothesis 1A. In addition, a significantly lower percentage accuracy was observed on the Mandarin recall task than the retell task but a difference was not observed on the English retell and recall tasks. The results suggest that, based on this outcome measure, the balanced bilingual group demonstrated greater strength in English than in Mandarin and that they retained information more poorly in their weaker language.

Table 4.1

Means and standard deviations on 'total macrostructure' measure by language and task type

	English						Mandarin						Retell		Recall		Total	
	Retell		Recall		Total		Retell		Recall		Total		Total		Total			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	78.9	12.4	74.4	16.4	76.6	12.9	65.1	13.7	56.9	16.1	61.0	13.0	72.0	10.7	65.7	12.7	68.8	10.6
Balanced	86.0	12.4	80.0	16.4	82.9	12.9	77.0	13.7	65.0	16.1	71.0	13.0	81.5	10.4	72.4	12.7	76.7	10.6

Table 4.2

Results of ANOVA for production of total macrostructure by both language dominance groups

		EL1CL2				Balanced			
		F	*p*	η_p^2	Interpretation	*F*	*p*	η_p^2	Interpretation
Language		18.71	<.001	.376	English > Mandarin	10.39	.003	.251	English > Mandarin
Task type		6.72	.014	.178	Retell > recall	13.01	.001	.296	Retell > recall
Language x task type	English tasks	1.79	.190	.055	EL retell did not differ significantly from EL recall	3.15	.086	.092	EL retell did not differ significantly from EL recall
	Mandarin tasks	5.30	.028	.146	CL retell > CL recall	10.80	.003	.258	CL retell > CL recall
	Retell tasks	14.15	<.001	.313	EL retell > CL retell	5.69	.023	.155	EL retell > CL retell
	Recall tasks	12.49	.001	.287	EL recall > CL recall	8.64	.006	.218	EL recall > CL recall

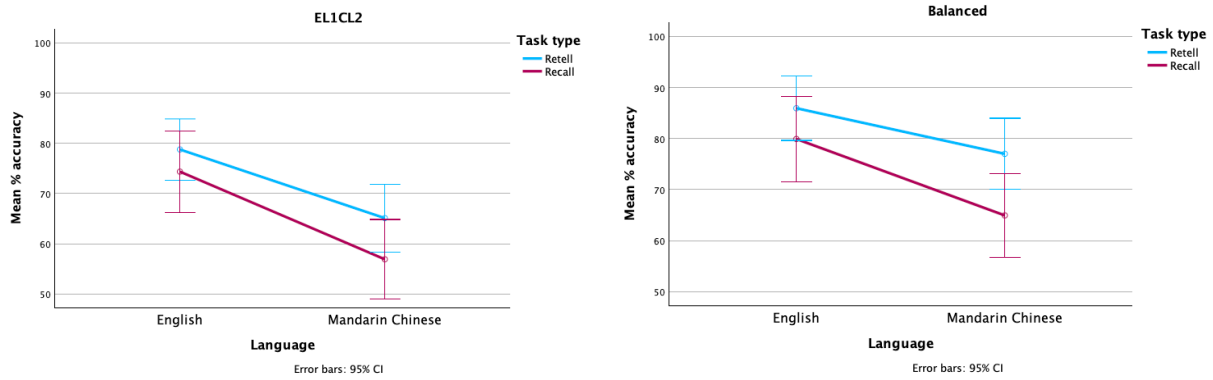
Note. EL = English and CL = Mandarin.

4.1.3 Comparing the two language dominance groups

There was no significant interaction effect between language dominance, language, and task type (complete statistical analysis in Table 4.4), indicating that the percentage accuracy of macrostructure elements across both language dominance groups did not differ across the tasks. Similar patterns were observed in the percentage accuracy of total macrostructure elements produced by both language dominance groups. Across all tasks, the balanced bilingual group produced a higher mean percentage accuracy of total macrostructure than the EL1CL2 group, as illustrated in Figure 4.1.

Figure 4.1

Mean percentage accuracy of total macrostructure produced by each language dominance for each task



Overall, the balanced group produced more macrostructure elements than the EL1CL2 group. This difference was significant, indicating stronger narrative skills in the balanced bilingual group.

Although it appeared overall that the balanced bilingual group produced more complete narratives, both language dominance groups performed very similarly except on the Mandarin retell task, in which the balanced bilingual group demonstrated significantly higher accuracy for total macrostructure elements than the EL1CL2 group. There was no significant difference between the groups on the English retell, English recall and Mandarin recall tasks, as demonstrated in Table 4.3. These findings did not support Hypothesis 1C and supported Hypothesis 1D to a partial extent.

Table 4.3

Difference in percentage accuracy of macrostructure elements between language dominance groups by task

	F	*p*	η_p^2	Interpretation
English retell	2.76	.107	.082	Balanced = EL1CL2
English recall	0.94	.340	.029	Balanced = EL1CL2
Mandarin retell	6.22	.018	.167	Balanced > EL1CL2
Mandarin recall	2.06	.162	.062	Balanced = EL1CL2

Taken together, these results suggest very similar performances by both the EL1CL2 group and the balanced bilingual group: participants demonstrated greater accuracy in English than in Mandarin, and on retell tasks than on recall tasks. In addition, both groups retained more information in their stronger language (English). The main difference between the groups was the more complete production of narratives on the Mandarin retell task.

Key results are outlined as follows, with the statistical analysis detailed in Table 4.4.

- The balanced bilingual group demonstrated significantly higher accuracy for total macrostructure elements than the EL1CL2 group. This suggests an overall higher language proficiency at the narrative level.
- Both language dominance groups demonstrated significantly greater accuracy for total macrostructure elements in English than Mandarin. This suggests English-dominance in both groups.
- There was no significant difference between language dominance groups on the English tasks, $F(1, 31) = 2.01$, $p = .166$, $\eta_p^2 = .061$. The results indicate similar proficiencies in English.
- The balanced bilingual group demonstrated significantly greater accuracy for total macrostructure elements than the EL1CL2 group, $F(1, 31) = 4.84$, $p = .035$, $\eta_p^2 = .135$. The results indicate a higher proficiency in Mandarin.
- Both groups demonstrated significantly greater accuracy for total macrostructure elements on the retell task than the recall task.
- The balanced bilingual group demonstrated significantly greater accuracy for total macrostructure elements on the retell tasks than the EL1CL2 group. This was likely due to the greater accuracy on the Mandarin retell task.

Table 4.4

Results of three-way ANOVA for production of total macrostructure between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	4.88	.035	.136	Balanced > EL1CL2
Language	28.36	<.001	.478	English > Mandarin
Task type	19.30	<.001	.384	Retell > recall
Language dominance x language	0.105	.749	.003	No significant two-way interaction between language dominance and language
Language dominance x task type	0.62	.439	.019	No significant two-way interaction between language dominance and task type
Language x task type	1.99	.168	.060	No significant two-way interaction between language and task type
Language dominance x language x task type	0.105	.749	.003	No significant three-way interaction

4.2 Macrostructure elements

For the INC scoring rubric, there was limited variance between scores for all elements. This was likely due to the ceiling effect. Therefore, only the proposed scoring rubric will be addressed in this thesis. It was noted that only the 'initiating event' (IE) and 'consequence' macrostructure elements had some variability.

4.2.1 Initiating event

4.2.1.1 EL1CL2

The descriptive data is detailed in Table 4.5 and the results of statistical analysis in Table 4.6. A significant finding was that the EL1CL2 group produced a higher percentage accuracy of IE elements in English than Mandarin and retained more IE elements in their stronger language. The former was evidenced by a significantly higher percentage accuracy on the English tasks than the Mandarin tasks. A similar pattern was also observed when the retell and recall tasks were analysed separately. The latter was demonstrated by a significantly lower percentage accuracy on the Mandarin recall task than the retell task. No significant difference was observed between the English retell and recall tasks. The results were as expected, given that this group was English-dominant.

4.2.1.2 Balanced

Generally, the balanced bilingual group produced a significantly higher percentage accuracy of IE elements in English than in Mandarin. This pattern was consistent on the retell and recall tasks (see descriptive data in Table 4.5 and results of statistical analysis in Table 4.6). A second observation is poorer retaining of IE elements in Mandarin. Although the balanced bilingual group produced lower percentage accuracy on the recall tasks compared to

the retell tasks in both languages, the percentage accuracy on the Mandarin recall was significantly lower than that in English. The results suggest that, based on this outcome measure, the balanced bilingual group demonstrated greater strength in English than in Mandarin and that they retained information more poorly in their weaker language. This was similar to patterns from the ‘total macrostructure’ outcome measure.

Table 4.5

Means and standard deviations of percentage accuracy of IE measure by language and task type

	English						Mandarin						Retell		Recall		Total	
	Retell		Recall		Total		Retell		Recall		Total		Total		Total			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	71.1	21.9	64.2	22.6	67.6	18.3	55.9	22.0	43.1	20.0	49.5	18.7	62.2	14.4	53.7	14.6	58.6	13.0
Balanced	80.2	17.2	71.4	18.2	75.8	18.3	69.3	21.2	51.1	21.1	61.2	18.7	74.7	14.4	63.5	14.6	68.5	13.0

Table 4.6

Results of ANOVA for percentage accuracy of IE elements by both language dominance groups

		EL1CL2				Balanced			
		F	*p*	η_p^2	Interpretation	*F*	*p*	η_p^2	Interpretation
Language		8.13	.008	.208	EL > CL	4.95	.034	.138	EL > CL
Task type		10.14	.003	.246	Retell > recall	15.51	<.001	.333	Retell > recall
Language x task type	English tasks	2.72	.109	.081	EL retell = EL recall	4.26	.047	.121	EL retell > EL recall
	Mandarin tasks	7.20	.012	.189	CL retell > CL recall	10.88	.002	.260	CL retell > CL recall
	Retell tasks	4.43	.044	.125	EL retell > CL retell	2.16	.152	.065	EL retell = CL retell
	Recall tasks	9.00	.005	.224	EL recall > CL recall	6.30	.017	.169	EL recall > CL recall

Note. EL = English and CL = Mandarin.

4.2.1.3 Comparing the two language dominance groups

Statistical analysis (illustrated in Table 4.8) revealed no significant three-way interaction between language dominance x language x task type. Overall, the balanced bilingual group produced a significantly higher percentage accuracy of IE elements than the EL1CL2 group (see Table 4.5 for descriptive data). The results indicate a more complete production of the key events by the balanced bilingual group and, by extension, more complete narratives, implying stronger narrative skills. However, comparisons between the two language dominance groups indicate similar performances on the tasks. There was no significant statistical difference between the two language dominance groups on the percentage accuracy of IE elements across all tasks (Table 4.7). The higher percentage accuracy by the balanced bilingual group was likely driven by a better performance in Mandarin, evidenced by the medium effect of language dominance on the Mandarin tasks, $F(1, 31) = 3.23$, $p = .082$, $\eta_p^2 = .094$.

Table 4.7

Difference in percentage accuracy of IE elements between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
English retell	1.76	.194	.054	Balanced = EL1CL2
English recall	0.99	.328	.031	Balanced = EL1CL2
Mandarin retell	3.16	.085	.092	Balanced = EL1CL2
Mandarin recall	1.95	.173	.059	Balanced = EL1CL2

The results, as illustrated in Figure 4.2 and detailed in Table 4.5, suggest that both language dominance groups performed better in English than in Mandarin and better on the retell task than the recall task. Both groups retained IE elements more poorly in Mandarin.

Figure 4.2

Interaction between language and task type for each language dominance group

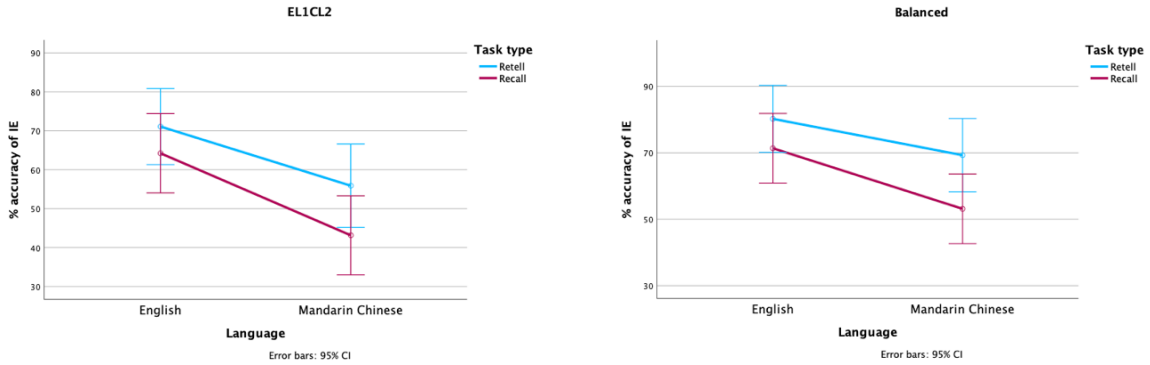


Table 4.8

Results of three-way ANOVA for production of IE elements between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	4.78	.036	.134	Balanced > EL1CL2
Language	12.83	.001	.293	English > Mandarin
Task type	25.43	<.001	.451	Retell > recall
Language dominance x language	0.15	.700	.005	No significant two-way interaction between language dominance and language
Language dominance x task type	0.37	.547	.012	No significant two-way interaction between language dominance and task type
Language x task type	2.01	.166	.061	No significant two-way interaction between language and task type
Language dominance x language x task type	0.02	.880	.001	No significant three-way interaction

4.2.2 Consequence

4.2.2.1 EL1CL2

Overall, the EL1CL2 group produced a higher percentage accuracy of ‘consequence’ elements in English than Mandarin. Although there was no significant difference between languages on both the retell task and recall tasks, there was still a medium effect of language (see Table 4.9 for descriptive data and Table 4.10 for statistical analysis), indicating higher proficiency in English. This was an expected finding as this group was English-dominant. There was no significant difference between percentage accuracy of ‘consequence’ elements on retell and recall tasks.

4.2.2.2 Balanced

The results indicate that the balanced bilingual group produced similar percentage accuracies of the ‘consequence’ elements across both languages and task types. There was no significant difference between languages, or between task types (see Table 4.9 for descriptive data and Table 4.10 for statistical analysis). Out of the ‘total macrostructure’, IE and ‘consequence’ elements, ‘consequence’ was the only outcome measure that showed similar proficiencies across both languages. A possible reason for this is that the ‘consequence’ elements tended to occur nearer to the end of the narrative and the children were not able to retain as much information even in the retell task in their stronger language.

Table 4.9

Means and standard deviations of percentage accuracy of 'consequence' elements by language and task type

	English						Mandarin						Retell		Recall		Total	
	Retell		Recall		Total		Retel		Recall		Total		Total		Total			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	73.5	20.7	71.3	24.4	72.4	19.3	57.4	28.2	53.7	32.1	55.5	26.9	65.4	16.8	62.5	21.1	64.0	16.5
Balanced	84.4	20.7	78.1	24.4	81.3	19.3	71.1	28.2	65.6	32.1	68.4	26.9	77.7	16.8	71.9	21.1	74.8	16.5

Table 4.10

Results of ANOVA for production of total macrostructure by both language dominance groups

		EL1CL2				Balanced			
		F	*p*	η_p^2	Interpretation	*F*	*p*	η_p^2	Interpretation
Language		4.42	.044	.125	EL > CL	2.42	.130	.072	English = Mandarin
Task type		0.41	.526	.013	Retell = recall	1.54	.224	.047	Retell = recall
Language x task type	English tasks	0.15	.703	.005	EL retell = EL recall	1.12	.298	.035	EL retell = EL recall
	Mandarin tasks	0.305	.585	.010	CL retell = CL recall	0.64	.432	.020	CL retell = CL recall
	Retell tasks	3.39	.075	.099	EL retell = CL retell (medium effect of language)	2.15	.153	.065	EL retell = CL retell
	Recall tasks	3.57	.068	.103	EL recall = CL recall (medium effect of language)	1.69	.204	.052	EL recall = CL recall

Note. EL = English and CL = Mandarin.

4.2.2.3 Comparing the two language dominance groups

Statistical analysis revealed no significant three-way interaction between language dominance, language and task type (see Table 4.12 for complete statistical analysis). The balanced bilingual group produced a higher percentage accuracy of 'consequence' elements than the EL1CL2 group. This difference was not statistically significant but language dominance had a medium effect on production of 'consequence' elements. The effect size of language dominance on the 'consequence' element was similar to the effect sizes of language dominance on total macrostructure and the IE element. This suggests a similar pattern between the three outcome measures.

Overall, there were negligible differences between the language dominance groups on all tasks (Table 4.11), with similar patterns between the two language dominance groups, as illustrated in Figure 4.3. However, there was a medium effect size of language dominance on the English retell task, indicating that the balanced bilingual group demonstrated strength in English as compared to the EL1CL2 group.

Figure 4.3

Interaction between language and task type by each language dominance group

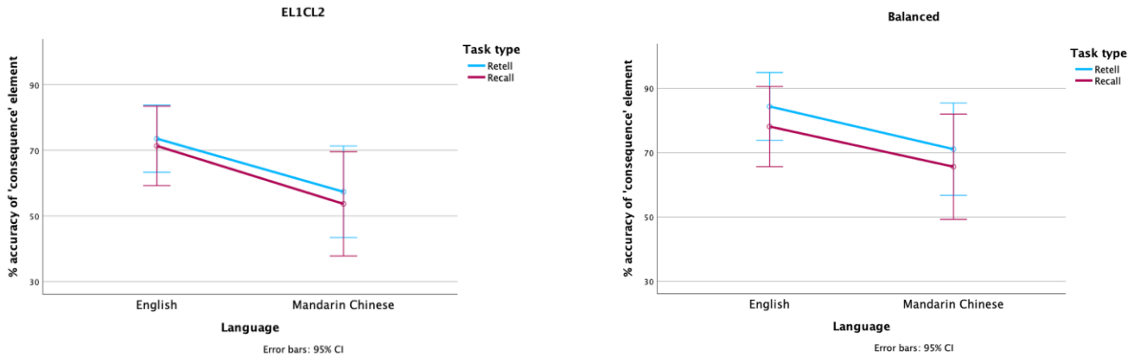


Table 4.11

Difference in percentage accuracy of 'consequence' elements between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
English retell	2.27	.142	.068	Balanced = EL1CL2
English recall	0.64	.430	.020	Balanced = EL1CL2
Mandarin retell	1.96	.171	.059	Balanced = EL1CL2
Mandarin recall	1.14	.294	.036	Balanced = EL1CL2

Table 4.12

Results of three-way ANOVA for production of 'consequence' elements between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	3.53	.070	.102	Balanced = EL1CL2 (but noted medium effect of language dominance similar to 'total macrostructure' and IE
Language	6.66	.015	.177	English > Mandarin
Task type	1.79	.191	.055	Retell = recall
Language dominance x language	0.12	.730	.004	No significant two-way interaction between language dominance and language
Language dominance x task type	0.20	.660	.006	No significant two-way interaction between language dominance and task type
Language x task type	0.00	.955	.000	No significant two-way interaction between language and task type
Language dominance x language x task type	0.04	.853	.001	No significant three-way interaction

4.3 Other elements

There was very limited variance for the other individual macrostructure elements and therefore non-parametric tests were administered. The Mann-Whitney *U* test was run on 16 balanced bilingual participants and 20 EL1CL2 participants; there was no missing data for these outcome measures. Overall, there was no significant difference between language dominance groups for any of these outcome measures. The results of the statistical analyses are detailed in Appendix 5.

4.4 Summary

The key findings from macrostructure elements are outlined in Table 4.13 and include the differences in performances between language dominance groups on each task across the three outcome measures of total macrostructure, IE, and 'consequence' element. In summary, the balanced bilingual group performed as well as the EL1CL2 group on the English tasks, suggesting that both groups have comparable narrative skills in English despite allocation to different language dominance groups. The balanced bilingual group also demonstrated stronger Mandarin narrative skills than the EL1CL2 group, which was unsurprising.

Table 4.13

Key macrostructure findings

Outcome measure	Main effect of language dominance	Main effect of language	Language dominance x language interaction	Balanced	EL1CL2
Total macrostructure	Yes • Balanced > EL1CL2	Yes • English > Mandarin	No	• English > Mandarin • Mandarin: balanced > EL1CL2 • Mandarin retell > Mandarin recall	
Character	No			N/A	
Setting	No			N/A	
Initiating event	Yes • Balanced > EL1CL2	Yes • English > Mandarin	No	• English > Mandarin • Retell > recall • English retell > • Mandarin retell >	

				• English recall • Mandarin retell > Mandarin recall	Mandarin recall
Internal response	No			N/A	
Plan	No			N/A	
Action/attempt	No			N/A	
Consequence	No (medium effect size of language dominance)	Yes • English > Mandarin	No		• English > Mandarin

Chapter 5: Discussion – Macrostructure

This chapter discusses the findings on the total macrostructure outcome measure as well as the individual macrostructure elements.

5.1 Total macrostructure

Although the aim of this thesis was exploratory in nature, some hypotheses were proposed based on clinical experience. As in Chapter 1, the following hypotheses were proposed regarding macrostructure elements:

- EL1CL2 group: more complete narratives in English than in Mandarin. The results supported this hypothesis.
- Balanced bilingual group: similar performances in English and Mandarin. This hypothesis was not supported by the results as this group produced more complete narratives in English than Mandarin.
- Comparison between groups: both groups would produce more complete narratives on the retell than recall tasks. The EL1CL2 group would produce more complete narratives than the balanced bilingual group in English. The balanced bilingual group would produce more complete narratives than the EL1CL2 group in Mandarin. Both groups performed similarly in English and the balanced bilingual group produced more complete Mandarin narratives than the EL1CL2 groups.

There is some literature on the effect of bilingualism on memory (e.g., Talli & Stavrakaki, 2020). Some studies explored retaining of grammatical structures in sentence repetition tasks (e.g., Sheng et al., 2023; Woon et al., 2014) but there is very limited research delving more deeply into the effects of language dominance in bilingual children on information retention. For

both language dominance groups, there was little effect of the delayed recall in English, but this was more consistently present in Mandarin. This can be easily explained for the EL1CL2 group: these children retained information more consistently in their stronger language and less information – in the form of macrostructure elements – in their weaker language. As the same pattern was observed for the balanced bilingual group, it was not unreasonable to expect that the same patterns apply to this group. This means that, despite being reported as 'balanced' in their language dominance, these children might actually be stronger in English. This was evidenced by their ability to retain the macrostructure elements more consistently in English. The effect of the stronger language was more evident when the cognitive load increased (recalling as compared to retelling), in that the children were able to retain more information in English. This might not be surprising given that the majority language in Singapore is English and that both groups might have been more exposed to English, resulting in English dominance.

The implications of this finding are twofold: firstly, given that the allocation of participants into the two language dominance groups was based on parental reports, the results add to the ongoing debate over the validity of parental reports of bilingual children's language proficiencies (Pua et al., 2017). In addition, it supports the theory that bilinguals, more often than not, are not truly balanced in their language proficiencies (Baker, 2006) and that the "notion of balanced bilingualism is an ideal one, which is largely an artifact of a theoretical perspective which takes the monolingual as its point of reference" (Romaine, 1989, p. 18). Secondly, it gives insight into the changing linguistic landscape of Singapore (Brebner et al., 2015), with the trajectory of Singaporean bilingual children becoming increasingly English-dominant. This, in turn, will have an impact on education policies and cultural identity, as bilingualism is a key pillar of the Singaporean education system and the Singaporean multicultural identity.

Another key finding was that the balanced bilingual group produced more complete narratives in Mandarin when compared to the EL1CL2 group. This was hypothesised and was likely due to the balanced bilingual group having more exposure to Mandarin; it was consistent with the higher scores on the Mandarin portion of the BLAB, which indicated stronger receptive and expressive vocabulary skills in Mandarin. An unexpected finding was that the balanced bilingual group produced narratives in English with comparable levels of completeness to the EL1CL2 group. This again may demonstrate a trend towards English dominance (Singapore Department of Statistics, 2021). As English is the language of instruction in kindergarten, in addition to the community language, the balanced bilingual group may had been exposed to sufficient English input to perform at a similar level to the English-dominant group. Overall, the balanced bilingual group produced more complete narratives than the EL1CL2 group, which suggests that a more balanced acquisition of two languages that a bilingual child uses might be a facilitating factor to developing stronger narrative language skills.

5.2 Character

All participants in both language dominance groups achieved the maximum score by labelling the two main characters in the narratives (i.e., the boy and the frog). No participants were observed to name the characters, as per the script modelled to them before the initial retelling. It was therefore more informative to analyse the samples qualitatively instead of quantitatively.

Firstly, all participants in both language dominance groups labelled the family members and animals, but only a few labelled the non-family characters in FGTD with accurate vocabulary and generalised ‘the man’ for all the male characters. In Mandarin, participants overused *ren* 人 (person or people) and *ta/ta* 他/她 (subjective pronoun indicating gender for

male and female respectively but both pronounced *ta*) without a prior introduction to the characters. These are demonstrated below. This observation provides insight into vocabulary skills of this population.

P11

- Referring to the saxophone player: then after that the man didn't notice
- Referring to the male diner: then after that when the man want to take a sip of bite the frog kiss him
- Referring to the waiter: then he ask the man

P10

- Referring to the saxophone player: 跑去他的那个东西 *pao qu ta de na ge dong xi* ('run to his that thing')
- Referring to the female diner: 然后她吃了之后看到青蛙 *ran hou ta chi le zhi hou kan dao qing wa* ('then she ate after saw frog')
- Referring to the waiter: 然后那个人要抓青蛙 *ran hou na ge ren yao zhua qing wa* ('then that person want to catch frog')

In English, only three participants produced relative clauses to clarify which characters they were referring to. Previous research showed that monolingual children start to produce relative clauses in preschool (Diessel & Tomasello, 2005) and that subject relatives (e.g., the person who served the food) are earlier developing than direct object relatives (e.g., the woman the waiter served the food to) (Diessel & Tomasello, 2005; Kim & O'Grady, 2016). A more recent study of Singaporean school-aged children demonstrated that although these older children produced a wider variety of relative clauses, these relative clauses were not consistently accurate (Yan & Matthews, 2017), which suggested that Singaporean bilingual

children continue to develop this linguistic pattern into their primary school years. The results add to the literature by showing that, for these participants, the relative clause starts to emerge in the kindergarten years but likely continues to develop in the school-going years, and that subject relatives develop before object relatives.

- P07: the person who was blowing the saxophone
- S12: the person who serve the food
- P11: the boy who playing the saxophone, the one playing the drum

In Mandarin, only one participant from the balanced bilingual group was observed to produce a relative clause, demonstrated below. No EL1CL2 participants produced relative clauses in Mandarin.

- P13 retell: 那个打鼓的人 *na ge da gu de ren* (‘that playing drums person’)

Secondly, there was an overuse of definite noun phrases, even when introducing new referents. This was observed in samples from both language dominance groups. In addition, there was also an instance where the indefinite noun phrase was used for an already introduced character. These are illustrated below. These errors support previous literature that showed that the accuracy of referring expressions at the narrative level start to become more accurate in the primary school years rather than in the kindergarten years (Hickmann et al., 2015). Zhou et al. (2022) studied referring expressions in Singaporean English-Mandarin 4- to 6-year-old bilingual children and likewise reported that they showed a tendency to overuse definite noun phrases. The overgeneralisation of indefinite noun phrases was a surprising finding but was likely to be an exception, as it was only observed once. Further study with a larger sample would be helpful in elucidating if it is characteristic of this group of children.

Overuse of definite noun phrases

- K17: the boy have three pet. Then is the dog and the frog and the turtle. The boy see the present in front of the boy there… The boy open the present and see the little frog inside the present

Using indefinite noun phrase for a previously introduced character

- K21 [referring to the scene of the frog in the restaurant]: and then he saw a frog drop inside his face

5.3 Setting

The target for this macrostructure element was the location at which the main event/conflict occurs. In FGTD, this was 'restaurant' and in OFTM, this was the 'pond' or the 'boat'. Both language dominance groups performed similarly in English: most participants produced the target vocabulary in both the retell and recall tasks with no effect of delayed recall. Further analysis of the error types revealed some differences but it should be noted that there were very few errors and so caution should be exercised in generalising the results. All participants who did not produce the target vocabulary made reference to location. These are demonstrated below. Only one balanced bilingual participant did not produce the target vocabulary, instead using semantically related vocabulary. Of the three EL1CL2 participants who did not use the target vocabulary, semantically related and vague vocabulary was substituted or the location vocabulary omitted altogether.

K21 (balanced)

- Retell: then he reach the <u>dinner</u>
- Recall: and then the boy go inside the <u>dinner place</u>

S03 (EL1CL2)

- Retell: and he kick the little frog and splash into the river
- Recall: and then after that soon they came onto the stream

The balanced bilingual participants and the EL1CL2 participants made more errors on the Chinese tasks than in English. This finding supports Hao et al.'s (2019) finding from Mandarin-English bilingual children in the United States, and it suggests an effect of English as the community language (Pesco & Bird, 2016), leading to higher linguistic proficiency in English than Mandarin. Omissions and non-specific vocabulary were observed in both language dominance groups, with code-switching also observed in the EL1CL2 group. One balanced bilingual produced the target vocabulary in English at the examiner's instruction after verbalising in English that he did not know the vocabulary in Mandarin. This suggests that both groups are stronger in English than in Mandarin and that the difference between language proficiencies is more pronounced in the EL1CL2 group than the balanced bilingual group. Again, this finding echoes that of Hao et al. (2019) in that the differences between both languages were negligible on this element.

Another finding was that this was the only macrostructure element in which codeswitching was observed. This possibly implies dominance in English, which although expected for the EL1CL2 group, was also observed in the balanced bilingual group.

K22 (balanced)

- Retell: 他们到那边了 *ta men dao na bian le* ('they reached there', referencing the restaurant)
- Recall: Participant: 去 ... *qu…* ('go')
  Examiner: 去哪里 *qu na li* ('go where')
  Participant: 吃饭 *chi fan* ('eat rice' but also means 'eat meal')

P01 (balanced)

- Retell: Participant: 他们到, 吃饭的, 他们吃, 他们 *ta men dao, chi fan de, ta men chi, ta men* ('they reach, eating, they eat, they' → self-corrections)

  Participant: I don't know how to say

  Examiner: you want to use English and say

  Participant: they went to the restaurant

K09 (EL1CL2)

- Retell: 然后他们到了 uh restaurant *ran hou ta men dao le uh restaurant* ('then they reached, uh, restaurant')
- Recall: omitted

P17 (EL1CL2)

- Retell: 蛙去那个 restaurant *wa qu na ge restaurant* ('frog go that restaurant')
- Recall: 有一个男孩、妈妈、爸爸要去 dinner *you yi ge nan hai ma ma ba ba yao qu dinner* ('had a boy, mother, father want to go dinner')

5.4 Initiating event

In English, the percentage of incomplete events was fairly stable across both tasks. An incomplete event is defined as a main event without the corresponding response. For example, in 'One Frog Too Many', the participants would have to narrate that the boy had a new little frog (main event) and that the big frog did not like the little frog (response) to achieve the full score for one of the 'initiating event' elements. If only the main event was produced (i.e., no corresponding response), then the participants would only achieve one point instead of two for that particular element. In addition, there was a 50% increase in omissions after the delay for

both language dominance groups. In Mandarin, for both language dominance groups, the percentage of incomplete events also remained fairly similar after the delay but the percentage of omissions increased. Omissions increased by about 50% on the delayed recall for the balanced bilingual group and about 100% for the EL1CL2. This may be explained by needing more cognition to retain information in the weaker language thereby reducing overall output in Mandarin. This difference was more obvious for the EL1CL2 as their weaker language was weaker than the balanced bilingual group's weaker language.

Although there were similar patterns, there were also differences in how the two language dominance groups performed. For the balanced bilingual group, the effect of the delayed recall was significant in both languages but more pronounced for Mandarin, which suggests, again, that these children appeared to be stronger in English and adds to the discussion about language proficiencies in the languages used by balanced bilinguals. This will be discussed in more detail in Chapter 12. In the narratives produced by the EL1CL2 group, the English narratives were much more complete than the Mandarin narratives, which was as expected.

When analysing the types of errors, the percentages of incomplete events in each language for each language dominance group were similar across both task types, i.e., the percentage of incomplete events was similar before and after the delay. For the incomplete events, further analysis revealed that the incomplete events from the retell tasks were also incomplete on the recall tasks. Omissions increased after the delay. Taken together, this indicates that there were fewer events produced after the delay (and, when produced, they were incomplete), which was logical and expected.

However, the importance of the factor of the differences in elicitation should not be understated. For example, in some productions the examiners prompted with open-ended questions more frequently while in others there were fewer such prompts. This was more obvious for this element and the 'consequence' element as there were more events for these two elements and, therefore, more opportunities for there to be an effect. Particular instances of this difference in elicitation are demonstrated below.

K03 (EL1CL2, FGTD recall, no prompts to elicit event number 4)

- Participant: after that the frog jumps out of the saxophone
- Participant: and the frog and the man lays on the drum set quietly

S09 (EL1CL2, FGTD recall, prompts to elicit event number 4)

- Examiner: where did the frog jump into?

  Participant: the band

  Examiner: and what happen?

  Participant: I don't know

  Examiner: what did the saxophone player did?

  Participant: turn around the trumpet because it make a so not good sound

5.5 Internal response

All but one balanced bilingual participant and one EL1CL2 participant produced the target emotion vocabulary in English.

Errors were mostly observed in the Mandarin narratives, and especially for the recall task. Although there was no significant difference between language dominance groups across the two task types, the EL1CL2 group omitted the internal response element four times as often

as the balanced bilingual group. This supports findings on other macrostructure outcome measures that show that the balanced bilingual group was stronger in Mandarin than the EL1CL2 group. MacLeod and Pesco (2023) reported that their Canadian bilingual kindergarten participants produced emotional vocabulary consistently in their second language (community language French) in response to a visible stimulus. The results from the present study support this. Although limited, the omissions in the weaker language for the EL1CL2 group aligned with Veneziano's (2016) findings, implying that the errors observed on this element might be due to the increased cognitive load of a delayed recall task.

5.6 Plan

No participant produced or alluded to internal plans. A similar result was observed in MacLeod and Pesco's (2023) study; a possible reason for this is that there were no visible cues to prompt cognitive vocabulary, such as thought bubbles, in the stimuli. In addition, Babar et al. (2013) reported that vocabulary to indicate cognitive states was not produced in narratives before primary school.

5.7 Action/Attempt

The target was the solution to main conflict in the narrative. Overall, there were more errors in Mandarin than English for both language dominance groups. In English, the few errors on the retell task appeared to be isolated errors, as the same participants produced complete responses on the recall task. Error analysis on the English recall samples revealed similar errors in both groups, such as omissions and implied the solution without giving the solution itself (illustrated below). One EL1CL2 participant mislabelled the main character ('little turtle' instead of 'little frog') but this appeared to be another isolated error as it was not observed in

other utterances. These observations suggest that balanced bilingual children and EL1CL2 children performed similarly in English.

P10 (balanced bilingual, attempt implied but not stated)

- Participant: and then hor, he keep to the, he put him to the sea

  Examiner: oh

  Participant: and, and cannot find him

In Mandarin, the data showed that the balanced bilingual group produced more complete responses on the retell task but there was an effect of the delayed recall, with errors in the form of omissions and implied solutions. There was no similar effect of the delayed recall for the EL1CL2 group, but the type of errors changed from the retell to the recall task. Errors on the retell task included semantically related, incomplete, implied and omissions, while errors on the recall tasks were all omissions. There were more omissions in the EL1CL2 group than the balanced bilingual group, which was unsurprising as Mandarin was the weaker language for the former group. MacLeod and Pesco (2023) suggested that young bilingual children may leave out content that might be perceived to be easily inferred by the communication partner, which could also be a possible reason for the particular errors in this study. Taken together, these results suggest that both language dominance groups were stronger in English and retained information more completely in their stronger language.

5.7 Consequence

In contrast to the total macrostructure score and the IE element, both language dominance groups performed similarly on all tasks. However, closer analysis revealed that the balanced bilingual group produced similar percentage accuracy of consequence across both languages while the EL1CL2 group produced more complete responses in English than in

Mandarin. This finding was as hypothesised, with balanced skills in the balanced bilinguals and higher relative English proficiency than Mandarin in the EL1CL2 group.

Qualitative analysis of the incomplete events and omissions revealed similar patterns across both languages: the number of incomplete events was fairly consistent across the task types for both language dominance groups. However, there was an obvious difference between language dominance groups, with the EL1CL2 group omitting 'consequence' elements more than 50% more frequently than the balanced bilingual group; this was observed in both languages. This aligns with previous findings from this study that the balanced bilingual group demonstrated stronger narrative skills than the EL1CL2 group, as evidenced by more complete 'consequence' elements and, by extension, more complete narratives.

Overall, the balanced bilingual group produced more 'consequence' elements on the retell task than the EL1CL2 but there was no difference between the groups on the recall task. There are a few possible reasons for the difference in patterns of narrative production on this outcome measure compared to the IE element. Firstly, there were fewer events that contributed to the 'consequence' element as compared to the IE element. Secondly, this might be due to a difference in the elicitation of the samples. For example, for participant K17, three 'consequence' events were omitted in the Mandarin recall narrative but there was no prompting to elicit the omitted events. In contrast, for participant P17 the presence of prompting elicited more events.

K17[4]

- Participant: 那个男孩子讲 *na ge nan hai zi jiang* ('that boy say')

[4] No prompting from examiner.

- Participant: 如果你拿那个青蛙我会收掉你的青蛙 *ru guo ni na na ge qing wa wo hui shou diao ni de qing wa* (‘if you take that frog, I will keep your frog’)
- Participant: 如果他们回家的时候, 那个, 他们的爸爸讲 *ru guo ta men hui jia de shi hou, na ge, ta men de ba ba jiang* (‘if when they went home, that, their father say’)
- Participant: 如果你拿青蛙的时候那个男孩子, 会拿掉, 会收掉 *ru guo ni na qing wa de shi hou na ge nan hai zi hui na diao, hui shou diao* (‘if when you take the frog, that boy will take away, will keep’)
- Participant: then 他们回家 *then ta men hui jia* (‘then they go home’)
- Participant: 那个青蛙还有那个男孩子笑 *na ge qing wa hai you na ge nan hai zi xiao* (‘that frog and that boy laugh’)

P17[5]

- Participant: 因为他做 bad thing *yin wei ta zuo bad thing* (‘because he do bad thing’)

  Examiner: 做了什么? *zuo le shen me* (‘did what?’)

  Participant: 因为那个青蛙 *yin wei na ge qing wa* (‘because that frog’)

  Examiner: 青蛙怎么样? *qing wa zen me yang* (‘frog how?’)

  Participant: 去 everywhere boings *qu everywhere boings* (‘go everywhere boings’)

  Examiner: 然后呢? *ran hou ne* (‘then?’)

  Participant: then 他爸爸生气 *then ta ba ba sheng qi* (‘then he father angry’)

  Participant: then 他去 on the room *then ta qu on the room* (‘then he go on the room’)

  Participant: then 他们很笑 *then ta men hen xiao* (‘then they very laugh’)

  Participant: 哈哈哈哈 *ha ha ha ha* (‘hahahaha’)

  Examiner: 他的爸爸说什么呢? *ta de ba ba shuo shen me ne* (‘his father say what?’)

  Examiner: 他的爸爸做什么? *ta de ba ba zuo shen me* (‘his father do what?’)

[5] Prompting from examiner.

Participant: 讲, 讲 *jiang, jiang* (‘say, say’)

Participant: 去你的房间 *qu ni de fang jian* (‘go your room’)

Examiner: 哦 然后呢? *o ran hou ne* (‘oh, then?’)

Participant: uh, uh then 他们 笑 笑 笑 *uh, uh then ta men xiao xiao xiao* (‘uh, uh then they laugh, laugh, laugh’)

Chapter 6: Results – General Microstructure

This chapter describes the results from the general microstructure outcome measures. These include MLUw, MLU5w, correlations between MLUw and MLU5w, and NDW. Similarly to Chapter 4, results for each outcome measure will be ordered to align with the research questions, i.e., first discussing performances by the EL1CL2 group, then the balanced bilingual group, and finally comparing the two language dominance groups.

A three-way repeated measures ANOVA was run on the sample of 36 participants to examine the effect of and interaction between language dominance, language, and task type on performance on measures of general microstructure elements. The between-factor was language dominance, which included two levels (balanced bilinguals and English-dominant). The within-factors were language, which included two levels (English and Mandarin Chinese), and task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each three-way ANOVA analysis (Feise, 2002).

6.1 MLUw

6.1.1 EL1CL2

Table 6.1 presents the descriptive data and Table 6.2 details the statistical analysis. Firstly, the EL1CL2 group produced statistically significantly longer utterances in English than Mandarin. This pattern was observed for both retell and recall tasks and supported Hypothesis 2C. Secondly, the group produced longer utterances on the English recall task than the English retell task. This difference was not observed on the Mandarin tasks. A possible reason for this is

the method of elicitation and relative proficiency in English; this will be explored in more detail in Chapter 7.

6.1.2 Balanced

Similarly to the EL1CL2 group, the balanced bilingual group produced significantly longer utterances in English than Mandarin. Hypothesis 2B was not supported. In contrast to the EL1CL2 group, however, there was no significant difference between retell and recall tasks in both English and Mandarin.

Table 6.1

Means and standard deviations of MLUw by language and task type

	English						Mandarin						Retell		Recall		Total	
	Retell		Recall		Total		Retell		Recall		Total		Total		Total			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	7.1	1.2	7.6	1.3	7.3	1.2	5.0	0.9	5.3	1.0	5.2	0.9	6.1	0.9	6.4	0.9	6.2	0. 9
Balanced	7.2	1.2	7.3	1.3	7.2	1.2	5.8	0.9	6.1	1.0	5.9	0.9	6.5	0.9	6.7	0.9	6.6	0.9

Table 6.2

Results of ANOVA for MLUw produced by both language dominance groups

		EL1CL2				Balanced			
		F	*p*	η_p^2	Interpretation	*F*	*p*	η_p^2	Interpretation
Language		68.78	<.001	.669	EL > CL	20.51	<.001	.376	EL > CL
Task type		14.73	<.001	.302	Retell < recall	2.44	.128	.067	Retell = recall
Language x task type	English tasks	7.38	.010	.178	EL retell < EL recall	0.06	.802	.002	EL retell = EL recall
	Mandarin tasks	2.15	.152	.059	CL retell = CL recall	2.82	.102	.077	CL retell = CL recall
	Retell tasks	50.06	<.001	.596	EL retell > CL retell	20.38	<.001	.375	EL retell > CL retell
	Recall tasks	55.55	<.001	.620	EL recall > CL recall	12.07	.001	.262	EL recall > CL recall

Note. EL = English and CL = Mandarin.

6.1.3 Comparing the two language dominance groups

Comparisons were made between the language dominance groups, with the results shown in Tables 6.3 and 6.4, and Figure 6.1. Key results are as follows:

- There was no significant difference in overall MLUw between language dominance groups. However, more specific analysis revealed differences between groups on specific languages.
- There was no significant difference between MLUw performances for either language dominance group on the English tasks, $F(1, 34) = 0.06$, $p = .814$, $\eta_p^2 = .002$, suggesting similar English proficiencies. Therefore, Hypothesis 2A was not supported. In Mandarin, however, the balanced bilingual group produced significantly more words per utterance than the EL1CL2 group on Mandarin tasks, $F(1, 34) = 6.46$, $p = .016$, $\eta_p^2 = .160$. This finding supported Hypothesis 2B.
- Both the balanced bilingual group and the EL1CL2 group produced longer utterances in English than Mandarin.

Table 6.3

Difference in MLUw between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
English retell	.12	.736	.003	Balanced = EL1CL2
English recall	.58	.454	.017	Balanced = EL1CL2
Mandarin retell	5.34	.027	.136	Balanced > EL1CL2
Mandarin recall	5.91	.021	.148	Balanced > EL1CL2

Figure 6.1

Comparing patterns of MLUw between language dominance groups

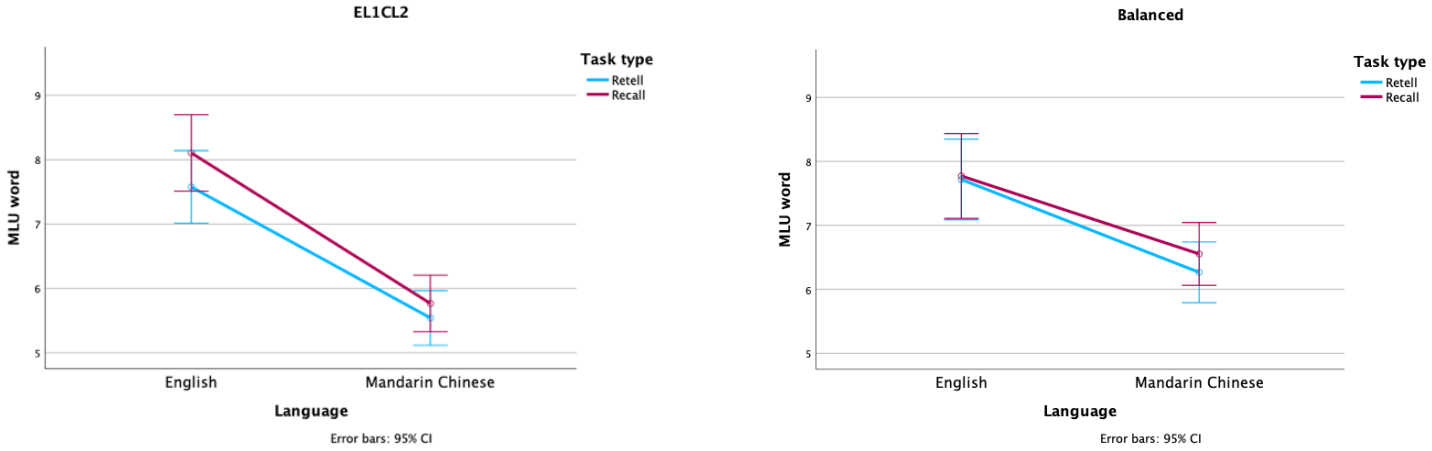


Table 6.4

Results of three-way ANOVA for MLUw measure between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	1.27	.267	.036	Balanced = EL1CL2
Language	79.29	<.001	.700	English > Mandarin
Task type	13.86	<.001	.290	Retell < recall
Language dominance x language	4.65	.038	.120	Significant two-way interaction between language dominance and language
Language dominance x task type	1.95	.172	.052	No significant two-way interaction between language dominance and task type
Language x task type	0.03	.871	.001	No significant two-way interaction between language and task type
Language dominance x language x task type	1.52	.226	.043	No significant three-way interaction

6.2 MLU5w

The performances on the outcome measure of MLU5w were similar to MLUw; a comparison of key findings is presented in Table 6.9.

6.2.1 EL1CL2

Table 6.5 presents the descriptive data and Table 6.6 the detailed statistical analysis. The EL1CL2 group produced a statistically significant higher average number of words in their five longest utterances in English than in Mandarin. This pattern was observed for both retell and recall tasks. However, in contrast to the MLUw measure, there were no statistical differences between task types in either English or Mandarin.

6.2.2 Balanced

The balanced bilingual group produced significantly longer utterances in English than Mandarin. This was also observed on both task types. There was no significant difference between retell and recall tasks overall in either English or Mandarin.

Table 6.5

Means and standard deviations of MLU5w by language and task type

	English						Mandarin						Retell		Recall		Total	
	Retell		Recall		Total		Retell		Recall		Total		Total		Total			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	13.4	2.7	13.1	2.8	13.2	2.6	9.5	2.3	9.2	2.0	9.3	1.9	11.4	2.0	11.1	1.7	11.3	1.7
Balanced	13.9	2.7	13.4	2.8	13.6	2.6	11.2	2.3	10.5	2.0	10.8	1.9	12.5	2.0	11.9	1.7	12.2	1.7

Table 6.6

Results of ANOVA for MLU5w produced by EL1CL2 group

		EL1CL2				Balanced			
		F	*p*	η_p^2	Interpretation	*F*	*p*	η_p^2	Interpretation
Language		35.37	<.001	.510	EL > CL	14.40	<.001	.297	EL > CL
Task type		0.87	.358	.025	Retell = recall	2.23	.081	.087	Retell = recall
Language x task type	English tasks	0.35	.560	.010	EL retell = EL recall	0.83	.370	.024	EL retell = EL recall
	Mandarin tasks	0.45	.508	.013	CL retell = CL recall	2.44	.128	.067	CL retell = CL recall
	Retell tasks	32.31	<.001	.487	EL retell > CL retell	12.11	.001	.263	EL retell > CL retell
	Recall tasks	25.07	<.001	.424	EL recall > CL recall	11.05	.002	.245	EL recall > CL recall

Note. EL = English and CL = Mandarin.

6.2.3 Comparing the two language dominance groups

A comparison of the language dominance groups is shown in Tables 6.7 and 6.8, and Figure 6.2. Key results are as follows:

- No significant difference between groups' MLU5w measure in English, $F(1, 34) = 0.20$, $p = ..656$, $\eta_p^2 = .006$, indicating similar English proficiencies. The balanced bilingual group produced significantly longer utterances in Mandarin than the EL1CL2 group, $F(1, 34) = 5.38$, $p = .027$, $\eta_p^2 = .137$.
- Both groups demonstrated higher MLU5w in English than Mandarin, indicating English-dominance. The effect size of language for the EL1CL2 group was higher than that for the balanced bilingual group, suggesting a more obvious difference in proficiencies of the two languages for the EL1CL2 group.
- The balanced bilingual group's MLU5w on the Mandarin retell task was significantly higher than that of the EL1CL2 group, indicating that the former group demonstrated higher Mandarin proficiency. Although there was no significant difference on the Mandarin recall task, there was a medium effect of language dominance.

Table 6.7

Difference in percentage accuracy of MLU5w between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
English retell	0.28	.598	.008	Balanced = EL1CL2
English recall	0.09	.766	.003	Balanced = EL1CL2
Mandarin retell	5.15	.030	.132	Balanced > EL1CL2
Mandarin recall	3.68	.063	.098	Balanced = EL1CL2 (medium effect size)

Figure 6.2

Comparing patterns of MLU5w between language dominance groups

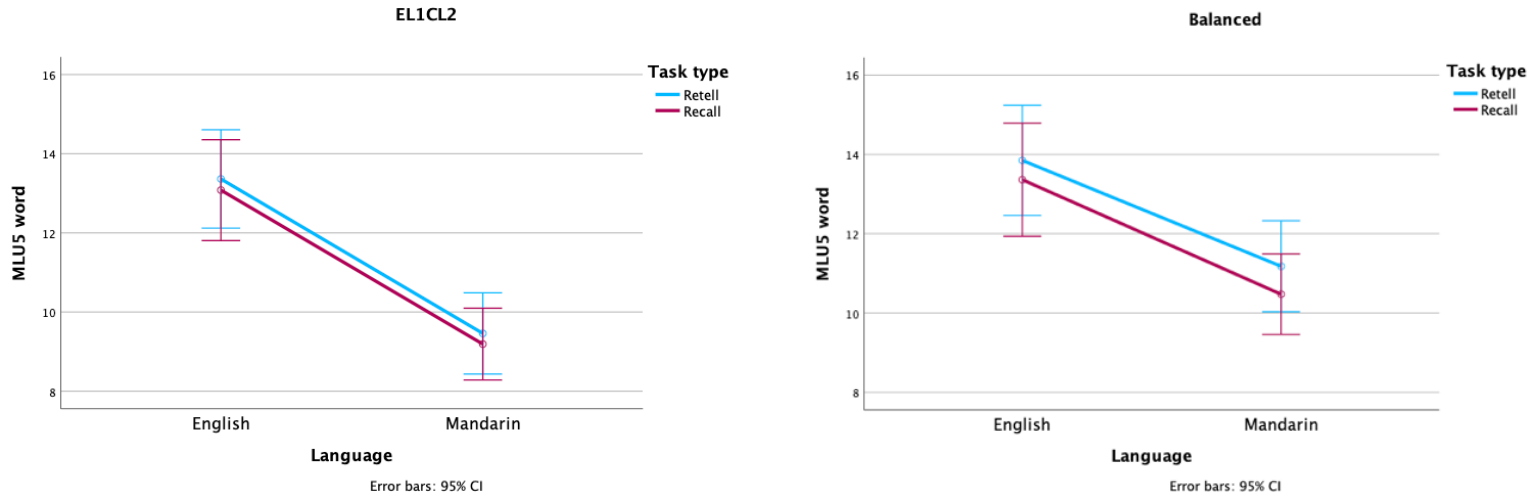


Table 6.8

Results of three-way ANOVA for MLU5w measure between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	2.66	.112	.072	Balanced = EL1CL2
Language	46.14	<.001	.576	English > Mandarin
Task type	3.84	.058	.101	Retell = recall
Language dominance x language	1.29	.264	.037	No significant two-way interaction between language dominance and language
Language dominance x task type	0.52	.478	.015	No significant two-way interaction between language dominance and task type
Language x task type	0.04	.837	.001	No significant two-way interaction between language and task type
Language dominance x language x task type	0.05	.818	.002	No significant three-way interaction

Table 6.9

Comparison of key MLU findings between language dominance groups

Outcome measure	Main effect of language dominance	Main effect of language	Language dominance x language interaction	Comparison between language dominance groups
MLUw	No	Yes	Yes	• English > Mandarin • English: balanced = EL1CL2 • Mandarin: balanced > EL1CL2
MLU5w	No	Yes	No	• English > Mandarin • English: balanced = EL1CL2 • Mandarin retell: balanced > EL1CL2 • Mandarin recall: not significant but medium effect size

6.3 MLU differentials

The analysis of MLUw and MLU5w differentials between English and Mandarin across tasks types and language dominance groups is provided in Appendix 6.

6.4 Correlation between MLU measures

Correlation was explored to evaluate the relationship between MLUw and MLU5w. If a positive and significant relationship is established, results can guide clinical practice. Clinicians would be able to undertake one measure instead of multiple measures, thereby increasing efficiency, and giving greater confidence in their findings.

Key results are as follows (the statistical data is presented in Table 6.10):

- There was a strong and significant correlation between MLUw and MLU5w in both English and Mandarin, indicating that analysis of one of these measures could provide sufficient information about mean length of utterance.
- There was a strong and significant correlation between retell and recall tasks for both MLUw and MLU5w measures in both languages, indicating that eliciting one sample (retell) could be sufficient for analysis.
- There were weak correlations between languages, suggesting that clinicians need to analyse a bilingual child's two languages separately, as is current practice.

Table 6.10

Correlations between tasks

		EL retell MLU5w	EL recall MLUw	EL recall MLU5w	CL retell MLUw	CL retell MLU5w	CL recall MLUw	CL recall MLU5w
EL retell MLUw	Pearson Correlation	.766**	.752**	.690**	0.325	0.213	.389*	0.088
	Sig. (2-tailed)	<.001	<.001	<.001	0.053	0.213	0.019	0.611
EL retell MLU5w	Pearson Correlation		.551**	.701**	0.289	0.27	.341*	0.116
	Sig. (2-tailed)		<.001	<.001	0.087	0.112	0.042	0.499
EL recall MLUw	Pearson Correlation			.792**	0.304	0.141	0.194	-0.056
	Sig. (2-tailed)			<.001	0.072	0.414	0.258	0.747

EL recall MLU5w	Pearson Correlation		.341*	0.218	0.282	-0.003
	Sig. (2-tailed)		0.042	0.201	0.096	0.986
CL retell MLUw	Pearson Correlation			.790**	.777**	.533**
	Sig. (2-tailed)			<.001	<.001	<.001
CL retell MLU5w	Pearson Correlation				.621**	.686**
	Sig. (2-tailed)				<.001	<.001
CL recall MLUw	Pearson Correlation					.723**
	Sig. (2-tailed)					<.001

Note. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). EL = English and CL = Mandarin.

6.5 Lexical diversity (NDW)

6.5.1 EL1CL2

Table 6.11 presents the descriptive data and Table 6.12 the detailed statistical analysis. The EL1CL2 group produced a statistically significantly higher number of unique words in English than Mandarin tasks, supporting Hypothesis 2C. This pattern was observed on both retell and recall tasks. The more pronounced lexical diversity in English indicates a higher relative proficiency in English than Mandarin, which was as expected for the English-dominant group. In both languages, the group also produced a significantly higher type frequency on the retell tasks than the recall tasks. This finding supported Hypothesis 4.

6.5.2 Balanced bilinguals

The balanced bilingual group produced a similar number of unique words on the English tasks and Mandarin tasks, although there was a medium effect of language. This finding supported Hypothesis 2D. Further analysis revealed that there was no significant difference between languages on the retell tasks but a significant difference between languages was observed on the recall tasks (fewer unique words in Mandarin than English). Table 6.12 below details the results from the statistical analysis. The smaller variety of words produced on the recall task in Mandarin suggests poorer retention of information in Mandarin, and thus indicates poorer relative proficiency in Mandarin than English. The balanced bilingual group produced significantly more unique words on the retell tasks than recall tasks in both languages. This supported Hypothesis 4 and was an expected result when considering the effect of the delay.

Table 6.11

Means and standard deviations of NDW by language and task type

	English						Mandarin						Retell		Recall		Total	
	Retell		Recall		Total		Retell		Recall		Total		Total		Total			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	95.4	13.2	78.6	17.6	87.0	14.0	67.1	16.8	59.8	17.5	63.4	15.9	81.2	10.0	69.2	13.2	75.2	10.4
Balanced	92.4	13.2	79.0	17.6	85.7	14.0	85.2	16.8	66.9	17.5	76.0	15.9	88.8	10.0	72.9	13.2	80.9	10.4

Table 6.12

Results of ANOVA for NDW produced by both language dominance groups

		EL1CL2				Balanced			
		F	*p*	η_p^2	Interpretation	*F*	*p*	η_p^2	Interpretation
Language		23.94	<.001	.413	EL > CL	3.23	.081	.087	EL = CL (medium effect size)
Task type		24.57	<.001	.419	Retell > recall	34.12	<.001	.501	Retell > recall
Language x task type	English tasks	29.71	<.001	.466	EL retell > EL recall	15.21	<.001	.309	EL retell > EL recall
	Mandarin tasks	6.38	.016	.158	CL retell > CL recall	32.10	<.001	.486	CL retell > CL recall
	Retell tasks	31.45	<.001	.481	EL retell > CL retell	1.65	.208	.046	EL retell = CL retell
	Recall tasks	13.15	<.001	.279	EL recall > CL recall	4.35	.045	.113	EL recall > CL recall

Note. EL = English and CL = Mandarin.

6.5.3 Comparing the two language dominance groups

Comparisons were made between the language dominance groups, with the data shown in Tables 6.13 and 6.14 and Figure 6.3. Key results are as follows:

- There was a significant three-way interaction between language dominance, language, and task type. This was likely driven by the difference in performances on the Mandarin retell task. As shown in Figure 6.3, the EL1CL2 group demonstrated a much steeper difference between English and Mandarin retell tasks than the balanced bilingual group. This indicates that the balanced bilingual group demonstrated a higher relative proficiency in Mandarin than the EL1CL2 group.
- Similar performances on the frequency type measure on English tasks from both language dominance groups, $F(1, 34) = 0.08$, $p = .786$, $\eta_p^2 = .002$, suggest similar proficiencies in English. The balanced bilingual group demonstrated a significantly more lexical diversity than the EL1CL2 group on the Mandarin tasks, $F(1, 34) = 5.61$, $p = .024$, $\eta_p^2 = .142$.

Table 6.13

Difference in NDW between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
English retell	0.45	.509	.013	Balanced = EL1CL2
English recall	0.01	.946	.000	Balanced = EL1CL2
Mandarin retell	10.38	.003	.234	Balanced > EL1CL2
Mandarin recall	1.47	.234	.041	Balanced = EL1CL2

Figure 6.3

NWD by language dominance groups

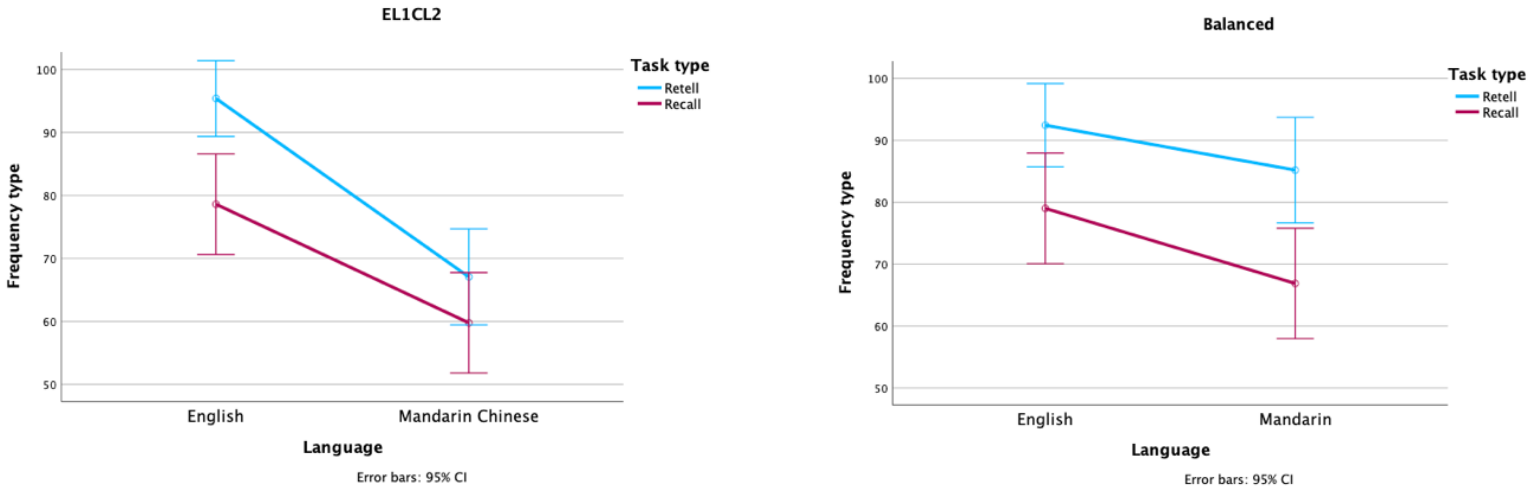


Table 6.14

Results of three-way ANOVA for NDW measure between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	0.266	.112	.073	Balanced = EL1CL2
Language	21.16	<.001	.384	English > Mandarin
Task type	58.64	<.001	.633	Retell > recall
Language dominance x language	3.70	.063	.098	No significant two-way interaction (medium effect size) between language dominance and language
Language dominance x task type	1.10	.302	.031	No significant two-way interaction between language dominance and task type
Language x task type	0.79	.381	.023	No significant two-way interaction between language and task type
Language dominance x language x task type	7.61	.009	.183	Significant three-way interaction

Chapter 7: Discussion – General Microstructure

This chapter discusses the findings from the general microstructure outcome measures, including length of utterances and lexical diversity in both languages. The following hypotheses were proposed:

- For the EL1CL2 group: more complex and longer utterances in English than in Mandarin. This hypothesis was supported.
- For the balanced bilingual group: similar performances in English and Mandarin. This hypothesis was partially supported as this group demonstrated similar lexical diversities in both languages but produced longer utterances in English.
- Comparison between groups: both groups would produce more complex and longer utterances on the retell than recall tasks. EL1CL2 group would produce more complex and longer utterances than the balanced bilingual group in English but the balanced bilingual group would produce more complex and longer utterances than the EL1CL2 group in Mandarin. This hypothesis was partially supported as both groups performed similarly on the English tasks and the balanced bilingual group produced longer utterances than the EL1CL2 group on the Mandarin tasks.

7.1 MLU

MLU is a popular method of measurement of language skills using secondary data (Treffers-Daller, 2019). However, although MLU is a valid measurement for comparison between task types within the same language, it might not be a valid comparison between languages produced by bilingual children, especially if the language pair have different morphosyntactic structures (Ooi & Wong, 2012). This means that the linguistic characteristics in

the language pair must be carefully studied in order to ensure that MLU provides a valid comparison across the languages.

Packard (2006) considered Mandarin to be an isolating language because of its relative absence of inflectional morphology, with the exception of some productive inflectional and derivational prefixes and suffixes. In a similar manner, Yip and Matthews (2000, p. 198) also argued for child English being a "predominantly isolating" language because "young children's English inflectional morphology is not yet in place". The omission of inflectional morphology is also observed in SCE and this makes MLU suitable for comparisons between the two languages and thus a valid measurement for this study. However, given the lack of literature establishing valid comparisons between English and Mandarin, MLU in words (MLUw) was used as a measurement in this study to align with earlier research (e.g., Hao et al., 2019; Ooi & Wong, 2012).

The analysis of MLUw and MLU5w measures is discussed as a whole because they were strongly correlated with each other and similar results were produced. Analysis of findings revealed both expected and unexpected results. Firstly, both language dominance groups produced longer utterances in English than Mandarin on all tasks and outcome measures. While unsurprising for the EL1CL2 group, this was an unexpected finding for the balanced bilingual group, and once again suggests that these Singaporean bilingual children had a higher proficiency in English.

A second surprising finding was that both language dominance groups produced utterances of similar lengths in English. Given that the EL1CL2 group would have had more input and more output in English, it is assumed clinically that these children would produce longer and more complex utterances. The results showed that the two groups produced

utterances of similar lengths and complexity. This suggests that balanced bilingual children can perform as well as English-dominant children in English. Compared to studies on bilingual children with different dominant languages, there is less research on bilingual children specifically relating to balanced and unbalanced bilinguals. Meir (2018) studied morphosyntax in Russian-Hebrew 5- and 6-year-old bilingual children, including Russian-dominant, Hebrew-dominant, balanced dominance and bilinguals with Specific Language Disorder, and found that Russian-dominant bilingual children and balanced dominance bilingual children performed similarly on morphosyntactic outcome measures on a sentence repetition task in Russian. The findings from this study support Meir's (2018) findings on language dominance and language proficiency, but it should nonetheless be noted that they are complementary given that different types of samples were elicited and the different language pairs of the bilingual children.

The results suggest that more extensive research at the narrative level is warranted. Narratives command a higher linguistic and cognitive demand than at other levels of language; there is currently no known MLU normative data for narrative tasks in English and Mandarin Chinese based on Singaporean bilingual children. Another possible reason for the similar performance in English is the nature of Singaporean English. Research has repeatedly demonstrated that omissions of grammatical morphemes are frequently observed in Singapore English (Leimgruber, 2011). Given that the EL1CL2 group was likely receiving input with omissions of grammatical markers, it was reasonable that the output would be characterised by absence of grammatical markers, as expected of the balanced bilingual group. This, in turn, will have implications when considering what kind of input the children are receiving in their early years, which will be discussed in more detail later in this chapter.

In addition to similar proficiency in English, the balanced bilingual group produced more complex utterances in Mandarin Chinese than the EL1CL2 group. While not unexpected, taken

together with the results from the English tasks, this indicates stronger overall language proficiencies in the balanced bilingual group and is suggestive of the benefits that balanced input of two languages has on overall language development. This could have implications for future education and social policies, given Singapore's strong emphasis on bilingual education and social cohesiveness (Lee & Phua, 2020).

The differences between retell and recall tasks were also explored. The EL1CL2 group produced longer utterances on the recall task in both English (significant) and Mandarin (not significant but with a medium effect of task type). A possible reason for this is the absence of the visual stimulus on the recall task. This would align with Masterson and Kamhi's (1991) finding that children's narratives elicited without visuals contained longer and more complex utterances compared to narratives elicited with a book. A proposed reason for this observation is that the participants narrated in a 'listing' fashion with visual support (book) but the absence of the visual stimulus on the recall task allowed for greater cohesion throughout the narrative.

For the balanced bilingual group, there was no effect of the delayed recall in both languages. In contrast to the EL1CL2 group, the 'listing' pattern was not observed in the narratives from the balanced bilingual group participants. However, this does not definitively indicate a difference in pattern of narrative production between the language dominance groups, given the modest sample size. A larger scale study with more participants would be warranted to establish clearer patterns of narrative production.

7.2 Number of Different Words

NDW is a measure of lexical diversity that has been shown to be sensitive to age (Westerveld & Vidler, 2016) and is a clinical indicator of language difficulties in bilingual children (Altman et al., 2016).

The narratives produced by the EL1CL2 group had a higher NDW in their dominant language, which was unsurprising and supports findings from studies on bilingual preschoolers across different language pairs (Altman et al., 2016; Rezzonico et al., 2015). For the balanced bilingual group, the NDW was similar between English and Mandarin on the retell task but the NDW was higher in English than Mandarin on the recall task. A possible reason for this is a higher proficiency in English, manifested as a more diverse lexicon.

Results from both language dominance groups demonstrate similar lexical diversity in English but that the balanced bilingual group had more lexical diversity in Mandarin. In addition, the NDW was higher on the retell tasks than the recall tasks, which may suggest an effect of the delay on retaining information. There is limited information on measurements of lexical diversity on delayed tasks but the results suggest that, because the participants retained fewer macrostructure elements, this was reflected in lexical diversity and vocabulary. Although research on bilingual children is emerging, previous studies on English-speaking monolingual children have shown a clear relationship between macrostructure and NDW (Heilmann et al., 2010).

Chapter 8: Results – English Fine-grained Microstructure

This chapter presents the results from the statistical analysis of the English grammatical markers:

- Regular past tense marker
- Irregular past tense form
- Regular plural marker
- Irregular plural form
- Possessive noun marker
- Subjective pronoun
- Subject omission
- Objective pronoun
- Object omission
- Possessive pronoun
- Auxiliary verb error
- Copula verb error
- Prepositional phrase error
- Conjunction

The analysis is summarised at the end of this chapter. Results from the EL1CL2 group will be presented first, followed by results from the bilingual group; finally, results from the two language dominance groups will be compared. All of these microstructure elements were analysed by accuracy, except for conjunctions, which was analysed by frequency. This was done (a) to align with the few previous studies on Singaporean children (e.g., Brebner, 2010) and (b) because there is a variety of possible responses for conjunctions while the other

microstructure elements are binary or ternary in nature (e.g., whether the regular past tense marker is absent or present or incorrectly used). Overall, both language dominance groups performed similarly on these grammatical markers. This finding was surprising and Hypothesis 3A was not supported. This will be discussed in more detail in the next chapter.

8.1 Regular past tense marker

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of the regular past tense marker between task type. Results for each group are presented in Tables 8.1 and 8.2. The Mann-Whitney *U* test was also run on the sample of 36 participants to determine if there was a difference in production of the regular past tense marker between language dominance groups. The results from comparison are presented in Table 8.3. The key results were:

- EL1CL2: no participants produced the target marker consistently[6] and a few did not produce any target marker. This suggests that for this group, this marker is only emerging. There was a significantly higher percentage accuracy of regular past tense marker on the retell than recall task. Coupled with a higher number of participants who did not produce any target on the recall task, this indicates an effect of the delay.
- Balanced bilingual: a similar pattern was observed for the balanced group. The results demonstrate that this marker also seems to be emerging in this group. The significantly higher percentage accuracy of regular past tense marker on the retell than recall task indicates an effect of the delay.
- Comparison: there was no significant difference between groups on this marker, indicating similar proficiencies in English morphology.

[6] Consistent production refers to achieving the target marker or response on equal to or more than 80% of all opportunities

Table 8.1

Analysis of percentage accuracy of the regular past tense marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	22.77 (15.5)	-2.81	.005	.628	Retell > recall	2 (10%)	0/20 (0.0%)
Recall	8.01 (13.5)					6 (30%)	0/20 (0.0%)

Table 8.2

Analysis of percentage accuracy of the regular past tense marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	22.02 (24.3)	-2.00	.047	.500	Retell > recall	5 (31.3%)	0/16 (0.0%)
Recall	6.51 (22.6)					7 (43.8%)	0/16 (0.0%)

Note. There were opportunities for production of the target marker in all narrative samples.

Table 8.3

Comparison between language dominance groups

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	159.00	-0.03	.987	.001	Balanced = EL1CL2
Recall	168.50	0.18	.789	.05	Balanced = EL1CL2

8.2 Irregular past tense form

A two-way repeated measures ANOVA was run on the sample of 36 participants to examine the effect of and interaction between language dominance and task type on production of irregular past tense forms of verbs. The between-factor was language dominance, which included two levels (balanced and English-dominant). The within-factor was task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each two-way ANOVA analysis (Feise, 2002).

Key results:

- EL1CL2: irregular past tense verb forms were produced consistently in narrative samples from two participants on the retell task and three participants on the recall task. Two participants did not produce any accurate verb forms on the retell task, nine (45%) more produced accurate irregular past tense verbs on less than 50% of all opportunities, and only two participants (10%) produced the targets on more than 80% of all opportunities. On the recall task, 12 participants (60%) produced target irregular past tense verbs on less than 50% of all opportunities while three participants (15%) produced the targets on more than 80% of all opportunities. These results suggest developing verb morphology. There was no statistical difference between percentage accuracy of the irregular past tense verb forms between task types, $F(1, 34) = 0.00$, $p = .966$, $\eta_p^2 = .000$. This indicates that there was no significant effect of the delay.
- Balanced bilingual: three participants produced the target verb forms consistently on the retell task while two participants did so on the recall task. On the retell task, 6% (one out of 16) of the balanced bilingual group did not use any accurate irregular past tense

verbs. Another 62.5% (10 out of 16) participants produced accurate irregular past tense verbs on less than 50% of all opportunities and 19% (three out of 16) produced target irregular past tense verbs on more than 80% of all opportunities. A similar pattern was observed on the recall task: 6% (one out of 16) did not use any accurate irregular past tense verb forms (the one exception was the same participant who did not use any accurate targets on the retell task). 56.3% (nine out of 16) of participants produced accurate irregular past tense verb forms on less than 50% of all opportunities and 12.5% (two out of 16) produced targets on more than 80% of all opportunities. On both tasks, one participant did not produce any accurate verb form. The results suggest developing verb morphology for these participants. There was no statistical difference between percentage accuracy of the irregular past tense verb forms between task types, $F(1, 34) = 0.31$, $p = .579$, $\eta_p^2 = .009$, suggesting that there was no significant effect of the delay.

- Comparison: no significant main effect of language dominance (see Table 8.4 for descriptive data and Tables 8.5 and 8.6 for statistical analysess and), indicating similar proficiencies between the two groups.

Table 8.4

Means and standard deviations of percentage accuracy of irregular past tense verbs by language dominance groups and task type

	Retell		Recall		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	45.0	29.0	44.8	27.5	44.9	27.5
Balanced	40.1	29.0	42.0	27.5	41.1	27.5

Table 8.5

Difference in percentage accuracy of irregular past tense verbs between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
Retell	0.25	.621	.007	Balanced = EL1CL2
Recall	0.10	.759	.003	Balanced = EL1CL2

Table 8.6

Results of two-way ANOVA for percentage accuracy of irregular past tense verbs between language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	0.18	.678	.005	Balanced = EL1CL2
Task type	0.15	.700	.004	Retell = recall
Language dominance x task type	0.20	.658	.006	No significant interaction

8.3 Regular plural marker

There were no opportunities for regular plural markers in the narrative retell samples for six balanced bilingual participants and two EL1CL2 participants. On the recall task, there were no opportunities for six balanced bilinguals and three EL1CL2 participants.

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of regular plural markers between task type. Results for each group are presented in Tables 8.7 and 8.8. The Mann-Whitney *U* test was run (retell task: 28 participants, recall task: 27 participants) to determine if there was a

difference in production of the regular plural markers between language dominance groups. The comparison results are presented in Table 8.9.

Key results:

- EL1CL2: about a third of the group had opportunities but did not produce any target markers, indicating that this is not yet emerging. However, about a third to half of the participants were observed to produce the target consistently. This shows variability even within a group. There was no significant difference between task types. Six participants produced the target marker consistently on both tasks.
- Balanced: there was less variability for the balanced group with fewer participants at the extremes, suggesting that this marker might be emerging or developing for this group. There was no significant difference between task types. Only one participant produced the target marker consistently on both tasks.
- Comparison: no significant effect of language dominance on both task types, indicating similar proficiencies between both groups.

Table 8.7

Analysis of percentage accuracy of the regular plural marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (with opportunities) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	66.67 (45.3)	0.65	.574	.14	Retell = recall	6/18 (33.3%)	7/18 (38.9%)
Recall	100.00 (45.2)					5/17 (29.4%)	9/17 (52.9%)

Note. Retell *n* = 18. Recall *n* = 17. These narrative samples had opportunities for production of the target marker.

Table 8.8

Analysis of percentage accuracy of the regular plural marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (with opportunities) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	37.50 (36.3)	1.60	.109	.57	Retell = recall	3/10 (30.0%)	1/10 (10.0%)
Recall	50.0 (30.4)					1/10 (10.0%)	3/10 (30.0%)

Note. Retell *n* = 10. Recall *n* = 10. These narrative samples had opportunities for production of the target marker.

Table 8.9

Comparison between language dominance groups on regular plural marker

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	109.00	0.94	.382	.18	Balanced = EL1CL2
Recall	94.00	0.48	.675	.09	Balanced = EL1CL2

8.4 Irregular plural form

No statistical analysis was conducted due to the small sample this target marker elicited. Limited opportunities were secondary to task constraints, as there were few stimuli in the narratives that would elicit irregular plural forms.

Key results:

- EL1CL2
    - On the retell task, two participants had opportunities for production of this marker. One of these two participants did not produce any irregular plural nouns accurately while the other achieved 100.0% accuracy.
    - On the recall task, one participant had opportunities and produced the target form on two out of two opportunities (100.0%).
- Balanced
    - On the retell task, three participants had opportunities for production of this marker. Two out of these three participants did not produce any irregular plural nouns accurately while the last participant achieved 100.0% accuracy.
    - On the recall task, three participants had opportunities and none of them produced the target form accurately on any opportunities (0.0%).

8.5 Possessive noun marker

For the EL1CL2 group, there were no opportunities for the target marker in the narratives from two participants on the retell task and six participants on the recall task. As for the balanced group, there were no opportunities in the narrative from one participant on the retell task and two participants on the recall task.

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of possessive noun markers between task type. Results for each group are presented in Tables 8.10 and 8.11. The Mann-Whitney *U* test was run (retell: 33 participants; recall: 28 participants) to determine if there was a difference in production of the possessive noun markers between language dominance groups. The comparison results are presented in Table 8.12.

Key results:

- EL1CL2: there was variability for this marker, suggesting developing skills, with some participants producing the target on all opportunities, some on some opportunities, and others omitting the marker. There was no significant difference between task types, indicating negligible effect of the delay.
- Balanced: similarly to the EL1CL2 group, there was variability in percentage accuracy of production of this marker, suggesting developing skills. There was also no significant difference between task types.
- Comparison: there was no significant effect of language dominance on either task type, indicating similar proficiency in English morphology.
- These results should be interpreted with caution as there were at most six opportunities across all the narratives. The low number of opportunities means that a single accurate or inaccurate response would affect the percentage accuracy and could change a participant's performance from consistently accurate to inconsistently accurate.

Table 8.10

Analysis of percentage accuracy of possessive noun marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (with opportunities) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	16.67 (47.5)	0.68	.496	.18	Retell = recall	5/18 (27.8%)	5/18 (27.8%)
Recall	50.00 (44.0)					6/14 (42.9%)	4/18 (28.6%)

Note. Retell *n* = 18. Recall *n* = 14. These narrative samples had opportunities for production of the target marker.

Table 8.11

Analysis of percentage accuracy of the possessive noun marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (with opportunities) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	50.00 (45.4)	-1.02	.309	.28	Retell = recall	6/15 (40.0%)	6/15 (40.0%)
Recall	50.00 (39.3)					5/14 (35.7%)	3/14 (21.4%)

Note. Retell *n* = 15. Recall *n* = 14. These narrative samples had opportunities for production of the target marker.

Table 8.12

Comparison between language dominance groups on possessive noun marker

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	106.00	-1.15	.307	.20	Balanced = EL1CL2
Recall	98.50	0.02	1.000	.00	Balanced = EL1CL2

8.6 Subjective pronoun

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of subjective pronouns between task type. Results for each group are presented in Tables 8.13 and 8.14. The Mann-Whitney *U* test was run on 36 participants to determine if there was a difference in production of the subjective pronouns between language dominance groups. The comparison results are presented in Table 8.15.

Key results:

- EL1CL2: no significant difference between task types. Most participants produced the target subjective pronoun accurately and consistently, indicating established skill.
- Balanced: no significant difference between task types. Most participants produced the target subjective pronoun accurately and consistently, indicating established skill.
- Comparison: no significant effect of language dominance on both task types, suggesting similar proficiencies in English morphology for the groups.

Table 8.13

Analysis of percentage accuracy of subjective pronouns by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who produced the target on >80% of opportunities (%)
Retell	91.61 (22.4)	-0.94	.349	.21	Retell = recall	17/20 (85.0%)
Recall	87.87 (12.1)					17/20 (85.0%)

Table 8.14

Analysis of percentage accuracy of subjective pronouns by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who produced the target on >80% of opportunities (%)
Retell	93.3 (17.2)	-1.10	.271	.28	Retell = recall	11/16 (68.8%)
Recall	87.50 (24.0)					12/16 (75.0%)

Table 8.15

Comparison between language dominance groups on subjective pronouns measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	168.50	0.28	.789	.05	Balanced = EL1CL2
Recall	166.00	0.19	.863	.03	Balanced = EL1CL2

8.7 Subject omission

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in number of subject omissions between task type. Results for each group are presented in Tables 8.16 and 8.17. The Mann-Whitney *U* test was run on 36 participants to determine if there was a difference in number of omissions of subjects between language dominance groups. The comparison results are presented in Table 8.18.

Key results:

- EL1CL2: more than half of the participants omitted subjects on both tasks, indicating that this might be a feature of Singaporean English. There was no significant difference between task types, suggesting that there was negligible effect of the delay.
- Balanced: about half of the participants omitted subjects on the retell task and this number dropped by a third on the recall task. This demonstrated that subject omissions are commonly observed in typically developing bilinguals. Again, there was a negligible effect of the delay.
- Comparison: no significant effect of language dominance on both task types, suggesting similar proficiencies in English syntactical structures.

Table 8.16

Analysis of number of subject omissions by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who omitted subjects (%)
Retell	0.50 (1.2)	0.86	.388	.19	Retell = recall	10/20 (50.0%)
Recall	1.00 (2.9)					11/20 (55.0%)

Table 8.17

Analysis of number of subject omissions by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who omitted subjects (%)
Retell	1.00 (1.2)	-1.51	.131	.38	Retell = recall	9/16 (56.3%)
Recall	0.00 (0.8)					6/16 (37.5%)

Table 8.18

Comparison between language dominance groups on subject omission measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	156.50	-0.12	.912	.02	Balanced = EL1CL2
Recall	197.00	1.28	.249	.21	Balanced = EL1CL2

8.8 Objective pronoun

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of objective pronouns between task type. Results for each group are presented in Tables 8.19 and 8.20. The Mann-Whitney *U* test was run (retell: 35 participants; recall: 31 participants) to determine if there was a difference in percentage accuracy of objective pronouns between language dominance groups. The comparison results are presented in Table 8.21.

Key results:

- EL1CL2: no significant difference between task types. Almost all participants produced the target objective pronoun accurately and consistently.
- Balanced: no significant difference between task types. Most participants produced the target objective pronoun accurately and consistently.
- Comparison: no significant effect of language dominance on both task types, suggesting similar proficiencies. In addition, objective pronouns appeared to be an established noun morphology skill in these Singaporean bilingual children.

Table 8.19

Analysis percentage accuracy of objective pronouns by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who produced the target on >80% of opportunities (%)
Retell	100.00 (18.6)	0.55	.581	.15	Retell = recall	17/19 (89.5%)
Recall	100.00 (13.2)					15/15 (100.0%)

Table 8.20

Analysis of percentage accuracy of objective pronouns by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who produced the target on >80% of opportunities (%)
Retell	100.00 (18.9)	-0.37	.715	.09	Retell = recall	15/16 (93.8%)
Recall	100.00 (11.7)					14/16 (87.5%)

Table 8.21

Comparison between language dominance groups on objective pronouns measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	155.00	0.57	.935	.14	Balanced = EL1CL2
Recall	126.50	0.69	.800	.12	Balanced = EL1CL2

8.9 Object omission

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in number of object omissions between task type. Results for each group are presented in Tables 8.22 and 8.23. The Mann-Whitney *U* test was run on 36 participants to determine if there was a difference in number of omissions of object between language dominance groups. The comparison results are presented in Table 8.24.

Key results:

- EL1CL2: no significant difference between task types. About half of the participants omitted at least one object.
- Balanced: no significant difference between task types. About a third of the participants omitted at least one object.
- Comparison: no significant effect of language dominance on both task types, suggesting similar proficiencies in English syntactical constructions.

Table 8.22

Analysis of number of object omissions by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who omitted objects (%)
Retell	0.50 (1.2)	-1.00	.319	.35	Retell = recall	10/20 (50.0%)
Recall	0.00 (0.8)					9/20 (45.0%)

Table 8.23

Analysis of number of object omissions by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who omitted objects (%)
Retell	0.00 (0.8)	0.54	.589	.14	Retell = recall	6/16 (37.5%)
Recall	0.00 (1.1)					5/16 (31.3%)

Table 8.24

Comparison between language dominance groups on object omission measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	189.00	1.03	.369	.17	Balanced = EL1CL2
Recall	174.50	0.53	.648	.09	Balanced = EL1CL2

8.10 Possessive pronoun

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of possessive pronouns between task type. Results for each group are presented in Tables 8.25 and 8.26. The Mann-Whitney *U* test was run (retell: 34 participants; recall: 29 participants) to determine if there was a difference in percentage accuracy of possessive pronouns between language dominance groups. The comparison results are presented in Table 8.27.

Key results:

- EL1CL2: about half of the participants produced the target pronoun consistently on the retell task and a quarter of the group on the recall task. This indicates this category of pronouns to be developing in this group. There was no significant difference between task types.
- Balanced: slightly over two thirds of participants produced the target consistently on the retell task and slightly under a quarter on the recall task. There was negligible effect of the delay but the decrease in participants with consistent accuracy indicates that this target was still developing.
- Comparison: no significant effect of language dominance on both task types, indicating similar proficiencies in English. For both groups, there was a decrease in the percentage of participants who produced the possessive pronoun accurately and consistently after the delay.

Table 8.25

Analysis percentage accuracy of possessive pronouns by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	83.75 (25.1)	1.63	.103	.41	Retell = recall	11/20 (55.0%)
Recall	100.00 (11.1)					4/16 (25.0%)

Note. Retell *n* = 20. Recall *n* = 16. These narrative samples had opportunities for production of the target marker.

Table 8.26

Analysis of percentage accuracy of possessive pronouns by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	91.88 (41.1)	0.00	1.00	.00	Retell = recall	10/14 (71.4%)
Recall	100.00 (35.2)					3/13 (23.1%)

Note. Retell *n* = 14. Recall *n* = 13. These narrative samples had opportunities for production of the target marker.

Table 8.27

Comparison between language dominance groups on possessive pronouns measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	133.50	-0.23	.823	.04	Balanced = EL1CL2
Recall	120.00	0.79	.503	.15	Balanced = EL1CL2

8.11 Auxiliary verb error

This outcome measure was analysed in terms of average number of auxiliary verb errors per utterance. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in average auxiliary verbs errors between task type. Results for each group are presented in Tables 8.28 and 8.29. The Mann-Whitney *U* test was run on 36 participants to determine if there was a difference in average auxiliary verbs errors between language dominance groups. The comparison results are presented in Table 8.30.

Key results:

- EL1CL2: about a fifth to a third of the participants presented with auxiliary verb errors on both tasks, suggesting that sizeable proportion of these children had difficulty with auxiliary verbs. There was negligible effect of the delay.
- Balanced: auxiliary verb errors were observed in only a few participants' narratives, suggesting that this is not a commonly observed error for this group. There was also no significant difference between task types.
- Comparison: no significant effect of language dominance on both task types. For the EL1CL2 group, a higher percentage of participants had auxiliary verb errors after the delay. The opposite was observed for the balanced bilingual group, with the percentage of participants with auxiliary verb errors decreasing after the delay.

Table 8.28

Analysis of average auxiliary verbs errors by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) with auxiliary verb errors (%)
Retell	0.00 (0.0)	1.07	.286	.38	Retell = recall	5/20 (25.0%)
Recall	0.00 (0.0)					7/20 (35.0%)

Table 8.29

Analysis of average auxiliary verbs errors by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) with auxiliary verb errors (%)
Retell	0.00 (0.0)	-0.37	.715	.09	Retell = recall	3/16 (18.8%)
Recall	0.00 (0.0)					2/16 (5.8%)

Table 8.30

Comparison between language dominance groups on auxiliary verb error measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	166.50	0.28	.838	.05	Balanced = EL1CL2
Recall	195.00	1.47	.276	.24	Balanced = EL1CL2

8.12 Copula verb error

This outcome measure was also analysed in terms of the average number of copula verb errors per utterance. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in average copula verbs errors per utterance between task type. Results for each group are presented in Tables 8.31 and 8.32. The Mann-Whitney *U* test was run on 36 participants to determine if there was a difference in average copula verbs errors per utterance between language dominance groups. The comparison results are presented in Table 8.33.

Key results:

- EL1CL2: more than half of the participants made copula verb errors in their narratives.
- Balanced: about two thirds of the participants made copula verb errors on both tasks.
- Comparison: no significant effect of language dominance on both task types. The high proportion of participants in both groups who made copula verb errors suggests that this is a commonly observed error and warrants further investigation.

Table 8.31

Analysis of average copula verbs errors by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) with copula verb errors (%)
Retell	0.03 (0.1)	0.28	.776	.06	Retell = recall	12/20 (60.0%)
Recall	0.03 (0.0)					11/20 (55.0%)

Table 8.32

Analysis of average copula verbs errors by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) with copula verb errors (%)
Retell	0.03 (0.1)	-0.98	.328	.24	Retell = recall	11/16 (68.8%)
Recall	0.03 (0.1)					10/16 (62.5%)

Table 8.33

Comparison between language dominance groups on copula verb error measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	134.00	-0.85	.422	.14	Balanced = EL1CL2
Recall	145.00	-0.50	.648	.08	Balanced = EL1CL2

8.13 Prepositional phrase error

This outcome measure was analysed in terms of average number of prepositional phrase errors per utterance. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in average prepositional phrase errors per utterance between task type. Results for each group are presented in Tables 8.34 and 8.35. The Mann-Whitney *U* test was run on 36 participants to determine if there was a difference in average prepositional phrase errors per utterance between language dominance groups. The comparison results are presented in Table 8.36.

Key results:

- EL1CL2: almost all participants produced at least one prepositional phrase error in their narratives, which was surprising considering that prepositional phrases tend to be early-developing. There was negligible effect of the delay.
- Balanced: all participants produced at least one prepositional phrase error in their narrative, which was, again, unexpected. There was negligible effect of the delay.
- Comparison: no significant effect of language dominance on both task types, indicating similar proficiencies in English syntax. There was at least one prepositional phrase error observed in narrative samples from all participants from both groups. The pervasiveness of this error requires further investigation and analysis into error patterns.

Table 8.34

Analysis of average prepositional phrase errors by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) with errors (%)
Retell	0.09 (0.1)	-0.81	.421	.18	Retell = recall	20/20 (100.0%)
Recall	0.09 (0.1)					18/20 (90.0%)

Table 8.35

Analysis of average prepositional phrase errors by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) with errors (%)
Retell	0.11 (0.1)	0.31	.756	.08	Retell = recall	16/16 (100.0%)
Recall	0.14 (0.1)					16/16 (100.0%)

Table 8.36

Comparison between language dominance groups on prepositional phrase error measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	133.50	0.40	.404	.14	Balanced = EL1CL2
Recall	108.00	-1.66	.102	.28	Balanced = EL1CL2

8.14 Conjunction

A two-way repeated measures ANOVA was run on the sample of 36 participants to examine the effect of and interaction between language dominance and task type on production of unique conjunctions. The between-factor was language dominance, which included two levels (balanced bilinguals and English-dominant). The within-factor was task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each two-way ANOVA analysis (Feise, 2002).

Key results:

- EL1CL2: no statistical difference between number of unique conjunctions between task types.
- Balanced bilingual: significant difference between number of unique conjunctions between task types, $F(1, 34) = 8.66$, $p = .006$, $\eta_p^2 = .203$, suggesting that the absence of visual support might have had an effect on the complexity of sentences produced. However, given the overall small number of unique conjunctions, the results must be interpreted with caution.
- Comparison: no significant main effect of language dominance on both task types, indicating similar proficiencies in English (Table 8.38). There was a large effect size of task type for the balanced bilingual group and a medium effect size of task type for the EL1CL2 group (see Table 8.37 for descriptive data).

Table 8.37

Means and standard deviations of percentage accuracy of irregular past tense verbs by language dominance groups and task type

	English retell		English recall		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	4.7	1.5	4.1	1.5	4.4	1.3
Balanced	4.6	1.5	3.6	1.5	4.1	1.3

Table 8.38

Difference in number of unique conjunctions between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
Retell	0.02	.880	.001	Balanced = EL1CL2
Recall	0.90	.349	.026	Balanced = EL1CL2

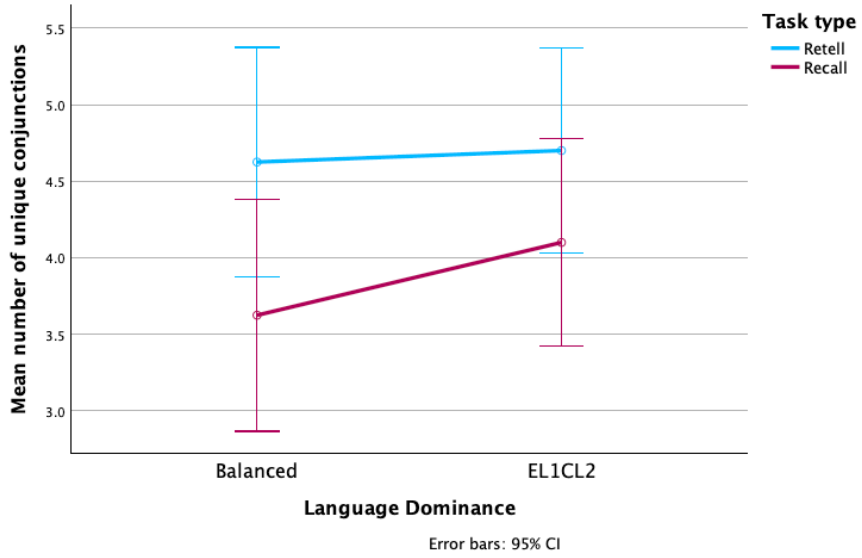
Table 8.39

Results of two-way ANOVA for number of unique conjunctions both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	0.39	.538	.011	Balanced = EL1CL2
Task type	12.32	.001	.266	Retell > recall
Language dominance x task type	0.77	.386	.022	No significant interaction

Figure 8.1

Average number of unique conjunctions produced by both language dominance groups



8.15 Summary

Table 8.40

Summary of key findings and percentage of participants in each group (with opportunities) that achieved more than or equal to 80% of opportunities, with comparison to Brebner's (2010) findings on English grammar at the sentence level

Outcome measure	Main effect of language dominance	% balanced group	% EL1CL2 group	Interpretation	Brebner (2010)
Past tense regular	No	Retell: 0.0 Recall: 0.0	Retell: 0.0 Recall: 0.0	• Emerging but not yet established	• Low mean occurrence • Emergence at 6;0 for EL1
Past tense irregular	No	Retell: 18.8 Recall: 12.5	Retell: 10.0 Recall: 15.0	• Developing for high frequency verbs	• Later emergence compared to Standard English speakers
Plural regular	No	Retell: 10.0 Recall: 30.0	Retell: 38.9 Recall: 52.9	• Developing but not yet established	• EL1: significant increase at 6;0 • ML1: not consistently used

Plural irregular	No	Retell: 33.3 Recall: 0.0	Retell: 50.0 Recall: 100.0	• Low occurrence (only ‘people’)	• N/A
Possessive nouns	No	Retell: 40.0 Recall: 21.4	Retell: 27.8 Recall: 28.6	• Developing but not yet established	• EL1: significant increase at 6;6 • ML1: not consistently used
Subjective pronouns	No	Retell: 75.0 Recall: 75.0	Retell: 85.0 Recall: 85.0	• Established for both groups	• ‘she’: EL1 > ML1
Subject omissions	No	N/A		• Commonly observed	• EL1 > ML1
Objective pronouns	No	Retell: 93.8 Recall: 87.5	Retell: 89.5 Recall: 93.3	• Established for both groups	• EL1 > ML1
Object omissions	No	N/A		• Not uncommon	• No difference between groups
Possessive pronouns	No	Retell: 71.4 Recall: 76.9	Retell: 60.0 Recall: 87.5	• Overall developing, established for some participants	• EL1 > ML1
Auxiliary verb errors	No	N/A		• Not uncommon	• Low mean occurrence

Copula verb errors	No	N/A	• Not uncommon	• Low mean occurrence
Prepositional phrase errors	No	N/A	• Produced by almost all participants	• EL1 > ML1
Conjunctions	No	N/A	• Established usage of coordinating conjunctions • Emerging usage of subordinating conjunctions	• Coordinating conjunctions: EL1 > ML1 • Subordinating conjunctions: EL1 > ML1

Chapter 9: Discussion – English Fine-grained Microstructure

This chapter discusses the quantitative results and explores error analysis based on the English grammatical markers, identifying similarities and differences between the two language dominance groups. As outlined in Chapter 1, the following hypotheses were proposed regarding fine-grained microstructure elements:

- For both groups: there would be more usage of accurate grammar and syntax on the retell than recall tasks. The results supported this hypothesis to only a small extent as this was observed only on the regular past tense marker outcome measure.
- The EL1CL2 group would use accurate grammar and syntax more consistently than the balanced bilingual group with specific caveats:
    - While bound morphemes were predicted to be omitted for both language groups, omissions would be more frequently observed for the balanced bilingual group.
    - For free morphemes or vocabulary with irregular forms, both groups would produce the target form accurately for forms of high frequency but would use root forms if of low frequency.
    - The main finding was that both groups performed similarly on all English fine-grained microstructure elements.

9.1 Past tense regular marker

It was hypothesised that the regular past tense ‘ed’ marker would be frequently omitted and this was observed. However, the analysis of the characteristics of the omission was to be exploratory in nature because there is no established literature for this population at the narrative level to compare to. There is evidence of the omission of the regular past tense marker in Singaporean English (e.g., Gut, 2009; Leimgruber, 2011; Leong, 2021), although most

previous research has focused on samples obtained from adults. Brebner et al. (2016) examined marking of verb tense in English-Mandarin bilingual kindergarten children and found that Mandarin-dominant children did not mark the regular past tense verbs consistently by the end of kindergarten. This is considerably later than observed in monolingual Standard English speakers, for whom this morpheme develops at about three years of age (Brown, 1973).

The results imply that the participants had yet to develop the regular past tense marker as an established skill. Moving from the retell task to the recall task, it was observed that the participants omitted regular past tense markers more frequently on the delayed recall. Similarly to a subgroup of participants in Brebner et al.'s (2016) study, the participants in this study were 5 to 6 years old and in Kindergarten 2 (the last year of kindergarten before starting primary school in Singapore). The results of the 2016 study suggested that Mandarin Chinese-dominant children did not develop regular past tense markers before completing kindergarten. In this study, the results revealed that the regular past tense marker was emerging but not fully developed. It may be that the participants in this study were balanced bilinguals rather than Mandarin-dominant, which indicated that they might have had more exposure to the grammatical marker. Another possible reason is the changing linguistic landscape of Singapore, with bilinguals becoming increasingly proficient in English relative to their second language. Changing language dominance profiles will be further discussed in Chapter 12.

A study examining /t/ and /d/ deletion in speech samples from university-educated Singaporean adults revealed that this omission was also observed consistently at over 70% in formal and informal settings (Lim & Guy, 2005). Further analysis was then conducted to evaluate if there was a difference in omission of regular past tense marker in which a /d/ was added (e.g., 'loved') and omission of the regular past tense marker in which an allomorph /əd/ was added (e.g., 'started') – i.e., regular past tense marking after alveolar stops. In monolingual

English-speaking children, there is some evidence that the allomorph /id/ or /ɘd/, was more frequently omitted than regular past tense marking after other phonemes (i.e., addition of /d/) (Blom & Paradis, 2011). It was observed on both Frog stories that there were more opportunities for the /d/ marker than the /ed/ allomorph and so the data was analysed qualitatively. In contrast to the findings of Blom and Paradis (2011), when participants produced the regular past tense markers, they produced the /ɘd/ allomorph more frequently on appropriate opportunities than the /d/ allomorph. This might be because deletion of final phoneme in word-final consonant cluster (i.e., the /d/ allomorph e.g., 'kicked') is frequently observed in Singaporean English (Wee, 2008); Ho and Platt (1993) found that the /ɘd/ is marked 40.6% of the time, in contrast to the consonant cluster, which was marked only 3.9% of the time. There is no evidence of weak syllable deletion, equivalent to omission of /ed/ allomorph, in Singaporean English.

Similar to the balanced bilingual group, it was hypothesised that frequent omissions of the regular past tense marker would be observed. On the retell task, 10% of the EL1CL2 participants did not produce any regular past tense markers and another 35% of the participants produced the regular past tense marker on less than 20% of all opportunities. None of the participants produced the target marker on more than 50% of all opportunities. On the recall task, 30% (six out of 20) of the EL1CL2 group did not produce any regular past tense marker. Another 35% (seven out of 20) produced the target marker on less than 20% of all opportunities and none of the participants produced the marker on more than 50% of all opportunities. For both tasks, 10% of the EL1CL2 participants did not produce any regular past tense markers. The participants omitted the regular past tense marker more frequently on the recall task than the retell task.

Brebner et al. (2016) reported frequent omissions but emerging usage of the regular past tense marker in 5-year-old English-dominant bilingual Singaporean children. The results from this study support Brebner et al.'s (2016) work to a certain extent: while the regular past tense marker was emerging for some participants, but this was not consistently observed across the group. This was observed less frequently on the recall task. A possible reason for the differences in findings is that the tasks administered to elicit the target markers were different: in the Brebner et al. (2016) study, samples were elicited via a picture description task in response to questions (i.e., sentence level) while the samples in this study were elicited via a narrative task. However, instead of being contradictory, these results are complementary in that they provide information on different language levels to help SLTs better understand this population.

Previous studies have established that bilingual children acquire the regular past tense marker differently from monolingual children (Nicoladis et al., 2012; Paradis et al., 2011). Rezzonico et al. (2017) investigated the production of tensed verbs on a narrative task (included regular past tense) by English-Cantonese kindergarten children living in Canada and found that these children produced accurate tensed verbs on 61% of opportunities on a narrative task. The participants from the Rezzonico et al. (2017) study demonstrated more consistent production of tensed verbs than the participants in the present study. This difference may be attributable to various factors. Firstly, the 2017 study grouped past tense and third person singular markers together as an outcome measure. Secondly, these participants lived in Canada while the children in this study lived in Singapore. While Cantonese is similar to Mandarin, Standard English is a community language spoken in Canada and maintains grammatical markers, while omissions are frequently observed in Singaporean English.

All but one error were omissions. The only other error was the addition of the regular past tense marker. Given previous knowledge of Singaporean English and that this error was only observed once, it is likely to be an individual error. The error is illustrated below:

- S13: without noticing when the woman was, was about to take a bite of the salad, he saw a frog peeped out of the salad

9.2 Irregular past tense form

It was hypothesised that emerging irregular past tense verbs would be observed, especially for basic and frequently occurring irregular past tense verbs, and that there would not be a significant difference between task types. The results suggest that the production of the past tense irregular verb forms was unlikely to be affected by task type; participants who produced the accurate irregular past tense verb forms to more than 80% accuracy on the retell task maintained accuracy levels on the recall task.

Previous research on acquisition of past tense verb forms in bilingual children revealed that bilingual children's trajectory parallels that of monolingual English-speaking children but with a lag, even for language pairs that consist of one tense-marking language (e.g., English, French) and one non-tense marking language (e.g., Chinese) (Jia, 2003; Nicoladis et al., 2012; Paradis et al., 2007). This implies that, at least for exploratory analysis, established literature on the acquisition of how irregular past tense verb forms develop can be used a guide to explore irregular past tense verb forms in this study.

Out of all erroneous productions, only 3.98% of target irregular past tense verbs were not substituted with the present tense form of the verbs. Bybee and Slobin (1982) classified irregular verb forms into eight categories, under which the results will be discussed. There did not appear to be any particular classes that were consistently produced accurately – defined for

the purpose of this study as 80% accuracy – except for class I, which indicates that irregular past tense forms had yet to develop in an established manner in Singaporean bilingual kindergarten children. A summary of the analysis is presented in Table 9.1 and discussed below.

Table 9.1

Summary of irregular past tense verb forms produced by class

Verb class	Feature	Examples from narrative samples	Observations from narrative samples
I	Verbs undergo no change	“put”	Accurate on all opportunities
II	Verbs undergo substitution of word final /d/ with /t/	“send”	Limited opportunities (task limitation)
III	Verbs undergo vowel change and addition of word-final /d/ or /t/	“keep”, “telled”, “have”	Root verbs and overgeneralisation of regular past tense marker
IV	Verbs undergo vowel change and substitution of word final consonant with /t/	“caught”, “brought”	High accuracy relative to other classes
V	Verbs with word-final /d/ or /t/ undergo vowel change	“bite”, “find”	Root verbs produced
VI	Verbs with /ɪ/ substituted with /æ/ or /ʌ/	“drink”, “sit”	Root verbs produced
VII	Other verbs with vowel changes	“came”, “fell”	High accuracy relative to other classes
VIII	Verbs undergo substitution of monophthongs with diphthongs	“blowed”, “throw”	Root verbs and overgeneralisation of regular past tense marker

Class I: the participants accurately produced irregular verb forms, which was the same as the root verb form. Considering the high percentage of errors for this grammatical form, and contrasting it with the participants achieving complete accuracy in this class, it was not unreasonable to suggest that these children might have been producing the root verb without considering the possibility of using a past tense form, i.e., coincidences resulting in accurate productions.

Class II: there were limited opportunities for expression of this class due to the nature of the stimuli. On the single opportunity present, the participant produced the root verb form ‘send’.

Classes III, V, VI, VIII: overwhelmingly, the participants produced the root verb form instead of the irregular past tense forms. Occasionally, errors also included overgeneralisation, as demonstrated below.

- J01: and then, and then, and then the, the, the boy telled the waitress to give it back to him
- K15: the man when he blowed his food he heard a squeaky noise

Classes IV and VII: participants achieved more success with irregular past tense forms in these classes. This was likely due to the relevant targets within these classes relating to the stimuli were of higher frequencies – for example, “thought” and “came”. This finding also aligns with those of Ho and Platt (1993), who reported that irregular past tense verb forms with a vowel change was marked 57.3% of the time.

Later research further elaborated on the types of errors produced by monolingual English-speaking school-aged children. Matthews and Theakston (2006) found that typically developing monolingual children overgeneralised the regular marker for classes III and IV, used

root forms for class V, and overgeneralised the regular marker most frequently for classes VI, VII and VIII. The differences between the error patterns from the participants in this study can be explained in light of previous research showing that bilingual children were more likely to achieve accurate higher frequency irregular past tense verbs and less likely to overgeneralise with the regular past tense marker when compared to monolingual children (Marinis & Chondrogianni, 2010). In addition, when specifically considering research on English-Chinese bilingual children, it was noted that, on erroneous productions, these bilingual children most commonly produced the root verbs, with only few overgeneralisations with the regular past tense marker (Huang & Kan, 2022; Nicoladis et al., 2012; Nicoladis et al., 2020; Woon et al., 2014), which was more similar to the results from this study.

Further analysis of errors other than overgeneralisation and substitution with root verbs was warranted to help understand Singaporean English-Mandarin Chinese bilingual children's language use. It should be noted that these errors were occurred only once each but should still be considered in future research when considering the small variety of verbs elicited in the tasks used for this study. These errors included:

- Addition of regular past tense marker to irregular past tense verbs:
    - P16: and he <u>founded</u> a box
- Incorrect phonological pattern. Although plausible in the context of class VI, this was an unusual error considering Bybee's (2008) argument that semantics has a bigger effect on irregular verb forms than phonology on accessing and usage of the lexicon:
    - S03: the boy <u>brang</u> them out for a walk
- Use of past participle instead of the irregular past tense:
    - P19: then they <u>gone</u> to the restaurant

Another important observation from this study was the overuse of 'got' as an alternative for multiple words (e.g., received, there was). With quantitative analysis, this would be classified as an accurate irregular past tense verb form but it would have different consequences qualitatively, in the sense that it might overinflate the percentage accuracy of this grammatical marker. Specific elicitation measures might be a solution to teasing apart true knowledge and ability to use irregular verb forms.

9.3 Regular plural marker

It was predicted that the regular plural marker would be frequently omitted, with the balanced bilingual group omitting the marker more frequently than the EL1CL2 group. The results from the balanced bilingual group suggest that the regular plural marker was still emerging in the sampled population. Although statistically there was no significant difference in percentage accuracy between language dominance groups, the results still suggest that, while this marker was also still emerging in the EL1CL2 group, the emergence of established pattern of usage of this marker might have occurred earlier. In addition, there was no significant difference between task types for both language dominance groups. A possible reason for this observation was that the marker was so infrequently produced on the retell task that there was no obvious effect of the delay on the recall task.

Omission was the most common error observed for both groups. In comparing the two language dominance groups, omissions were more frequently observed in the narrative samples from the balanced bilingual group than in the EL1CL2 group on both recall and retell tasks, but the difference was not statistically significant. Given that the omission of plural marker is a characteristic of Singaporean English (Leimgruber, 2011), this finding was unsurprising. This finding supports previous findings that English-Chinese bilingual preschool and

kindergarten children were not producing the regular plural marker consistently (Brebner, 2010; Xu Rattanasone & Demuth, 2022) and that these bilingual children do not produce inflectional morphemes until a later age, even after years of being exposed to English (Jia, 2003).

A possible reason for the omission of the regular plural marker is the cross-linguistic transfer from Mandarin to Singaporean English, as Mandarin is not an inflectional language (Packard, 2006), instead marking plurality with a numeral with a classifier and/or quantifier. Brebner's (2010) study of Singaporean English-Mandarin kindergarten children showed that, instead of plural noun markers, the children used numerals or quantifiers. Other studies produced similar findings (e.g., Deterding & Poedjosoedarmo, 2001; Platt et al., 1983). Although the substitution of the plural noun marker with a numeral or quantifier was also observed in the present study (e.g., K22: the two frog), most of the noun phrases in which a numeral or quantifier was present also included the plural noun marker (e.g., J01: all the pets; S08: two pets). This suggests that the quantifier and/or numeral might act as a lexical reminder for the children to use the plural noun marker.

Brebner (2010) reported that English-dominant children produced the plural noun marker significantly more than Mandarin-dominant children. In the present study, the difference between the EL1CL2 group and the balanced bilingual group was not significant. The difference between the two studies was not surprising, as the gap between proficiencies in English for this study was smaller than for Brebner's (2010) study, given that they were rated to be balanced bilinguals as compared to Mandarin-dominant.

Erroneous additions of the regular plural marker were also observed in six bilingual balanced participants' narrative samples and four EL1CL2 participants' samples (e.g., K16: 'boys' when referring to the main character). This was an unexpected finding. Lee and Yang

(2022) found that omissions were the only errors observed in a Cantonese-English bilingual child's language samples and that overgeneralisation of the regular plural marker was absent. A possible reason for this observation from the present study is that, rather than a syntactic error, this might be a lexical error. Examples below demonstrate this.

- S08 : 'the boys[7] excited to open the box'
- P15: 'then the frog jump in his clothings'[8]

Given that the erroneous additions were observed in narrative samples of a significant proportion of participants in both language dominance groups, the reasons for the additions warrant further investigation.

9.4 Irregular plural form

It was hypothesised that high frequency irregular plural nouns, when there were opportunities, would be produced correctly but that lower frequency plural nouns would still be produced as a singular root noun. In addition, there would be no overgeneralisation of the regular plural marker and no significant difference between the language dominance groups.

It was noted that there were few opportunities for the elicitation of irregular plural nouns due to the stimuli used. Given that only 2% of nouns have irregular plural forms (Marcus, 1995), it is not surprising that there were not many opportunities for production of this target. For the balanced bilingual group, there was no opportunity for irregular plural nouns on the retell task. On the recall task, participant P18 produced "feet" – however, this appeared to be a semantic error ("the big frog bit the small frog's leg", i.e., singular instead of plural and semantically related but inaccurate). Although it was a semantic error, the production of irregular plural noun

[7] Referring to the boy and pets.
[8] Referring to clothes.

‘feet’ suggests some knowledge of high frequency irregular plural nouns (Matthews & Theakston, 2006).

For both language dominance groups, the only opportunities and errors were between the irregular plural ‘people’ and singular ‘person’. This is illustrated with the below examples.

- P15: then the restaurant people ask how many person
- P15: the daddy say four person

As demonstrated in P15’s utterances, the singular ‘person’ was used instead of the plural but the irregular plural ‘people’ was used instead of the singular noun. This pattern was observed in the other participants who made errors on this outcome measure. Given that ‘people’ is a high frequency irregular plural noun, it was not surprising that it would substitute the less frequently occurring singular noun ‘person’. How and when high frequency irregular plural nouns and low frequency irregular plural nouns are acquired in this group of children, and whether they differ, will require further investigation with materials that elicit a larger variety of irregular plural nouns.

9.5 Possessive noun marker

It was hypothesised that both language dominance groups would frequently omit possessive noun markers, with the balanced bilingual group omitting the marker more frequently than the EL1CL2 group (i.e., the EL1CL2 was predicted to have a higher percentage accuracy). It was also hypothesised that frequency of omission would be similar across both task types for both language dominance groups.

For the balanced bilingual group, the results suggest that the usage of this marker was emerging but not yet established. For the EL1CL2 group, Similarly to the balanced bilingual group, this marker appeared to be only emerging for most participants.

These results showed that, across both language dominance groups, only a small number of participants used the possessive noun marker consistently, with most participants using the marker either inconsistently or not at all. This observation supports Brebner's (2010) findings based on a similar group of children that this marker was used very infrequently and appeared to be acquired later in children who speak other forms of Standard English. In addition, and also similar to Brebner's (2010) findings, qualitative analysis of the errors showed that, although the markers were omitted, the noun phrases still indicated possession (e.g., P15: the boy nose). The production of this marker was not even emerging in Mandarin-dominant children in Brebner's (2010) study, while some balanced bilingual participants were demonstrating emerging use. This fills the gap between what is already known about English-dominant and Mandarin-dominant children, given the changing linguistic landscape in Singapore.

There was no significant difference between the language dominance groups on production of the possessive noun marker. This was somewhat a surprising finding, as it could be assumed that the EL1CL2 bilingual children would be exposed to the marker more frequently and previous research has found that input frequency has a direct impact on how children acquire the possessives (Ambridge et al., 2015; Babatsouli & Nicoladis, 2019). A possible reason for this might be that although the EL1CL2 children had greater exposure to English than the balanced bilingual group, they were exposed to Singapore Colloquial English – which frequently omits this marker – rather than Standard English. This, in turn, means that both groups may have been exposed to this marker at similar frequencies. However, this observation

supports Brebner's (2010) finding that there was no significant difference in production of the possessive marker between English-dominant and Mandarin-dominant bilingual Singaporean children.

9.6 Subjective pronoun

The main hypothesis for production of pronouns was that there would be omissions of subjects (and subjective pronouns) but that, when produced, the pronouns would be accurate in terms of gender and singularity or plurality. In addition, there would not be differences in accuracy between language dominance groups or between task types.

Statistical analysis revealed similar accuracies between the language dominance groups, which aligned with other findings in this study that the balanced bilingual group had at least similar proficiency in English to the EL1CL2 group. The fact that a substantial proportion of participants in this study demonstrated the ability to use English pronouns accurately and consistently when present suggests that this was an established skill. Another observation was the consistently accurate usage of first and second personal pronouns when speaking in a character's voice. In both narratives, there were opportunities for dialogue in which the children used first person and second person personal pronouns. This was expected when combining Qi's (2010) findings based on pronoun acquisition in a Mandarin-English bilingual child – who developed these pronouns by four years of age – with cognitive literature on perspective taking (Birch et al., 2016).

Given that pronouns are known to be challenging for children acquiring language (e.g., Smith et al., 2019; Rispoli, 2005), it is important to undertake error analysis to identify potential gaps. Similar errors across both language dominance groups were noted:

- Inaccurate pronouns within category of third person singular pronoun. Research on monolingual English-speaking children revealed that the third person singular pronouns are usually acquired after the first person and second person singular pronouns (Brown, 1973) and by three years of age (Wells, 1985). A possible reason for this error is cross-linguistic transfer from Mandarin. Although third person singular pronouns are frequently used in English, these are pronounced the same (*ta*) in Mandarin (Qi, 2010). There is not much information on pronoun usage in Singaporean English beyond frequent omissions (e.g., Leimgruber, 2011), which will be discussed later. However, considering the influence of Mandarin on English, it was proposed that the gender neutrality of pronouns in Mandarin was transferred into Singaporean English, thereby resulting in inaccurate gendering of third person singular pronouns:
    - S08: and she decided to open it (referring to the boy)
    - S08: then the big frog don't know what she do to sorry to them
    - PK16: and then he scream (referring to the female diner)
- Inconsistent usage of singular and plural third person pronouns. Most errors in this category included substituting singular pronouns for plural pronouns, with only one participant substituting plural pronouns for singular pronouns. In contrast to the first point, this was unlikely to be a cross-linguistic feature as the singular and plural third person pronouns in Mandarin are distinguished with the addition of a syllable indicating plurality. Although there is research supporting a singular 'they' (e.g., Bjorkman, 2017), this was unlikely to be the case here since there was no ambiguity regarding the referenced character. There is currently no published research regarding overuse of singular third person pronouns, but a possible explanation is that the participants may have focused on the main character instead of the group of characters carrying out the action. One participant added 'all' to the singular pronoun to indicate plurality. Future

research could explore whether these errors are part of the developmental trajectory and provide insight into how pronouns develop in bilingual children.

- K22: then he hear a sound is a small frog (referring to the boy, turtle, and dog)
- P10: and hor he find all the place don't have (referring to the boy, turtle, and dog)
- P10: then he all go home (referring to the boy, turtle, and dog)

9.7 Subject omission

Subject omissions were observed at least once in the narrative samples of about half of the participants in each of the two language dominance groups. This was expected, as previous research on Singaporean English has demonstrated the prevalence of subject omissions, even in formal settings (Deterding, 2007; Leimgruber, 2011; Wee & Ansaldo, 2004). Detering (2007) concluded that it was unnecessary for speakers of Singaporean English to repeat subjects once they have been previously established, and this was supported by Tamaredo (2018), who found that omissions increased when they pertained to obvious and salient referents. This was the pattern observed in the narrative samples of these children, as shown below, where the referents were in the utterances immediately preceding the utterances with subject omissions.

- K22: then the boy take the baby frog up to his hand. Then scold the big frog
- K14: and then they go on the boat. And then never see the big frog push the baby frog off the turtle

9.8 Objective pronoun

Almost all participants in both language dominance groups consistently produced objective pronouns accurately (defined as accurate on more than or equal to 80% of opportunities) across both tasks.

There was some overlap with the errors from the subjective pronouns:

- Inaccurate pronouns within category of third person singular pronoun:
    - K17: the big frog through nobody will see her (referring to the big frog)
- Overgeneralisation of plural objective pronoun:
    - S12: and then he ask them to give back his frog (referring to the waiter)
- Repetition of noun phrase in place of pronoun. This appeared to be an isolated error and likely to be rooted in general syntax rather than a difficulty with pronouns per se, as evidenced by the participant demonstrating ability to use pronouns in other utterances:
    - K17: the boy see the present in front of the boy there
- Case error, substituting a possessive noun. Again, this was an isolated error:
    - S12: then the dog and the frog and the tortoise look at his hang the nice clothes (referring to the boy)

9.9 Object omission

Comparisons to bilingual children with different language pairs highlight the importance of considering the linguistic characteristics of the two languages a child speaks and how they interact with each other. In comparing between language dominance groups, research from French-speaking bilingual children revealed that balanced bilingual omitted object noun phrases more frequently than unbalanced bilinguals in their dominant language (Pirvulescu et al., 2013). The statistical results from the present study indicate no significant difference between language dominance groups, although nominally there appeared to be more EL1CL2 participants with object omissions compared to the balanced bilingual group.

A possible reason for the discrepancy lies in the language pairs. The French study included participants with diverse language pairs, while the language pair in the present study

was restricted to English-Mandarin. Secondly, the participants in the French study were slightly younger than the sample in the present study and may not have had as much input, given that the participants in the present study were receiving input in both languages in the community and in kindergarten, and bilingual children are known to benefit from input to develop the ability to integrate the syntactic rules of both languages (Zhou et al., 2021).

Yip and Matthews (2005, 2007) reported that young Cantonese-English bilingual children omitted objects following transitive verbs (e.g., put, take, get) much more frequently than monolingual English-speaking children. The results from the present study corroborate this finding, implying that Mandarin has the same cross-linguistic influence on English as Cantonese, which is unsurprising given that they belong to the same family of Chinese languages.

- P12: then after that the waiter give the girl (omitting object of the plate)
- P15: then the boy just put very near to his mouth (omitting object of the cup)

However, similar to subject omissions, most objects were omitted when the object was implied, once again echoing Leimgruber's (2011) findings on omission of noun phrases in Singaporean English. An example of omission due to implied object is presented below:

- S10: he wanted to take out the new present. Then he take out (omitted object of the new present). Got a new frog come. Then the big frog don't like' (omitted object of the new frog).

9.10 Possessive pronoun

As predicted, both language dominance groups performed similarly across both tasks. Error analysis revealed that some errors were common for both language dominance groups:

- Gender errors were noted in samples, with most of these errors substituting the feminine possessive pronoun ‘her’ instead of the masculine ‘his’. This finding matches those of other studies that found that Chinese-English bilinguals frequently make gender errors (Pozzan & Anton-Mendez, 2017) as gender information is not as salient in Chinese as it is in English (Chen & Su, 2011), which has effects on cognition given cross-domain transfers. Research by Rispoli (1994, 1998) and Moore (2001) confirmed that children made more errors on feminine pronouns than male pronouns. In contrast, the results from the present study confirms and extends Brebner’s (2010) finding for Singaporean bilingual children that more errors were made with the masculine pronoun in this group of children, but at the narrative level in addition to the sentence level. However, given that knowledge regarding Singaporean English is only emerging, further investigation would be beneficial in understanding how this bilingual group develops pronouns and the impact of their development on clinical practice.
    - K17: when the boy went to her home he lie down in her bed crying (referring to the boy’s home)
    - K16: when he want to take a one drink but the frog kiss her nose (referring to the male diner’s nose)
- Case errors. In this study, participants were observed to replace ‘his’ with ‘he’. This aligns with research findings for both Standard English and Singaporean English. Rispoli (1994) developed the Pronoun Paradigm Building Hypothesis, which proposed that lexical access to pronouns was dependent on retrieval strength guided by grammatical and phonological characteristics of the pronoun paradigm, predicting that the normative pronoun would be overextended due to its phonetic core. Although errors in which the nominative form substitutes for the genitive form occur less frequently (Rispoli, 1998), it is still plausible given the phonetic consistencies between the pronouns in this paradigm (/h_/ for he/him/his). This is compounded by Singaporean English, in which morpho-

phonemic word-final consonant omissions are not unusual (Deterding, 2007; Wee, 2008) and therefore is also a possible – or perhaps additional – reason for this error, again given the clear phonetic similarities between the two pronouns.

  - K11: then the papa say go to <u>he</u> room

- Errors within the same case. Two types of errors were observed in this category. One was the substitution of 'my' for 'mine'. In combining Puckica's (2013) summary of previous work categorising possessive pronouns into (a) a 'weak' or 'dependent' form that is usually used as part of a noun phrase (e.g., 'my hat') and (b) a 'strong' or 'independent' form that can be used by itself (e.g., 'mine'), and theories that less salient phonological features are more difficult to learn (Vanderweide, 2005), one would expect that the error might involve the 'strong' pronoun ('mine') replacing the 'weak' pronoun ('my'), but this was not the case here. A closer analysis of this error demonstrates possible reasons for this non-conformity. Firstly, there is no distinction between these 'weak' and 'strong' pronouns in Mandarin (both 我的 *wo de*). Cross-linguistic transfer suggests that the lack of distinction might be carried over to English, resulting in this error. However, Qi's (2010) study of pronoun acquisition in a Mandarin-English bilingual child showed that 'mine' was acquired before 'my', which suggests that the error observed in this study did not follow the typical pattern in bilingual children with this specific language pair. Secondly, given the close morphological similarity between these two forms (Puckica, 2013) alongside final consonant deletion in Singaporean English, it is not difficult to see how this error was produced.
  - K16: hey that's <u>my</u> (speaking in voice of the main character)
- Another case error lies within the singular/plural paradigm, addressed earlier.
  - P03: once there was a little boy and their three pets

- Substitution of article for pronouns. 'Weak' pronouns were found to be distributionally complementary to the definite article and could be termed definite determiners (Puckica, 2013), which lends credence to the possibility that they could be used interchangeably. However, there were instances whereby the determiner phrase appeared semantically inaccurate due to the lack of perceived relationships between the objects and the characters.
    - S12: the boy was change the clothes
    - K22: then the frog kick the baby frog inside and stick the tongue out

9.11 Auxiliary verb error

It was hypothesised that there would be omissions for both language dominance groups, with the balanced bilingual group producing more errors than the EL1CL2 group. As expected, omissions was the main error observed in the samples from both groups, but there was no effect of language dominance. The omission of the auxiliary verb is well documented in literature on Singaporean English (Gupta, 1994). The only study to evaluate different language dominance groups was that of Brebner (2010), who reported that omissions were commonly observed in sentence-level tasks elicited from both English-dominant and Mandarin-dominant kindergarten children but that the English-dominant group omitted the auxiliary verb more than the Mandarin-dominant group, also noting that the English-dominant group used the progressing '-ing' marker more frequently. In comparison to Brebner's (2010) study, the lack of difference between the language dominance groups in the present study was likely due to the difference between English and Mandarin proficiencies being smaller for this study given that the groups were English-dominant and balanced (as compared to Mandarin-dominant). The different language dominance groups in each study also has implications for the changing linguistic landscape of Singapore, which will be discussed in more detail later in this chapter.

Another possible reason for the difference is the difference in complexity of the tasks. In Brebner's (2010) study, the stimuli elicited single sentences while in the present study narratives were elicited. With narratives being of a higher degree of complexity at sentence level, the results from this study suggest that the two language dominance groups had similar proficiencies even when more complex discourse was elicited.

Only one participant was observed to substitute 'never' for an auxiliary verb. Bao (2005) described 'never' as a negative perfective marker, transferred from Mandarin negation markers (不 *bu* , 没 *mei*) into Singapore English. Leong (2013) corroborated this cross-linguistic transfer by comparing the syntactic and semantic features of 'never' in Singapore English and negation in Hokkien and Cantonese (dialects of Chinese also used in Singapore). Therefore, while it was not surprising that there would be usage of 'never' in the narratives, the extremely low frequency of occurrence indicated that this substitution is sensitive to the context of the elicitation, in line with the relationship between Singapore English and Standard English, termed 'diglossia' (Gupta, 1989, 1994). Further research in this area will aid clinicians in understanding how children codeswitch between Singapore Colloquial English and Singapore Standard English for certain features, and why they do so for some features but not others.

An unexpected observation was the addition of redundant auxiliary verbs. This error has not been addressed in previous literature on Singaporean bilingual children or in Standard English but, given that it was observed in narrative samples produced by participants in both language dominance groups, there would be much benefit in analysing these errors in order to better understand this often understudied population. Examples presented below reflect the differences in presentation in each language dominance group. This is one of the few grammatical markers in which there is a difference in the error patterns between the two

language dominance group. However, as there were only a few of these errors, further investigation is warranted.

For the balanced bilingual group, the auxiliary verb was omitted before the main verb which did not include the progressive '-ing' marker. As the present progressive '-ing' is one of the earliest developing markers (Brown, 1973) and considering that the participants with this error also produced the '-ing' marker in other occasions, it was unlikely that the '-ing' omission was the error.

- K22: and then is know that the baby frog was gone
- S08: two pets is see the box

For the EL1CL2 group, the errors were more diverse. One participant contracted the additional auxiliary before an irregular past tense while another used two auxiliary verbs together with a main verb. Currently there is no extant literature that would explain these errors. More in-depth investigation would be helpful in differentiating if this is an error pattern or if it is idiosyncratic.

- K14: then they were keep finding the baby frog
- P11: then his mum's told him to be quiet

9.12 Copula verb error

The hypothesis for copula verbs is the same as that for the auxiliary verbs, given their syntactic similarity. More than half of the participants in both language dominance groups made at least one error on this grammatical element. Studies based on other language pairs have found that bilingual children are usually not delayed in their acquisition of this particular grammatical element even if they lag in terms of other morphological structures (Paradis, 2010).

This appears to be similar for English-Mandarin bilingual children. Jia and Fuse (2007) reported that kindergarten to early primary school aged children were almost 80% accurate on copula verbs while Paradis' (2008) study on Chinese-English bilingual 5-year-olds demonstrated that they were more successful with copula verbs than other grammatical markers on the Rice/Wexler Test of Early Grammatical Impairment (TEGI). In Singapore, the omission of copula verbs has been proposed as a diagnostic feature of Singaporean English (Gupta, 1994), but later research indicated that copula verb omission in Singaporean English happens only infrequently (Ho & Platt, 1993; Leimgruber, 2009), implying that while omissions do occur they are not necessarily compulsory features of Singaporean English. In line with previous findings, in the present study the most frequent error was omissions. Platt and Weber (1980) found that the omission of copula verbs in Singapore English is not random but, rather, follows a specific syntactic structure, dependent on the type of complement that comes after the copula verb. They reported that omissions were most frequently observed before adjectives and least frequently before nouns or prepositions. In the present study, most omissions occurred before adjectives, and, in particular, emotion-type adjectives.

Another observation was that the participants who made the most errors (i.e., more than three to four errors) did not make any auxiliary verb errors. Although there is insufficient research to explain why this might be so, the answer in this case may lie in the complement following the position where the copula verb should be. The participants with multiple errors were observed to be listing emotions of different characters, as illustrated below, and therefore were repeating the errors in quick succession. Given that this method of narration was observed in several participants, further investigation would be useful in identifying if this is a non-idiosyncratic error pattern. Another possible reason is that if the auxiliary verb was omitted

leaving only the root verb, it would have been coded as a past tense error instead of an auxiliary verb error.

- P13: this one sad. This one angry
- P17: then the frog very angry again. Then very sad

The second most common error was the usage of two copula verbs. Some of these were realised via contraction of one copula verb and another copula verb in its full form immediately following. Unlike the auxiliary verb element, where the error was only observed in the EL1CL2 group, the additional copula verb was noted in both language dominance groups; examples are shown below. The other was the addition of a copula verb (K19: there's a boy was in dressing up his room) but was more likely a general syntax error when considering the rest of the utterance.

Addition of contracted copula verb

- K21: one day there's was a boy dressing up his nice clothes
- K05: it's looks like a frog

The final error to be analysed was the substitution of one copula verb for another. Based on research on copula verb errors in bilingual children (e.g., Paradis, 2008), it appears that copula verb substitution is an unusual error pattern. The implication is that the error in this study might be an individual error. A more specific evaluation of copula verbs might be able to confirm the idiosyncrasy.

- K03: did you realise the salad was a frog inside

9.13 Prepositional phrase error

The general finding was that prepositional phrase errors were the norm in both language dominance groups, with errors observed in narrative samples of all participants. This finding was not surprising, as previous studies on Singapore English have found that prepositional phrase errors are characteristic of Singaporean English (Deterding & Poedjosodarmo, 2001). However, given that prepositional phrase errors are a diagnostic feature of language disorders in monolingual children (e.g., Grela et al., 2004) and bilingual children (Armon-Lotem, 2014; Taliancich-Klinger et al., 2018), and perhaps in Singaporean English (Gupta & Chandler, 1994), analysis of the errors is warranted.

Most studies investigating prepositional phrases have evaluated accuracy (e.g., Taliancich-Klinger et al., 2018) with only few analysing error patterns. There is yet no consensus on which error patterns would be a more obvious indicator of language disorders. For example, Grela et al. (2004) found that monolingual English-speaking children with language disorders tended to substitute rather than omit. In contrast, Armon-Lotem (2014) found that monolingual children with language disorders tended to omit. She added that typically developing English-Hebrew bilingual children tended to substitute. The present study contributes to the limited research on analysis of prepositional phrase errors. In line with Armon-Lotem's (2014) findings, the most common error in this study was substitution of target prepositions with another inaccurate preposition. This was also unsurprising when specifically considering Singaporean children: Brebner (2010) reported that English-dominant children's production of prepositional phrases increased steadily throughout kindergarten while the Mandarin-dominant children's productions increased then plateaued after 5 years of age. This implies that while omissions do occur, there were increasing occasions of prepositional phrases produced and therefore more opportunities for errors other than omissions. Furthermore, based on the other outcome

measures, it appeared that the balanced bilingual group performed quite similarly to the EL1CL2 group, as compared to Brebner's (2010) Mandarin-dominant group versus English-dominant group. Prepositional phrases serve a variety of linguistic functions and are used to indicate aspects of location, directionality, time, means, possession and purpose, and they have both syntactic and semantic features. Qualitative analysis revealed that both language dominance groups had the most difficulty with directionality. In particular, there appeared to be frequent usage of 'inside' and 'to' instead of 'into'. For the latter, this might be due to cross-linguistic transfer from Mandarin, which uses *dao* 到 to indicate a general direction for reaching a location. The other error observed to have similar frequency across both language dominance groups was the substitution of dative prepositions in preposition phrases, also demonstrated below. Although there is no published literature on language dominance for this error pattern, it echoes previous studies that this substitution is a feature of bilingual speech development (Komeili & Marshall, 2013). Further exploration will be required to confirm whether this is a differentiating feature between language dominance groups.

Substitution

- P10: he don't know how the turtle tell the people go say the small frog hor um fall <u>until</u> the sea
- K09: so he kick him <u>out</u> of the turtle (referring to the big frog kicking the small frog off of the frog)

Omission

- P12: after that they are drive the fancy restaurant

Dative prepositions

- K16: the mommy is angry to the boy

Addition

- P15: then the boy just walk past of the frog

The language dominance groups differed on other errors. Firstly, the balanced bilingual group was more likely to make errors on location-type prepositional phrases as well as to omit the preposition, compared to the EL1CL2 group. It was unexpected that there would be location-type errors at all, considering that these prepositions usually develop by four years of age (Brown, 1973). The omission of prepositional phrases, in contrast, supports Brebner's (2010) finding that children who were not English-dominant omitted prepositions more frequently than English-dominant children. This study again extends her findings due to the nature of the discourse.

Of note was that only one balanced bilingual participant was observed to use prepositions with a mix of English and Mandarin sentence structures. This observation is usually considered an example of negative transfers (Argyri & Sorace, 2007; Nicoladis, 2006) and indicates a clear cross-linguistic influence of Mandarin on English development in this child; further exploration of how this language pair affect each other in elicited sentences and higher levels of discourse would be beneficial in improving clinicians' ability to distinguish between difference and disorder in this population.

- J01: … so he wore his coat on

In Mandarin, this would be translated as '所以 (so) 他 (he) 穿 (wear) 上 (up/on) 他的 (his) 外套 (coat/outerwear)'. From this participant's utterance, it appears that he constructed the utterance with English syntax but with vocabulary translated and transferred from Mandarin.

9.14 Conjunction

Monolingual English-speaking children start to acquire coordinating conjunctions at three years of age and their production of conjunctions continues to develop to include subordinating conjunctions. Conjunctions do not appear to be frequently studied in bilingualism literature, although there is some research on non-English or Mandarin language pairs (e.g., Tribushinina et al., 2017). While there is some research on English-Chinese bilinguals, these studies included secondary school-aged children in a Chinese-medium school and were not appropriate for comparison. Previous research on Singaporean children is more relevant. Brebner's (2010) study of Singaporean English-Mandarin bilingual children revealed that by 5 years old they were using coordinating and subordinating conjunctions without errors. However, caution is needed in comparing Brebner's (2010) results to the present study given the differences in stimuli. Brebner's (2010) study elicited sentences while the present study elicited narratives, which allowed for a wider variety of conjunctions. The participants in this study produced a variety of coordinating conjunctions (e.g., and, but, so) and these were similar across both language dominance groups. This was not surprising, as coordinating conjunctions develop earlier.

Both language dominance groups also produced subordinating conjunctions, with most of them being time-related (e.g., meanwhile, while, until, as). It should be noted here that these were only occasionally produced. Other subordinating conjunctions produced fall into the causal (because) and conditional (until) categories.

Error analysis revealed differences between the language dominance groups:

- Coordinating conjunctions: more EL1CL2 participants were observed to use coordinating conjunction inaccurately than the balanced bilingual participants, in particular 'but'.

- Subordinating conjunctions: participants from both language dominance groups appeared to have some difficulty with subordinating conjunctions, although there were also instances of earlier developing subordinating conjunctions (e.g., because) consistently being used accurately. However, it should be noted that, compared to coordinating conjunctions, there were fewer instances of usage of subordinating conjunctions, likely due to the freer nature of this method of elicitation. The nature of the task (i.e., eliciting narratives) involved a less restricted discourse, meaning that it would be more challenging to elicit a wide variety of conjunctions. Future exploration with more structured stimuli at this discourse level might shed more light on how these children produce conjunctions in narratives. Most errors observed have roots in sentence order. However, occasionally the subordinating conjunction was substituted with an earlier developing coordinating conjunction. In the below example, the participant used 'but only' to indicate 'except'.

    - P01: when he was setting sail and nobody was looking <u>but only</u> the little frog he jumped onto the boat

Chapter 10: Results – Mandarin Fine-grained Microstructure

This chapter presents the results from the analysis of the Mandarin morphosyntax structures:

- Perfective aspect marker
- Imperfective aspect marker
- Negation marker
- Passive sentence structure
- Active sentence structure
- Classifier
- Subjective pronoun
- Subject omission
- Objective pronoun
- Object omission
- Possessive pronoun
- Prepositional phrase error
- Conjunctions

Results from the EL1CL2 group will be presented first, followed by results from the bilingual group; finally, results from the two language dominance groups will be compared. Unless explicitly stated, the Wilcoxon Signed Rank test was run on 16 balanced bilingual participants and 20 EL1CL2 participants, and the Mann-Whitney *U* test on 36 participants. The analysis is summarised at the end of this chapter. Overall, the participants demonstrated varying abilities on the different markers. Both groups performed similarly on most grammatical markers, which only partially supported Hypothesis 3B.

10.1 Perfective aspect marker

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of the perfective aspect marker between task type. Results for each group are presented in Tables 10.1 and 10.2. The Mann-Whitney *U* test was also run on the sample of 36 participants to determine if there was a difference in production of the perfective aspect marker between language dominance groups. The comparison results are presented in Table 10.3.

Key results:

- EL1CL2: The EL1CL2 group performed similarly on this marker on the retell and recall tasks. In addition to the participants who did not produce any target markers, no participant from this group produced the perfective aspect marker consistently.
- Balanced: there was no significant difference between performances on the retell and recall tasks. Also similarly to the EL1CL2 group, no balanced bilingual participant produced the target markers consistently. This suggests that the perfective aspect marker was only emerging in this population.
- Comparison: the lack of difference between the two language dominance groups suggests similar proficiencies in Mandarin form.

Table 10.1

Analysis of percentage accuracy of the perfective aspect marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who did not produce any target markers (%)
Retell	15.79 (15.7)	1.64	.100	.37	Retell = recall	2 (10.0%)
Recall	17.69 (16.5)					1 (5.0%)

Table 10.2

Analysis of percentage accuracy of the perfective aspect marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who did not produce any target markers (%)
Retell	29.50 (18.2)	-0.62	.535	.15	Retell = recall	2 (12.5%)
Recall	27.67 (17.2)					2 (12.5%)

Table 10.3

Comparison between language dominance groups on perfective aspect marker measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	111.00	-1.56	.124	.26	Balanced = EL1CL2
Recall	138.00	-0.70	.498	.12	Balanced = EL1CL2

10.2 Imperfective aspect marker

There were no opportunities for imperfective aspect markers in the retell narratives of one balanced bilingual participant and five EL1CL2 participants. For the recall task, there were no opportunities for progressive aspect markers in the narrative samples produced by six balanced bilingual participants and seven EL1CL2 participants. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of the imperfective aspect marker between task type. Results for each group are presented in Tables 10.4 and 10.5.

The Mann-Whitney *U* test was run on the sample of 30 participants (15 balanced bilingual participants and 15 EL1CL2 participants) to determine if there was a difference in production of the progressive aspect marker between language dominance groups on the retell task. For the recall task, the Mann-Whitney *U* test was run on 23 participants (10 balanced bilingual participants and 13 EL1CL2 participants). The comparison results are presented in Table 10.6.

As can be seen in Figure 10.1, a greater number of balanced bilingual participants than EL1CL2 participants consistently produced progressive aspect markers . While there was a decrease between retell and recall for both groups, this was more obvious for the EL1CL2 group. The effect of the delay was more prominent for the EL1CL2 group and suggests that they have lower proficiency in Mandarin compared to the balanced bilingual group. This is further evidenced by the medium effect of language dominance on the recall task. In addition, the percentage of participants who did not produce any target marker was much higher for the EL1CL2 group than the balanced bilingual group. This indicates that the marker was developing for the balanced bilingual group but only emerging for the EL1CL2 group.

Table 10.4

Analysis of percentage accuracy of the imperfective aspect marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (with opportunities) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	50.00 (42.7)	-1.79	.073	.50	Retell = recall (medium effect)	5/15 (33.3%)	5/15 (33.3%)
Recall	0.00 (36.5)					7/13 (53.8%)	1/13 (7.7%)

Note. Retell *n* = 15. Recall *n* = 13. These narrative samples had opportunities for production of the target marker.

Table 10.5

Analysis of percentage accuracy of the imperfective aspect marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (with opportunities) who did not produce any target markers (%)	Number of participants who produced the target on >80% of opportunities (%)
Retell	100.00 (35.1)	-0.59	.553	.19	Retell = recall	2/15 (4.8%)	8/15 (53.3%)
Recall	78.57 (42.0)					2/14 (14.3%)	5/14 (35.7%)

Note. Retell *n* = 15. Recall *n* = 14. These narrative samples had opportunities for production of the target marker.

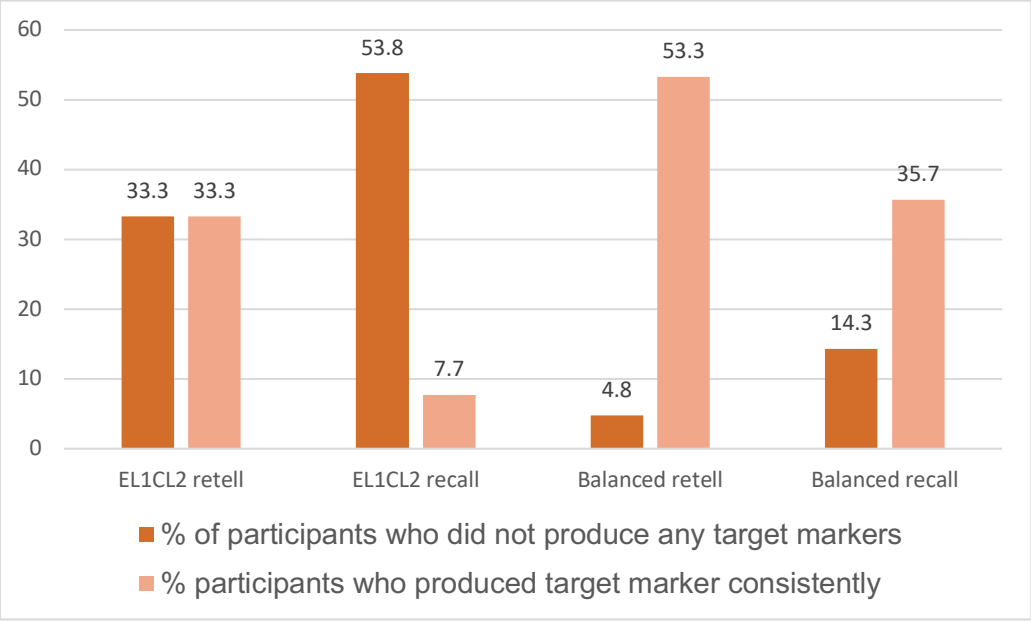
Table 10.6

Comparison between language dominance groups on imperfective aspect marker measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	77.00	-1.55	.148	.28	Balanced = EL1CL2
Recall	36.50	-1.84	.077	.38	Balanced = EL1CL2 (medium effect)

Figure 10.1

Percentage of participants who did not produce any target markers and participants who produced target markers consistently



10.3 Negation

There were no opportunities for negation markers in the narrative retell samples for two out of 20 of the EL1CL2 participants. There were no opportunities for one out of 20 EL1CL2 participants for the recall task. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of the negation marker between task type. Results for each group are presented in Tables 10.7 and 10.8.

The Mann-Whitney *U* test was run on the sample of 34 participants (16 balanced bilingual and 18 EL1CL2) to determine if there was a difference in production of the negation markers between language dominance groups on the retell task. For the recall task, the Mann-Whitney *U* test was run on the sample of 35 participants (16 balanced bilingual and 19 EL1CL2) to determine if there was a difference in production of the negation markers between language dominance groups. The comparison results are presented in Table 10.9.

Both groups demonstrated skill in using negation markers, as evidenced by the high percentage of participants with consistently accurate productions. There was no statistical difference between the two language dominance groups. These observations imply that negation would be an appropriate clinical indicator of language difficulties in Singaporean English-Mandarin bilingual kindergarten children.

Table 10.7

Analysis of percentage accuracy of the negation marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	100.00 (7.3)	1.34	.180	.32	Retell = recall	17/18 (94.4%)
Recall	100.00 (3.3)					19/19 (100.0%)

Note. Retell *n* = 18. Recall *n* = 19. These narrative samples had opportunities for production of the target marker.

Table 10.8

Analysis of percentage accuracy of the negation marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	100.00 (5.6)	0.00	1.00	.00	Retell = recall	16/16 (100.0%)
Recall	100.00 (12.5)					15/16 (93.8%)

Table 10.9

Comparison between language dominance groups on negation measure

	Mann-Whitney *U*	*z*	*p*	*r*	Interpretation
Retell	144.50	0.03	1.000	.01	Balanced = EL1CL2
Recall	154.00	0.17	.961	.03	Balanced = EL1CL2

10.4 Passive sentence structure

There were no passive sentences produced in any tasks by either language dominance group.

10.5 Active sentence structure

On the retell task, there were opportunities for active sentence structures in narratives from four out of 16 (18.8%) balanced bilingual participants and three out of 20 (15.0%) EL1CL2 participants. For the narrative recall samples, opportunities were present in narratives produced by five out of 16 (31.3%) balanced bilingual participants and four out of 20 (20.0%) EL1CL2 participants. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of the negation marker between task type. Results for each group are presented in Tables 10.10 and 10.11.

The Mann-Whitney *U* test was run on the sample of seven participants (four balanced bilingual and three EL1CL2) to determine if there was a difference in production of the accurate active sentence structures markers between language dominance groups on the retell task. For the recall task, the Mann-Whitney *U* test was run on the sample of nine participants (five balanced bilingual and four EL1CL2) to determine if there was a difference in production of the active sentence structures between language dominance groups. The comparison results are presented in Table 10.12.

The results should be interpreted with caution as only few instances of the target structure were elicited. Most participants from both groups with opportunities demonstrated that active sentence structure was an established skill. However, it should also be noted that the overwhelming majority of the participants did not produce active sentence structures spontaneously and it was therefore difficult to analyse the results further. More explicit elicitation would be beneficial to further explore whether this structure is an established skill.

Table 10.10

Analysis of percentage accuracy of the active structure marker by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)	Number of participants with opportunities (%)
Retell	100.00 (14.4)	1.34	.180	.32	Retell = recall	2/3 (66.7%)	4/20 (20.0%)
Recall	100.00 (0.0)					4/4 (100.0%)	

Note. Retell *n* = 3. Recall *n* = 4. These narrative samples had opportunities for production of the target marker.

Table 10.11

Analysis of percentage accuracy of the active structure marker by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)	Number of participants with opportunities (%)
Retell	100.00 (0.0)	0.00	1.00	.00	Retell = recall	3/3 (100.0%)	7/16 (43.8%)
Recall	100.00 (54.8)					3/5 (60.0%)	

Note. Retell *n* = 3. Recall *n* = 5. These narrative samples had opportunities for production of the target marker.

Table 10.12

Comparison between language dominance groups on the active structure measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	4.00	-1.16	.629	.44	Balanced = EL1CL2
Recall	14.00	1.35	.413	.45	Balanced = EL1CL2

10.6 Classifier

There were no opportunities for classifiers in the narrative samples of one balanced bilingual participant and one EL1CL2 participant. A two-way repeated measures ANOVA was run on the sample of 34 participants to examine the effect of and interaction between language dominance and task type on production of classifiers. The between-factor was language dominance, which included two levels (balanced bilinguals and English-dominant). The within-factor was task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each two-way ANOVA analysis (Feise, 2002).

Key results:

- EL1CL2: no statistical difference between percentage accuracy of classifiers across task types, $F(1, 32) = 0.15$, $p = .699$, $\eta_p^2 = .01$.
- Balanced bilingual: no statistical difference between percentage accuracy of classifiers across task types, $F(1, 32) = 1.65$, $p = .208$, $\eta_p^2 = .05$.
- Comparison: no significant main effect of language dominance (see Table 10.13 for descriptive data and Tables 10.14 and 10.15 for statistical analyses). It was noted that there was a medium effect of language dominance on the recall task. As can be seen from Figure 10.2, the EL1CL2 group produced a higher mean percentage accuracy of classifiers than the balanced bilingual group. Given the reported relative proficiencies of the two groups, the medium effect of language dominance on the recall task might be a surprising finding. However, it becomes less surprising when considering what constitutes an accurate classifier. In Mandarin, the general classifier *ge* is acceptable in many instances even though a more specific classifier might be preferred, and this was

what was observed in the samples from the EL1CL2 group, thereby inflating their percentage accuracy. This will be discussed in more detail in Chapter 11.

Table 10.13

Means and standard deviations of percentage accuracy of classifiers by language dominance groups and task type

	Retell		Recall		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	60.0	24.5	57.8	31.1	58.9	20.6
Balanced	51.7	20.4	43.4	14.5	47.5	20.6

Table 10.14

Difference in percentage accuracy of classifiers between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
Retell	1.12	.299	.034	Balanced = EL1CL2
Recall	2.71	.109	.078	Balanced = EL1CL2 (medium effect of language dominance)

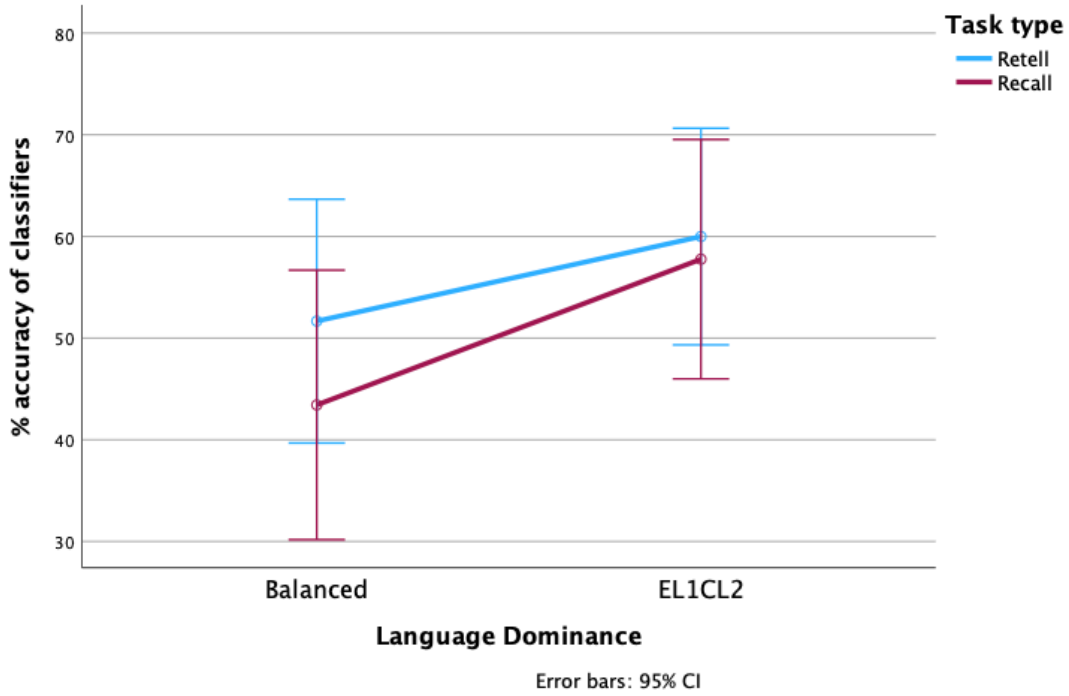
Table 10.15

Results of two-way ANOVA for mean percentage accuracy of classifiers between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	2.55	.120	.074	Balanced = EL1CL2
Task type	1.49	.232	.044	Retell = recall
Language dominance x task type	0.49	.488	.015	No significant interaction

Figure 10.2

Mean percentage accuracy of classifiers on tasks by each language dominance group



10.7 Subjective pronoun

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in percentage accuracy of the subjective pronoun marker between task type. Results for each group are presented in Tables 10.16 and 10.17. The Mann-Whitney *U* test was run on the sample of 36 participants to determine if there was a difference in production of the subjective pronouns between language dominance groups. The comparison results are presented in Table 10.18.

Most participants in the EL1CL2 group and the balanced bilingual group demonstrated established skill in production of accurate subjective pronouns, as evidenced by the majority of participants producing the target pronoun on more than 80% of all opportunities. This was unsurprising, as pronouns are an early developing grammatical form. For the balanced bilingual group, there was an effect of the delay on production of subjective pronouns, which was not unexpected considering the cognitive demand of the delay. However, the presence of effect of task type for the balanced bilingual group but not for the EL1CL2 group was not expected. The results do not suggest that the balanced bilingual group showed lower proficiency in Mandarin, as evidenced by the Mann-Whitney *U* tests.

Table 10.16

Analysis of percentage accuracy of subjective pronouns by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) who produced the target on >80% of opportunities (%)
Retell	98.48 (8.5)	-1.28	.201	.29	Retell = recall	19/20 (95.0%)
Recall	93.93 (11.1)					17/20 (85.0%)

Table 10.17

Analysis of percentage accuracy of subjective pronouns by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) who produced the target on >80% of opportunities (%)
Retell	100.00 (4.7)	-2.19	.028	.55	Retell > recall	16/16 (100.0%)
Recall	96.15 (9.0)					14/16 (87.50%)

Table 10.18

Comparison between language dominance groups on subjective pronoun measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	133.50	-0.93	.404	.15	Balanced = EL1CL2
Recall	147.00	-0.43	.694	.07	Balanced = EL1CL2

10.8 Subject omission

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in the number of subject omissions between task type. Results for each group are presented in Tables 10.19 and 10.20. The Mann-Whitney U test was run on the sample of 36 to determine if there was a difference in number of subject omissions between language dominance groups. The comparison results are presented in Table 10.21.

Subject omissions were observed in narrative samples from most participants. This was not an unexpected finding as Mandarin is a pro-drop language. There was no significant difference between the number of subject omissions by the language dominance groups, which suggests that relative proficiency in English did not remediate the omission of subjects in Mandarin.

Table 10.19

Analysis of number of subject omissions by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) with omissions (%)
Retell	3.00 (4.3)	-1.85	.064	.41	Retell = recall	17/20 (85.0%)
Recall	2.50 (2.2)					16/20 (80.0%)

Table 10.20

Analysis of number of subject omissions by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) with omissions (%)
Retell	3.50 (2.2)	-1.75	.080	.44	Retell = recall	14/16 (87.5%)
Recall	2.00 (1.7)					15/16 (93.8%)

Table 10.21

Comparison between language dominance groups on the subject omission measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	163.50	0.11	.912	.02	Balanced = EL1CL2
Recall	170.50	0.34	.741	.06	Balanced = EL1CL2

10.9 Objective pronoun

On the retell tasks, 15 out of 16 (93.8%) balanced bilingual participants and 13 out of 20 (65.0%) of EL1CL2 participants produced objective pronouns. On the recall tasks, nine out of 16 (56.3%) balanced bilingual participants and 15 out of 20 (75.0%) of EL1CL2 participants produced objective pronouns. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in the percentage accuracy of objective pronouns produced between task type. Results for each group are presented in Tables 10.22 and 10.23. The Mann-Whitney *U* test was run on 28 participants for the retell task and 24 participants on the recall task to determine if there was a difference in number of subject omissions between language dominance groups. The comparison results are presented in Table 10.24.

Objective pronouns appeared to be an established skill for both language dominance groups, as evidenced by almost all participants achieving 80% or higher accuracy on all opportunities.

Table 10.22

Analysis of percentage accuracy of objective pronouns by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	100.00 (27.7)	1.00	.317	.30	Retell = recall	12/13 (92.3%)
Recall	100.00 (0.0)					15/15 (100.0%)

Note. Retell *n* = 13. Recall *n* = 15. These narrative samples had opportunities for production of the target marker.

Table 10.23

Analysis of percentage accuracy of objective pronouns by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	100.00 (15.8)	1.00	.317	.33	Retell = recall	14/15 (93.3%)
Recall	100.00 (0.0)					9/9 (100.0%)

Note. Retell *n* = 15. Recall *n* = 9. These narrative samples had opportunities for production of the target marker.

Table 10.24

Comparison between language dominance groups on object pronoun measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	102.00	0.39	.856	.06	Balanced = EL1CL2
Recall	67.50	0.00	1.00	.00	Balanced = EL1CL2

10.10 Object omission

The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in the number of object omissions between task type. Results for each group are presented in Tables 10.25 and 10.26. The Mann-Whitney *U* test was run on the sample of 36 to determine if there was a difference in number of object omissions between language dominance groups. The results from comparison are presented in Table 10.27.

Similarly to the subject omission marker, object omissions were observed on the majority of participants in both groups. For the EL1CL2 group, there were more omissions and more participants with omissions. This was surprising, as more omissions would be expected with the added cognitive demand of the delay. A possible reason for this is that the EL1CL2 participants produced fewer utterances on the recall task and there were therefore fewer opportunities for object omissions. This was further evidenced by the percentage of participants with omissions remaining fairly similar across both tasks but a significant drop in the actual number of omissions. For the balanced bilingual group, the decrease in the number of participants with omissions juxtaposed against overall similar number of object omissions in both tasks suggests that there might be fewer omissions per participant, as compared to the EL1CL2 group. This would therefore not constitute a significant difference, even though there were fewer participants who made omissions. On both tasks, there was negligible difference between the groups, indicating that relative proficiency in English did not remediate the pro-drop characteristic in Mandarin.

Table 10.25

Analysis of number of object omissions by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 20) with omissions (%)
Retell	2.00 (2.1)	2.42	.016	.54	More omissions on retell task	18/20 (90.0%)
Recall	2.00 (1.4)					16/20 (80.0%)

Table 10.26

Analysis of number of object omissions by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants (*n* = 16) with omissions (%)
Retell	1.50 (1.3)	-0.73	.468	.18	Retell = recall	13/16 (81.3%)
Recall	1.00 (1.7)					9/16 (56.3%)

Table 10.27

Comparison between language dominance groups on object omission measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	215.00	1.79	.083	.30	Balanced = EL1CL2
Recall	196.50	1.20	.249	.20	Balanced = EL1CL2

10.11 Possessive pronoun

On the retell task, 15 out of 16 (93.8%) balanced bilingual participants and 15 out of 20 (75%) of EL1CL2 participants had opportunities for the marker. On the recall task, opportunities were present in samples from 13 out of 16 (81.3%) balanced bilingual participants and 16 out of 20 (80.0%) of EL1CL2 participants. The Wilcoxon Signed Rank test was run separately on both language dominance groups to determine if there was a difference in the percentage accuracy of possessive pronouns produced between task type. Results for each group are presented in Tables 10.28 and 10.29. The Mann-Whitney *U* test was run on 30 participants on the retell task and 29 participants on the recall task to determine if there was a difference in percentage accuracy of possessive pronouns between language dominance groups. The comparison results are presented in Table 10.30.

Most participants with opportunities in both language dominance groups demonstrated established usage of the target marker, suggesting that Mandarin possessive pronouns had developed by this age. This was as expected given the strong performance on subjective and objective pronouns, because possessive pronouns differ from the other pronouns only by a *de* possessive marker.

Table 10.28

Analysis of percentage accuracy of possessive pronouns by the EL1CL2 group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	100.00 (23.2)	-0.18	.859	.05	Retell = recall	11/15 (73.3%)
Recall	100.00 (27.0)					11/16 (68.8%)

Note. Retell *n* = 15. Recall *n* = 16. These narrative samples had opportunities for production of the target marker.

Table 10.29

Analysis of percentage accuracy of possessive pronouns by the balanced bilingual group

	Mdn (SD)	*z*	*p*	*r*	Interpretation	Number of participants who produced the target on >80% of opportunities (%)
Retell	85.71 (14.3)	1.37	.172	.38	Retell = recall	11/15 (73.3%)
Recall	100.00 (16.1)					11/13 (84.6%)

Note. Retell *n* = 15. Recall *n* = 13. These narrative samples had opportunities for production of the target marker.

Table 10.30

Comparison between language dominance groups on possessive pronoun measure

	Mann-Whitney *U*	*z* statistic	*p*	*r*	Interpretation
Retell	114.50	0.09	.935	.02	Balanced = EL1CL2
Recall	97.50	-0.32	.779	.06	Balanced = EL1CL2

10.12 Prepositional phrase error

A two-way repeated measures ANOVA was run on the sample of 36 participants to examine the effect of and interaction between language dominance and task type on average number of erroneous prepositional phrases produced. The between-factor was language dominance, which included two levels (balanced bilinguals and English-dominant). The within-factor was task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each two-way ANOVA analysis (Feise, 2002).

Key results:

- EL1CL2: no statistical difference between average number of erroneous prepositional phrases per utterance across task types, $F(1, 34) = 0.04$, $p = .853$, $\eta_p^2 = .001$.
- Balanced bilingual: no statistical difference between average number of erroneous prepositional phrases per utterance across task types, $F(1, 34) = 4.01$, $p = .053$, $\eta_p^2 = .105$, although there was a medium effect of task type. This group produced more erroneous prepositional phrases on the recall task, which was expected due to the delay and its cognitive demands.
- Comparison: no significant main effect of language dominance (see Table 10.31 for descriptive data and Tables 10.31 and 10.32 for statistical analyses), although there was a medium effect driven by performance on the retell task. As can be seen from Figure 10.3, the EL1CL2 group produced a higher average number of erroneous prepositional phrases per utterance than the balanced bilingual group on both tasks. This difference was significant on the retell task. This was not surprising considering the reported relative proficiencies between the two languages in both language dominance groups. In

addition, all participants in this study produced prepositional phrases and all participant made at least one erroneous production, with the number of errors ranging from one to eight across the entire narratives.

Table 10.31

Means and standard deviations of average number of erroneous prepositional phrases produced by language dominance groups and task type

	Retell		Recall		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	0.1	0.1	0.1	0.1	0.1	0.0
Balanced	0.1	0.0	0.1	0.1	0.1	0.0

Table 10.32

Difference in average number of erroneous prepositional phrases produced between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
Retell	8.25	.007	.195	EL1CL2 produced more erroneous prepositional phrases
Recall	0.44	.508	.013	Balanced = EL1CL2

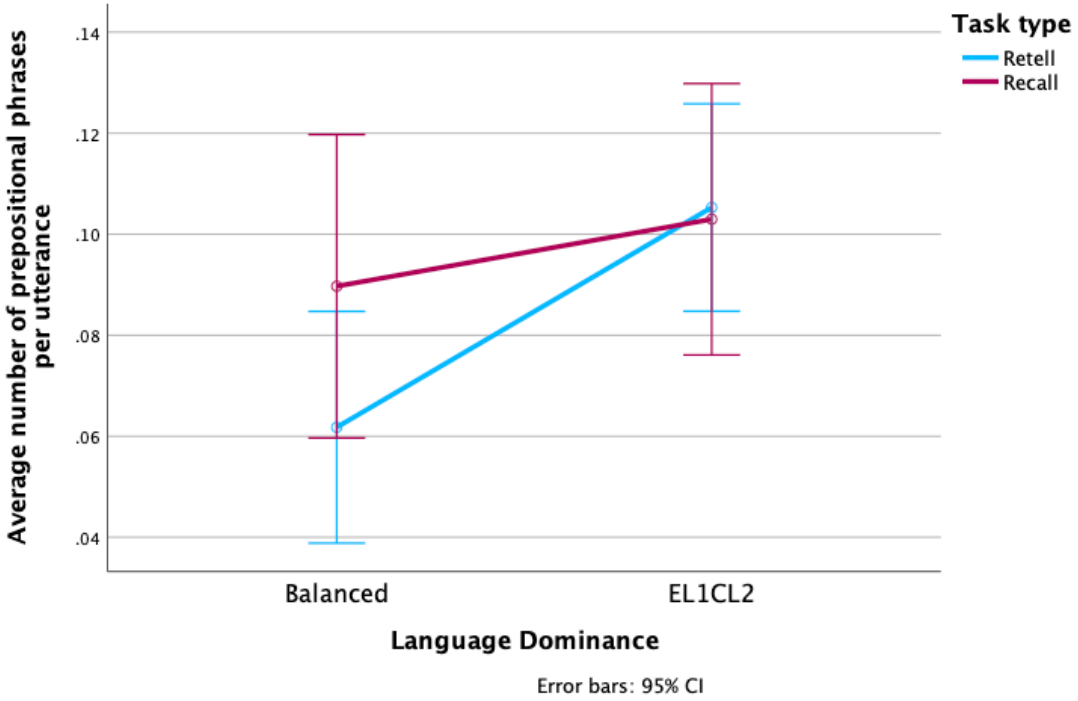
Table 10.33

Results of three-way ANOVA for average number of erroneous prepositional phrases produced between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	3.60	.066	.096	Balanced = EL1CL2 (medium effect size)
Task type	1.87	.180	.052	Retell = recall
Language dominance x task type	2.61	.115	.071	No significant interaction

Figure 10.3

Average number of erroneous prepositional phrases per utterance by language dominance groups



10.13 Conjunction

A two-way repeated measures ANOVA was run on the sample of 36 participants to examine the effect of and interaction between language dominance and task type on the number of unique conjunctions produced in the narratives. The between-factor was language dominance, which included two levels (balanced and English-dominant). The within-factor was task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each two-way ANOVA analysis (Feise, 2002).

Key results:

- EL1CL2: no statistical difference between average number of unique conjunctions across task types, $F(1, 34) = 0.03$, $p = .874$, $\eta_p^2 = .001$.
- Balanced bilingual: no statistical difference between average number of unique conjunctions across task types, $F(1, 34) = 1.56$, $p = .221$, $\eta_p^2 = .04$.
- Comparison: there was a significant main effect of language dominance (see Table 10.34 for descriptive data and Tables 10.35 and 10.36 for statistical analyses and), with the balanced bilingual group producing more unique conjunctions than the EL1CL2 group. This significant difference was also observed on the retell task but not on the recall task, although there was also a medium effect of language dominance. The difference is illustrated in Figure 10.4. This was not surprising and reinforces the difference in reported Mandarin proficiencies between the two language dominance groups.

Table 10.34

Means and standard deviations of average number of unique conjunctions produced by language dominance groups and task type

	Retell		Recall		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
EL1CL2	2.2	1.5	2.2	1.5	2.2	1.3
Balanced	3.5	1.5	3.1	1.5	3.3	1.3

Table 10.35

Difference in number of unique conjunctions produced between language dominance groups by task

Task	*F*	*p*	η_p^2	Interpretation
Retell	7.01	.012	.171	Balanced > EL1CL2
Recall	2.953	.095	.080	Balanced = EL1CL2 (medium effect)

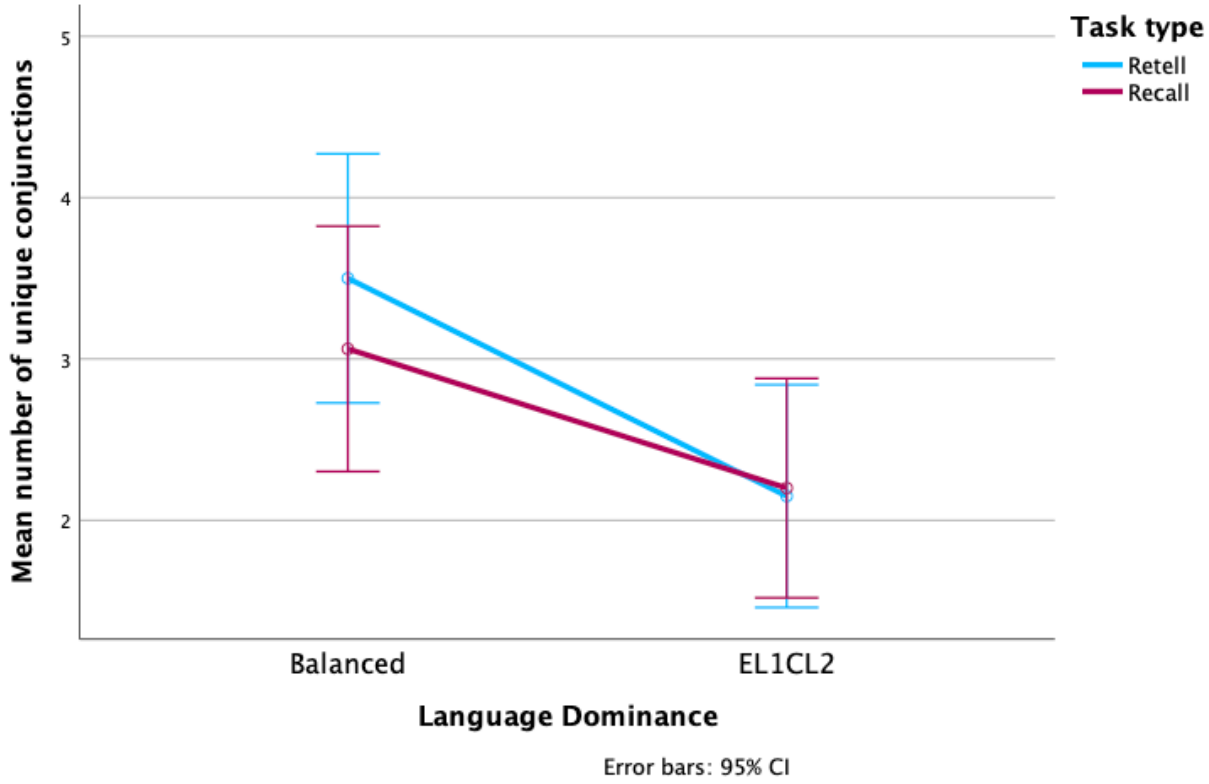
Table 10.36

Results of two-way ANOVA for number of unique conjunctions produced between both language dominance groups

	F	*p*	η_p^2	Interpretation
Language dominance	6.10	.019	.152	Balanced > EL1CL2
Task type	0.68	.416	.020	Retell = recall
Language dominance x task type	1.07	.307	.031	No significant interaction

Figure 10.4

Mean number of unique conjunctions by language dominance groups



10.14 Summary

Table 10.37

Key findings from Mandarin fine-grained microstructure elements and percentage of participants in each group (with opportunities) who achieved more than or equal to 80% of opportunities

Outcome measure	Main effect of language dominance	% balanced group	% EL1CL2 group	Interpretation
Perfective aspect	No	Retell: 0.0 Recall: 0.0	Retell: 0.0 Recall: 0.0	• Emerging but not yet established • Frequent omissions
Progressive aspect	No	Retell: 53.3 Recall: 50.0	Retell: 33.3 Recall: 7.7	• Low occurrence
Negation	No	Retell: 100.0 Recall: 93.8	Retell: 94.4 Recall: 100.0	• Established usage • Marked negation on errors
Passive	No	N/A	N/A	• Nil occurrence
Active	No	Retell: 100.0 Recall: 40.0	Retell: 66.7 Recall: 100.0	• Low occurrence
Classifier	No	Retell: 12.5 Recall: 0.0	Retell: 25.0 Recall: 15.8	• Overgeneralisation of *ge*

Subjective pronouns	No	Retell: 100.0 Recall: 87.5	Retell: 95.0 Recall: 85.0	• Established usage by both groups
Subject omissions	No	N/A		
Objective pronouns	No	Retell: 93.3 Recall: 100.0	Retell: 92.3 Recall: 100.0	• Established usage by both groups
Object omissions	No	N/A		
Possessive pronouns	No	Retell: 75.0 Recall: 84.6	Retell: 73.3 Recall: 68.8	• Established usage by both groups • Occasional omission of *de*
Prepositional phrase errors	Yes for retell (EL1CL2 > balanced)	N/A		• More errors in narrative by the EL1CL2 group compared to the balanced group
Conjunctions	Yes (balanced > EL1CL2)	N/A		• More unique conjunctions produced by the balanced group than the EL1CL2 group

Chapter 11: Discussion – Mandarin Fine-grained Microstructure

This chapter discusses the quantitative results and provides error analyses based on the Mandarin grammatical markers, identifying similarities and differences between the two language dominance groups. As outlined in Chapter 1, the following hypotheses were proposed regarding fine-grained microstructure elements:

- For both groups: more usage of accurate grammar and syntax on the retell than recall tasks. The results supported this hypothesis to only a small extent.
- The balanced bilingual group would use accurate grammar and syntax more consistently than the balanced bilingual group. This hypothesis was partially supported, with the balanced bilingual group demonstrating higher proficiency on a few Mandarin fine-grained microstructure elements.

11.1 Perfective aspect marker

It was hypothesised that both language dominance groups would omit the perfective aspect marker and that the EL1CL2 group would do so more frequently than the balanced bilingual group. Unlike English, which marks tenses with a bound morpheme or an irregular form, Mandarin is a tenseless language, meaning that it does not express tense on the verb but instead is rich with aspect markers – i.e., the addition of other lexical words or use of neighbouring contextual information to indicate time (Liu, 2015). Most aspect markers are expressed as suffixes, and this includes the simple perfective *le* 了 and the experiential perfective *guo* 过. Both are verbal suffixes which indicate the action as completed, but *guo* has the additional meaning of discontinuity while *le* does not (Liu, 2015).

For the purpose of this analysis, there was no differentiation between the simple and the experiential. The results indicated that both language dominance groups performed similarly and that there was no effect of the delay on the production of this marker. Further analysis revealed that none of the participants had produced the markers consistently. In fact, an overwhelming majority of participants from both language dominance groups produced the target markers accurately on less than 50% of all opportunities, with some participants not achieving accurate productions on any opportunity. These results suggest that not only was this marker not yet established in these groups, it did not appear to even be emerging for some of them. This might be surprising when considering Mandarin in isolation in monolingual Mandarin-speaking children (cf. Erbaugh, 1992) but is more reasonable when accounting for the Singaporean context. Just as Singaporean English has features that distinguish it from Standard English, Singaporean Mandarin, too, should be considered as a Singaporean variety of Mandarin, influenced by contact with other languages and Chinese dialects in Singapore (Lin & Khoo, 2018).

Nicoladis et al. (2020) reported that Mandarin-English bilingual children living in Canada produced the simple perfective aspect marker *le* similarly to monolingual Mandarin-speaking children living in Beijing, producing the target marker on 68.1% of telic verbs. This was much higher than the percentage accuracy achieved in the present study. Possible reasons for these different findings include a difference in language learning environments. The participants in Nicoladis et al.'s (2020) study were exposed to Mandarin in their homes and started learning English at daycare or preschool, and were rated by their parents as Mandarin-dominant. The participants in the current study, however, were exposed to less Mandarin given that schooling was in English and were, at best, balanced in their language dominance. Secondly, besides language dominance, there might have been a difference in the input received by the children in

each study. The parental background was not clarified in the Nicoladis et al. (2020) study but the children in this study were exposed to Singaporean Mandarin, which has characteristics that differ from Putonghua.

Kang (2019) echoed previous literature in suggesting that, in contrast to Putonghua, aspect markers are optional in Singaporean Mandarin. It would be reasonable, in that case, that the most common error demonstrated by the participants in this study was omission of the perfective aspect markers, demonstrated in the examples below.

- S10: then 那个青蛙亲那个人的鼻子 *then na ge qing wa qin na ge ren de bi zi* ('then that frog kiss that person's nose'. The stimulus was a picture of the frog kissing the male diner's nose).
- S12: 然后大青蛙就踢小青蛙在河里 *ran hou da qing wa jiu ti xiao qing qa zai he li* ('then big frog then kick small frog at river in'. The stimulus was a picture of the big frog kicking the small frog into the pond).

Error analysis beyond omissions also revealed slight differences in the types of errors made between the language dominance groups. The EL1CL2 group had a tendency to replace the perfective aspect marker with the progressive aspect marker, while this was less frequently observed for the balanced bilingual group. This could possibly be explained by cross-linguistic transfer from the dominant language for the English-dominant group and, to a smaller extent, the balanced bilingual group. Liu (2015) suggested that bilingual children acquire grammar in their second language that has parallel constructs in their first language earlier than markers without parallels. Both language dominance groups frequently omitted the regular past tense marker in English and it was therefore unsurprising that the equivalent perfective aspect marker in Mandarin would be omitted too. In addition, while the present progressive marker was not

analysed as a grammatical marker in this study, Brebner (2010) reported that English-dominant kindergarten children were using the progressive '-ing' marker fairly consistently by six years of age. This suggested that Singaporean children were using the English progressive marker consistently but not the regular past tense marker and that substitutions were observed in the English narrative samples. It is therefore plausible that these features in English could be transferred to Mandarin, reflected as the progressive aspect marker replacing the perfective aspect marker.

While the simple perfective aspect marker and the experiential aspect marker were analysed under the umbrella category of perfective aspect markers, Singaporean bilingual children used the simple perfect aspect marker *le* much more frequently than the experiential aspect marker *guo*. This was not surprising, as *le* was previously established to be the earliest acquired aspect marker and had the highest frequency of occurrence (Erbaugh, 1992). The finding of high frequency of *le* also concurs with Kang's (2019) findings from a corpus of spoken Singapore Mandarin.

Besides the perfective aspect markers *le* and *guo*, *you* 有 was also analysed as it had been previously suggested in literature that *you* can function as a simple perfective (Chua, 2003) and an experiential aspect marker (Kang, 2019). However, in this study, participants did not use *you* as a perfective aspect marker, instead solely using it in its intended meaning in Putonghua (i.e., has/have). A possible reason for this is the context of elicitation. The usage of *you* appears to not be as commonly used in structured tasks where there are definite events, as there is fluidity in the temporality of the verb (whether the event is in the past) as well as the state of termination of the event (Chua, 2003). Further exploration in a less structured task (e.g., conversation) might be better suited to explore the usage of this version of the perfective aspect markers.

11.2 Imperfective aspect marker

The imperfective aspect is expressed in Mandarin via progressive imperfective prefix *zai* 在, which is used in dynamic and ongoing situations, as well as the stative suffix *zhe* 着, which is more restrictive in its usage and limited to temporary result states (Liu, 2015). There is some debate about how *zhe* can be used. Some researchers argued that *zhe* is compatible with dynamic verbs but incompatible with stative or 'being' verbs; some argued that *zhe* is a stative imperfective; others proposed that *zhe* can be used together with both dynamic and stative verbs (Kang, 2019). For the purpose of this study, *zhe* was considered to have been used accurately if it indicated that an action or a state was maintained for a duration of time.

For this study, both *zai* and *zhe* were analysed together quantitively. It was hypothesised that both language dominance groups would omit the imperfective aspect marker frequently. As predicted, the error with the highest frequency for both the balanced bilingual group and the EL1CL2 group was omissions. This was hardly surprising as, similarly to perfective aspect markers, imperfective aspect markers are also optional in Singaporean Mandarin (Kang, 2019).

There was a medium effect of task type for the EL1CL2 group, indicating that percentage accuracy of the target marker was affected by the additional cognitive demand associated with the delay. This was not observed for the balanced bilingual group. This suggests that the balanced bilingual group's Mandarin proficiency accommodated the additional cognitive demand.

The language dominance groups differed in other types of errors produced besides omissions. The balanced bilingual group substituted target imperfective aspect markers with perfective aspect markers but the EL1CL2 group's errors were more varied and included substitution with perfective aspect markers and additions of unnecessary imperfective markers.

These errors are outlined below. It is very important to note when analysing the errors, however, that there were very few opportunities for imperfective aspect markers.

Substitution of imperfective aspect markers with perfective aspect markers:

- P19: then 他们哭了回家 *then ta men ku le hui jia* (‘then they cried back home’)
- K03: 男孩追了青蛙 *nan hai zui le qing wa* (‘boy chased frog’, stimulus showed the waiter chasing the frog)

Addition of imperfective markers:

- S12: 他在家里在哭 *ta zai jia li zai ku* (‘he at home crying’. The first *zai* in this sentence indicates location)

The progressive imperfective marker was used more frequently than the stative imperfective marker, indicating that the progressive structure might be developed earlier for these children. This aligns with Erbaugh’s (1992) findings with young monolingual Mandarin-speaking children as well as Jin and Hendricks’ (2005) findings from a story retelling task with bilingual children. Jin and Hendricks (2005) also reported that children had a tendency to mark stative verbs with the progressive aspect marker *zai* instead of the stative aspect marker *zhe*. It is suggested based on the findings from the present study that this may be similar for Singaporean bilingual children. However, this also has implications for sentence structure beyond the aspect marker per se, since *zai* is a pre-verbal marker, as compared to the post-verbal marker *zhe*. Another consideration is that, unlike *zai*, *zhe* can be used as a dynamic marker in addition to a stative marker. It is possible that the added complexity of indicating the progressive versus the state could require a higher level of linguistic ability thereby delaying the emerging or consistent production of *zhe*.

11.3 Negation

Erbaugh (1992) categorised the negative *mei* 没 to exist with the existential verb *you* (有, meaning 'to have') to form *meiyou* 没有, which means 'to not have', and also negates the progressive aspect marker *zai* 在. Another negative, *bu* 不, is used more generally. *Bu* negates imperfective dynamic and stative verbs, as well as active verbs. Although there is some debate about the distinction between *bu* and *mei* (Wang, 2023), they were analysed as a single category negation in this study, but errors within each negative will be discussed separately.

As predicted, the production of negation markers was well-established in both language dominance groups. Both the balanced bilingual group and the EL1CL2 group performed similarly on this microstructure element and most participants produced either *mei* or *bu* accurately with the compatible type of verbs on all opportunities for negation. The lack of a significant effect of task type further strengthens the conclusion that this marker is well-established in this population. Tang et al.'s (2023) work in establishing a Mandarin Child Language corpus revealed that the semantic category of negation is acquired at about three years of age in Mandarin-speaking monolingual children. The results from this study suggest that this semantic marker is established by 5 years of age for Singaporean bilingual children, but how this marker is acquired is still unknown. Further investigation into whether the developmental trajectory in bilingual children is similar to that of monolingual children is required. Most research has focused on acquisition of negation in second language Mandarin speakers, particularly in adults (e.g., Wang, 2023), so research into how children acquire negation is warranted.

Two types of errors were observed in the narrative samples. Given the very small sample of errors, they have to be analysed with caution to provide insight into possibly

persistent errors rather than errors that bilingual kindergarten children produce per se. The first error was observed in narrative samples produced by both language dominance groups, which further supports the idea that by kindergarten, both language dominance groups perform very similarly. The errors are demonstrated below.

Marked negation but with the wrong marker

- P18: 他不看到有一个人要抓它了 *ta bu kan dao you yi ge ren yao zhua ta le* (‘he (negation) saw had a person wanted to catch it’, *bu* here implies not wanting to see rather than not being able to see)
- P01: 也没有带你的青蛙来了 *ye mei you dai ni de qing wa lai le* (‘also no bring your frog here’, instead of *buyao* 不要, which means ‘do not’)
- K03: 他们没有找小青蛙 *ta men mei you zhao xiao qing wa* (‘they didn’t find the little frog’, instead of 找不到, which means ‘couldn’t’)
- P17: 他们看不到 *ta men kan bu dao* (instead of 没有看到, implying that they couldn’t see when they did not see)

These errors appeared to be similar, although the latter two utterances were otherwise syntactically accurate, which could possibly indicate a semantic error rather than a syntactic error, depending on the child’s interpretation. However, in P17’s case for example, since the stimulus showed that the characters were not aware of the frog, it was deemed to be a semantic error. Previous research showed that monolingual Mandarin-speaking children had difficulty differentiating *bu* and *mei* and had a tendency to overgeneralise *bu* but did not do the same for *mei* (Zhang et al., 2006, as cited in Wang, 2023). The results from this study showed similar errors, albeit at a lower frequency. While this suggests a similar pattern of development of Chinese acquisition between monolingual and bilingual children, it should be noted that Zhang

et al.'s (2006) study focused on children under four years old, which is younger than the participants in the present study. Further exploration with a wider age group of bilingual children is needed.

Addition

- K17: 可是没有人没有看到 *ke shi mei you ren mei you kan dao* ('but nobody did not see')
  There was only one instance of this error and this error might be an individual error rather than a pattern

11.4 Passive sentence structure

It was hypothesised that neither language dominance group would produce many passive constructions. Mandarin's basic word order is subject-verb-object (SVO) (Cheung, 1973). The initial noun phrase is usually the agent of the succeeding verb. However, in contrast to English, Mandarin syntax is also compatible with object-subject-verb structures in the passive voice, facilitated by morphosyntactic markers *bei* 被, *gei* 给, and *rang* 让, e.g., object-passive-subject-verb. This analysis focused on the passive marker *bei* as it is the most commonly used and is considered the default passive marker in Mandarin (Cook, 2019). As predicted, none of the participants in either language dominance group produced any passive markers on both retell and recall tasks. This was unsurprising and aligns with literature on both monolingual and bilingual children. Huang et al. (2013) summarised theories that explain the challenges that children face with acquisition of passive sentence structures. It has been well documented that monolingual kindergarten children are still acquiring passive structures at this age due to the linguistic skills needed to produce high complexity markers (Messenger et al., 2012). In a narrative task like the one used in this study, where participants were not restricted in the type

of sentence structures used, it would be expected that the participants would avoid using structures they had not yet acquired, although this would be impossible to verify.

These findings echo results of Hao et al.'s 2019 study, which explored narratives in Mandarin-English bilingual children in Texas. The participants in the 2019 study had a wider age range (four to nine years) but passive structures were still rarely used. Although these children came from Mandarin-speaking households, and some of them were older than the participants in the current study, the lack of distinct difference between the frequency of production of passive structures as a whole could possibly be explained by children generally having less exposure to passive structures, and especially so in Mandarin as compared to other languages such as English (Xiao et al., 2006). To understand how passive structures are acquired in Singaporean bilingual children, it might be beneficial to explore this marker in older children with more structured tasks.

11.5 Active sentence structure

The active marker *ba* 把 necessitates sentences of subject-*ba*-object-verb structure. The subject or agent is usually a noun phrase and the object the recipient of the verb that follows. Mandarin is a pro-drop language. The topic takes prominence and null subjects and null objects are allowed (Li & Thompson, 1976). The syntactic rules of Mandarin dictates that there is no variation to the basic construction of *ba* sentences, except for the omission of the subject (Li & Thompson, 1976). In monolingual children, *ba* constructions emerge at about two years of age, after the children acquire the default SVO structure, extend to new verbal phrases at three years (Hsu, 2014), and eventually reflect adult-like complexity at about 4.5 years (Deng et al., 2018). A more recent study by Ji et al. (2023) explored comprehension and production of passive and active markers in sentences with 4- to 6-year-old monolingual Mandarin-speaking children. They

found that *ba* constructions increased across the age groups but that errors in the 5- and 6-year-old groups included switching to the default SVO structure instead of using the *ba* marker. The differences between the 2023 study and earlier studies appear to lie in the way the productions were elicited. Earlier reports tended to be from naturalistic studies while the 2023 study used a picture description task with priming of a target structure from an adult. Studies of bilingual acquisition of the *ba* constructions mostly focused on adult learners (e.g., Kou, 2016). Hao et al.'s (2019) study on Mandarin-English bilingual children showed that *ba* constructions were rarely produced at the narrative level.

Similarly to passives, it was predicted that active constructions would not be produced frequently. The results revealed that there were some instances of active constructions and that with one exception all participants who attempted the active markers were accurate in their constructions. However, less than half of the balanced bilingual participants and a fifth of the EL1CL2 participants produced the active marker *ba*, with one to six instances each. Although there were few opportunities, the fact that most participants were accurate in their constructions on both the retell and recall tasks reflect that when elicited, children from both language dominance groups demonstrated established ability. Further investigation, perhaps with more structured tasks with obvious opportunities to elicit the active marker, is warranted to identity how *ba* is acquired in the developmental trajectory in bilingual children.

Most *ba* constructions were subject-*ba*-object-verb, with some being of a more complex nature, illustrated below.

- P10: 你 快点 把 我的 青蛙 还 给 我 *ni kuai dian ba wo de qing wa huan gei wo* ('you hurry *ba* my frog return to me' – subject-adverbial-ba-possessive-object-verb-recipient)

Further analysis showed that participants with active structure errors only produced a single opportunity in the narrative. In addition, the participants who used active structure more than once were consistent in their accuracy. This indicates that for some children in this sample this was an established skill, while for others it was only emerging.

Error analysis of the participants with *ba* construction errors revealed that these were mostly likely errors secondary to overall language proficiency rather than a specific difficulty with *ba* per se. For example, their narrative included incomplete utterances with omissions and vocabulary errors, as demonstrated below.

- P16: 然后一个人把他们出来 *ran hou yi ge ren ba ta men chu lai* ('then one person ba them come out', semantic error)
- K22: 青蛙赶走 *qing wa gan zou* ('frog chase away' → the stimulus showed the waiter chasing the frog, i.e., syntax error with inaccurate agent)
- P13: 他就还给了他 *ta jiu huan gei le ta* ('he returned to him' → omission of object and *ba*-marker)

11.6 Classifier

Classifiers are independent morphemes which are produced alongside demonstratives or numbers to quantify and classify nouns. Each classifier has specific semantic properties that informs about features of co-occurring objects. Chinese classifiers have been widely studied in language acquisition research (Li et al., 2010; Wu, 2018) and difficulties producing nominal classifiers were found to be a characteristic of language disorders in Mandarin-speaking children (Hao et al., 2018). Yip and Matthews (2010) proposed that English-Chinese bilingual children would struggle with classifiers as the classifier system, although salient in Chinese, is absent in English. In view of earlier research, it was hypothesised that both language

dominance groups would use classifiers but have a limited variety of classifiers, particularly overgeneralising the general classifier *ge* (个). In addition, although overall still limited, it was expected that the balanced bilingual group would use a wider variety of classifiers.

Quantitative analysis revealed that, unexpectedly, while the difference between language dominance groups was not statistically significant, there was an overall medium effect of language dominance group. The EL1CL2 group produced more accurate classifiers than the balanced bilingual group. This was a very interesting finding considering the literature on language input and the complexity of classifiers and warrants more detailed looking into why the language dominance groups performed the way they did. Firstly, further analysis revealed that the effect of language dominance was only at the level of the recall task, with medium effect sizes. The medium effect size suggests that, although the EL1CL2 group produced a higher percentage of classifiers, the effect of language dominance was not large enough to definitively conclude that the difference was purely due to language dominance.

This raises the question as to why the EL1CL2 group appeared to perform better on this measure. This outcome measure was calculated as a percentage and, overall, the EL1CL2 group produced only about two thirds of the number of classifiers produced by the balanced bilingual group. This means that there were more possible opportunities for the balanced bilingual group to make errors, since previous research shows that overgeneralisation is common in children still in the process of developing their language competencies in Mandarin (Hao et al., 2019). Moreover, there are differences in how different variants of Mandarin use classifiers. Previous studies have focused on production of specific classifiers in bilingual children in Standard Mandarin (e.g., Hao et al., 2019). However, in Singaporean Mandarin Chinese, the generic classifier *ge* is acceptable and appropriate in many different contexts (see Table 2.3), even if there is a more suitable classifier. For example, the classifier to quantify

sound in Mandarin is *zhen* 阵, but *ge* is also acceptable. The difference between *zhen* and *ge* is that the former has a 'burst' quality while the latter is more general in its semantic boundary. For the purpose of this study, as the participants would have been exposed to Singaporean Mandarin Chinese and not Standard Mandarin, if *ge* was an appropriate classifier for the context, it was considered to be accurate. Given its versatility and status as a default classifier, it drove up the percentage accuracy for the EL1CL2 group. In addition, more EL1CL2 participants did not produce any classifiers than the balanced bilingual participants, thereby further inflating the percentage accuracy.

Qualitative analysis of both groups' productions would therefore be more effective in understanding how they produce classifiers. The first observation was that both groups overgeneralised *ge*. This concurred with findings from monolingual children (Hao et al., 2021) as well as bilingual children in Canada (Jia & Paradis, 2015), the United Kingdom (Kan, 2019, in Cantonese), and the United States (Hao et al., 2019; Sheng et al., 2023). Most of these studies employed elicitation techniques with sentence completion or sentence construction tasks. The findings from this study extend previous work by identifying parallels at the narrative level.

The second observation was that both groups produced a limited variety of classifiers. The EL1CL2 group used only two classifiers accurately. These were the generic classifier *ge* and the classifier *kou* (口; 'mouth' in English), which is used to quantify mouthful-sized portions of food. Lexically, *kou* is an early-developing vocabulary as the same word is used to indicate an obvious body part. The balanced bilingual group as a whole used five classifiers accurately: general classifier *ge*, *kou*, *zhi* (只; widely considered to classify various objects, including small animals and some musical instruments), *zhong* (种; classifier to indicate different types) and *he* (盒; directly translating as 'box' in English) is a classifier to indicate box-shaped items. The usage of more varied classifiers reflected a higher level of linguistic competency. This would be

expected, given that the balanced bilingual group would have had more Mandarin input than the EL1CL2 group. However, percentage accuracy was still considered to be a better indicator as not all participants in both groups were using all the different classifiers. More direct elicitation of the different classifiers would be better able to evaluate the children's abilities.

The third observation was that there was only one other error besides the overgeneralisation of *ge*. The balanced bilingual participant used *bao* 包 as a classifier for the noun *li wu* (礼物; 'gift'). This error appeared to be rooted in semantics: *bao* is used to classify an object that is packaged (like a gift is) but usually in the shape of a bag or a bundle. The same participant also used *he* accurately to indicate the boxy nature of the gift, so the error with using *bao* mostly likely indicated a developing understanding of the semantic properties of the more closely related classifiers.

It is extremely important to understand acquisition of classifiers in bilingual children, as difficulties producing classifiers is known to be an indicator of language disorders (Hao et al., 2018). As Chinese is a pro-drop language (Huang, 1989), narrative tasks in which the child has more freedom to construct the mostly easily accessible sentence constructions would not always elicit classifiers. In addition to elicitation techniques at the word and sentence levels that were used in previous research, I propose that a dynamic method of testing would be more effective in teasing apart English-Mandarin bilingual children's classifier-specific knowledge and production at the narrative level. Dynamic assessment encompasses different methods but the test-teach-retest method is considered to be more appropriate for differentiating language disorders and language differences and therefore more suitable for use with multilingual children (Petersen et al., 2017). This will be discussed in more detail in the next chapter.

11.7 Subjective pronoun

Naturalistic studies based on monolingual Mandarin-speaking children have demonstrated that pronouns are early developing morphological markers, with singular third-person pronouns emerging at about two years of age and plural third-person pronouns emerging at about three years (Hsu, 1987, as cited in Qi, 2010). Qi's (2010) single-case study on pronoun acquisition in a Mandarin-English bilingual child showed that, although the bilingual child lagged behind monolingual peers, there were some similarities in development. Singular pronouns were acquired before plural pronouns, and that singular third person pronouns emerged before three years of age. One consideration when analysing Chinese subjective (and objective) pronouns is that omissions of subjects are common, which in turn affects the production of subjective pronouns. When the topic of the utterance is obvious, it is acceptable for the speaker to omit pronouns, as the listeners can infer them from contextual knowledge (Li & Thompson, 1989). The hypothesis was that, when pronouns were used, they would be used accurately and it was expected that there would be minimal differences in the patterns of usage between both language dominance groups. This is because, unlike English, there is only the addition of a single marker *men* 们 to denote plurality. Phonologically, the Chinese equivalents of 'he', 'she', and 'it' are the same *ta* (i.e., no gender distinction), although they differ orthographically (他 to indicate a male, 她 to indicate a female, and 它 to indicate non-human animals or objects; plural pronoun 'they' is *tamen* 他们). In the case of *ta* (for objects), 它 is used. Li and Thompson (1981) argued that Mandarin pronouns are usually only compatible with persons and rarely refer to animals or objects, although this does occasionally occur, possibly due to cross-linguistic transfer from English. This effectively means that pronouns are primarily used to refer to people. Therefore there were fewer opportunities for production and errors in this study because of the stimuli used, which represented non-human main characters.

As expected, most participants produced subjective pronouns accurately and consistently (more than or equal to 80% of all opportunities). This was unsurprising due to the early-emerging nature of pronouns and their lack of gender distinction. It also confirmed that Singaporean bilingual children of kindergarten-age, regardless of language dominance, demonstrate knowledge and usage at the narrative level. However, some participants from both language dominance groups who were consistent on the retell task did not achieve the same level of consistency after the delay on the recall task. Quantitatively, it would appear that there was an effect of the delay, especially as evidenced by the medium effect of task type for the balanced bilingual group. In contrast, I propose that the difference in performance was more likely due to difficulty retaining information (i.e., semantics secondary to focusing on the main character) rather than difficulty with the pronouns per se. This is illustrated with an example below.

K19

- 然后那个男孩看到了小青蛙 不见了 *ran hou na ge nan hai kan dao le xiao qing wa bu jian le* (then that boy saw little frog missing + perfective aspect)
- 他就找 *ta jiu zhao* (then he find)
- 然后他找不到 *ranhou ra zhao bu dao* (then he couldn't find)

In OFTM, the stimulus showed the boy and the animals looking for the little frog. However, it appeared that the above participant focused on the boy (main character) and therefore used the singular pronoun *ta* (he) instead of the plural pronoun *ta men* (them). This was considered an error in the quantitative analysis, but qualitatively the difficulty did not appear to be rooted in singular and plural pronouns. Another piece of evidence supporting this reason was that this error was not produced when the visual support was present, indicating that when

the participant was presented with the illustrations in the book, they could produce the target subjective pronouns.

Error analysis revealed that the error patterns were similar for both language dominance groups. Balanced bilinguals and EL1CL2 bilinguals mostly used substituted singular pronouns for plural pronouns. The semantic and syntactic characteristics of *men* are often debated (e.g., Jiang, 2017), but this goes beyond the scope of this study. For the purpose of this current study, *men* is considered a plural-marking morpheme. This error pattern seemed to suggest difficulty differentiating between singular and plural pronouns but this could be attributed to focusing on the main character (the boy or the frog in both narratives) instead of all the characters. That would make this error a factor of cognition rather than language. Further research into the factor leading to this error would be beneficial in understanding acquisition in bilingual children.

Another observation was that there were additions of subjective pronouns after the initial noun phrase subject e.g., "然后乌龟 (tortoise) 它 (it) 摇小男孩的脚" *ran hou qu gui ta yao xiao nan hai de jiao* ('then tortoise it shake boy's leg'). Chinese is a topic prominent language and double nominal constructions occur fairly commonly (Sun, 2018). The presence or absence of these constructions in English could inform bilingual language acquisition research.

There were only two unambiguous instances of double nominal construction observed in the English narratives, and they were both produced by a single EL1CL2 participant. These are presented below.

- P11: then after that when he get, when they get to the restaurant, the fr, the frog he get off the pocket little bit and say hello
- P11: then the one playing the drum he scolded the one that is playing the saxophone

Considering that these constructions were only produced by a single participant, and an English-dominant participant at that, it is suggested that there was no prominent cross-linguistic transfer of double nominal constructions from Mandarin into English for Singaporean bilingual children. This was not a surprising result because Mandarin was not the dominant language for this participant and therefore cross-linguistic transfer was less likely. The results echo earlier research into nominal constructions by simultaneous Mandarin-English bilingual children that demonstrated that these two languages develop separately and that there was no cross-linguistic transfer from the non-dominant language to the dominant language (Chang-Smith, 2010) and provides support for the Separate Development Hypothesis (De Houwer, 2005). The Separate Development Hypothesis suggests the bilingual children develop morphosyntax in their two languages largely independently (De Houwer, 2005). There might be cross-linguistic transfers early in their acquisition but they would eventually adhere to syntactical structures within the constraints of each language. To investigate whether this applies to language acquisition in Singaporean bilingual children, a longitudinal study would be warranted.

11.8 Objective pronoun

Previous studies on development of Chinese pronouns in English-Chinese bilingual children focused on pronouns generally rather than by case (e.g., Chen & Lei, 2013; Qi, 2010). Compared to other grammatical markers, pronouns have been less studied; this might be due to the similarities between the different pronouns in Chinese. Objective pronouns in Mandarin are the same phonologically and orthographically as subjective pronouns, which means that, in addition to a lack of gender distinction phonologically, there is also a lack of overt case distinction. This is in contrast to the different cases present in English pronouns.

The hypothesis was that the participants in this study would perform similarly on this outcome measure to that of the subjective pronouns – i.e., that when present, objective pronouns would be used accurately and that there would be minimal differences in the patterns of usage between both language dominance groups. An overwhelming majority of the participants who used at least one objective pronoun in a narrative produced the accurate objective pronoun on all opportunities. Although the participants in this study were of kindergarten age and achieving consistent accuracy, the findings do not inform clinicians regarding acquisition. However, the clinical implication here is that difficulty with objective pronouns could potentially be an indicator of persistent language difficulty if still present at this age. Given that there is still very little known about this specific population, this could help clinicians make more informed clinical decisions about diagnosis.

One observation is that there were fewer opportunities for objective pronouns than subjective pronouns (by about 20%) for both language dominance groups. There are two possible reasons for this. Firstly, these participants might have used noun phrases for the characters more frequently for objects than for subjects and so used fewer objective pronouns. Secondly, these bilingual children might have been omitting objects more frequently than subjects and in omitting objects omit opportunities for objective pronouns. Null pronouns are acceptable in Chinese (Li & Thompson, 1981) but robust usage of overt pronouns has also been found in later studies (e.g., Christensen, 2000). Despite this, there has been little research into the differences in production of subjective pronouns and objective pronouns. Further research into cross-linguistic transfer of Mandarin pronouns into bilingual children's other language is warranted. Particularly in Singapore, the lack of gender distinction and case distinction in Mandarin may have an effect on case and gender differentiation and production in English pronouns.

11.9 Subject and object omission

Subject and object omissions are discussed together in this section because of the similar syntactic features relating to subjects and objects in Mandarin. As discussed in previous sections, Mandarin is a pro-drop language. The presence of subjects and objects is not as dependent on syntactic rules as other grammatical markers but instead on the semantics of the related discourse. Subjects and objects can be omitted when the referent can be inferred from contextual information. Pirvulescu et al. (2014) summarised findings from previous studies and concluded that the pairing of a pro-drop language (e.g., Mandarin) and a non-null element language (e.g., English) would result in the bilingual child omitting more elements and for a longer duration than monolingual children. Chen and Lei (2012) studied referring expressions, including noun phrases, overt pronouns, and null pronouns, in 8- to 10-year-old Chinese-English bilingual children living in the United States and found that these children produced null pronouns in about half of all opportunities in Mandarin narratives. This was comparable to monolingual Mandarin-speaking children living in China. One possible reason for this finding, in contrast to Pirvulescu et al.'s (2014) claim, was that these children were of primary school age and that samples were elicited at the narrative level. In addition, Chen and Lei's (2012) study was on a specific language pair while Pirvulescu et al. (2014) were referring more generally to pro-drop and non-null languages. The present study will therefore add to the evidence by exploring the features of omission in kindergarten children in Singapore.

When considering the semantic boundaries of accepted null-elements, the omission of subjects and objects was analysed in two ways: (a) frequency of each type of omission and (b) whether the omissions were acceptable (i.e., with previous referents or identifiable from contextual information). It was hypothesised that subject and object omissions would be frequently observed in both language dominance groups and that both language dominance

groups would display similar frequencies of omissions but for different reasons. The balanced bilingual group was expected due to the inherent syntactic and semantic rules of Mandarin while the EL1CL2 group was expected to omit subjects and objects due to an overall poorer proficiency in Mandarin. Yet there were few omissions observed in the narratives of both language dominance groups. This finding was clearly in contrast to previous research on Chinese omissions. It is important to note here the different contexts of this study with other studies. Yip and Matthews (2007) suggested that, in a Chinese-English bilingual child, the influence of Chinese on English was stronger than English on Chinese because of language dominance. The opposite would also be assumed to hold true – i.e., if an English-Chinese bilingual child is more proficient in English, that cross-linguistic transfer from English to Chinese would be observed. English is a non-null element language and omissions are acceptable only in restricted contexts. The results of this study suggest that the omissions might be mitigated by cross-linguistic influence from the lack of acceptable omissions in English. This resulted in the lower frequency of omissions as compared to previous studies on Chinese omissions in other studies. By extension, this also suggests that both language dominance groups were, in fact, English-dominant but perhaps to different degrees.

This, in turn, leads to the second observation – namely, that there was no difference in frequency of omissions between both language dominance groups. If the two groups were indeed of the same language dominance, albeit to different degrees, it would not be unreasonable to expect that the frequency of omissions would not differ significantly. An alternative, but less likely, argument is that omissions, in contrast to Putonghua, might not be as pronounced a feature in Singaporean Mandarin. This might be due to the cross-linguistic influence from English, which is not a pro-drop language. Given the dynamic nature of language and Singapore's unique blend of languages and their interactions, a longitudinal study of how

the languages interact and influence one another would be better placed to elucidate the changes.

The third observation was that object omissions were more infrequent than subject omissions. There is research into subject omissions and object omissions separately but research at this time does not appear to compare the two. A possible reason for the utterances with subject omissions might be perceived to be a continuation of earlier utterances referencing the same subject and therefore the subjects were implied. In contrast, the semantic links between consecutive utterances might not be as obvious and so objects would be more necessary to clearly convey the semantics of the utterances. This is illustrated with the below examples with subject omissions and object omissions.

Omissions in Mandarin are governed by semantic boundaries. There were three identifiable contexts in which omissions were acceptable. Firstly, omissions were present where subjects and objects were implied – for example, with the referenced character in the preceding utterance. Secondly, and specifically pertaining to subjects, was when the participants initially produced the subjects but recasted their utterances without the subjects. Due to the CLAN coding conventions, the subjects were considered omitted but the listener would still be able to make the appropriate inferences to identify the referent. Thirdly, objects were omitted due to incomplete utterances secondary to possibly reduced vocabulary knowledge, which was evidenced by incomplete utterances where the participants trailed off in the audio samples. This was observed mainly from the EL1CL2 participants but not from the balanced bilingual participants. This confirmed that there was a difference in Mandarin proficiencies, although the difference in their English proficiencies was not as obvious. However, there were also instances in which it was not overtly clear exactly which characters the participants were referring to. This is illustrated with an example (consecutive utterances) below.

- P15: 然后他们上船 了 *ran hou ta men shang chuan le* (‘then they went onto the boat’)
- P15: 然后他们不让 *ran hou ta men bu rang* (‘then they don’t let’ with object omitted)

It is therefore important to consider the context in which the narratives were elicited. On the retell task, the examiner and the participant looked at the book together with the examiner providing prompts such as ‘what’s happening here?’. The participants could have referenced characters through joint attention, so the subjects would also be considered implied. This could be verified by video recordings, but only audio recordings were available. Another piece of evidence that supports this was that there were fewer omissions of this nature on the recall task, particularly for the EL1CL2 group.

11.10 Possessive pronoun

Mandarin marks possessive constructions with the morpheme *de* 的, which has the equivalent meaning of the possessive ‘–s’ marker in English. However, it is also important to note that *de* as a marker carries a “heavy grammatical load”[9] (Du, 2014, p. 6) and can be used in several different grammatical contexts (Thompson & Chappell, 1992). For pronouns specifically, possessive pronouns are constructed in a *personal pronoun-de* manner. There are two schools of thought regarding the *de* marker. Some researchers considered the construction with the *de* marker (i.e., possessor-*de*-possessee) to be the canonical form (Li & Thompson, 1981), while others considered the possessive constructions without the *de* marker (i.e., possessor-possessee) in optional contexts acceptable in Chinese (Li, 2010). Previous research on *de* acquisition has mainly focused on the development of the possessor-*de*-possessee form. Shi and Zhou (2018) studied monolingual Mandarin-speaking children and reported that four-year-olds could produce possessive *de* constructions to indicate alienable possessive

[9] In addition to marking possession, *de* can also indicate complex grammar and syntax such as relative clauses, subordination, and noun attribution, among others.

relationships (generally used for tangible items for which possession is not permanent). There is little research on this in bilingual children, but Qi (2010) presented a single case study that showed no cross-linguistic transfer between *de* and the English pronominal form. This is therefore an important area to explore in more detail, especially when considering its grammatical load.

For the purpose of this study, *de* constructions was first analysed via the possessor-*de*-possessee (i.e., *de* deletion was considered inaccurate) in line with previous research, then errors were analysed to consider *de* deletions. There was no difference between language dominance groups in percentage accuracy of possessive pronoun constructions. Most participants from both language dominance groups demonstrated established usage of possessive pronouns (equal to or more than 80% of opportunities).

Singaporean kindergarten bilingual children in this study used the possessor-*de*-possessee construction much more frequently than that with the *de* deletion. Although there has yet to be research on *de* deletion in SMC, I propose that *de* deletion might be a localised feature of variants of Mandarin. In Singapore, *de* construction would be more frequently used in more structured and formal settings (e.g., education) while the *de* deletion construction would be overall less commonly used. When used, it would be present only in informal or conversational settings. This would in turn have an effect on input of the children in this study. If the children were receiving more input of the *de* construction, then it was a reasonable finding that they would produce more *de* constructions. To confirm this, further research on Singaporean adult and child language across different settings and comparisons to Mandarin from other Mandarin-speaking populations such as Malaysia and Taiwan are needed.

It was observed that participants from both language dominance groups substituted *na ge* 那个 for possessive pronouns when referring to characters. *Na ge* can be directly translated into 'that' in English. For example, *na ge ma ma ba ba* 那个妈妈爸爸 means 'that mother/mummy father/daddy', which is syntactically jarring. While *na ge* might have been more acceptable on the recall task due to the nature of elicitation as discussed in the preceeding sub-chapter, it was also often observed on the retell task. Instead of being solely a determiner, Wang (2011) argued that *na ge* can be considered a discourse marker that is compatible with various discourse-pragmatic functions, including introducing a new character. This would make *na ge* also acceptable on the retell task with the book in front of the participant and examiner.

11.11 Prepositional phrase error

There were similarities and differences between prepositional phrases in English and Chinese. In English, locative prepositional phrases are accepted in a postverbal position but not immediately preceding the verb. In Chinese, locative prepositional phrases are generally produced preverbally and some verbs allow constructions with the prepositional phrases preverbally and postverbally (Wu, 2018). Yip and Matthews (2007) reported that Cantonese-English bilingual children produced postverbal prepositional phrases more often than preverbal prepositional phrases despite their Cantonese-dominance. Their results suggested that the overlapping possibilities of constructions specific to this language pair adds a layer for complexity for acquisition of prepositional phrases. At the narrative level, To et al. (2010) identified prepositional phrases as an area of difficulty for monolingual children with language disorders. More recent research found that Mandarin-English bilingual children had some difficulty with prepositional phrases, but this grammatical feature did not sufficiently differentiate between typically developing bilingual children and bilingual children at risk for language disorders (Sheng et al., 2023). However, the morphosyntax items administered included only

two prepositional phrases with more than one acceptable response, and so the results, as noted by the authors, should be interpreted with caution as they might not reflect the groups' true abilities. A difference between at-risk and typically developing bilingual children might be identified if this domain was explored in more detail via more items and more varied items. At this point there is still limited research on acquisition of prepositional phrases in bilingual children and will benefit from further investigation.

The medium effect of language dominance suggests stronger Mandarin proficiency in the balanced bilingual group as compared to the EL1CL2 group. Error analysis revealed that despite the syntactic errors, most of the utterances maintained the participants' intended meanings. The main error observed in the narrative samples were overgeneralisation of *zai* 在 (equivalent of 'at' in English) for other locative vocabulary, illustrated with examples below. This in part concurs with Sheng et al.'s (2023) study, which found that, based on the morphosyntax items administered, Mandarin-English bilingual children had a tendency to omit *zai* in *zai*-noun-location constructions. However, as above, this comparison has to be made with caution due to the limited items in the screener administered, as well as taking into account the wider age range of participants in their study. Omissions were also observed in this study and will be discussed shortly. A similar pattern of results was observed in Deng and Yip's (2015) study, which investigated Mandarin-speaking children's acquisition of spatial phrases and found that children up to the age of 6 overused *zai*, specifically for *dao* ('to'). I suggest that the general difficulty with difficulty with *zai* is related to the multiple grammatical and semantic functions it has and their corresponding positions in sentence constructions (Deng & Yip, 2015; Liu, 2009). Bilingual children who are still acquiring prepositional phrases struggle with its dual categorical representations in different sentence constructions. For example, *zai* as a locative preposition

means ‘at’ but can also function as a progressive aspect marker in another position in the same utterance (Paul & Yan, 2024; Woo, 2021).

- K03: 没有人看大青蛙跳在船里 *mei you ren kan da qing wa tiao zai chuan li* (‘nobody see big frog jump at boat in’. The preposition to be used here is *jin* 进 ‘into’)
- K11: then 然后它跳在上面 *then ran hou ta tiao zai shang mian* (‘then then it jump at above’. The preposition to be used here is *dao* 到 ‘to’)

To a smaller extent, some participants overused *dao*. Unlike *zai*, the participants tended to substitute *dao* (‘to’) for only *jin* (‘into’) instead of a variety of prepositions.

- K10: 然后掉到了一个鼓里面 *ran hou diao dao le yi ge gu li mian* (‘then dropped to one drum inside’)
- K19: 然后它就踢它去到水里 *ran hou ta jiu ti ta qu dao shui li* (‘then it then kick it go to water inside’)

Like *zai*, *dao* has different semantic functions (‘to’ and verb ‘reach’) but is more limited than *zai*. This might explain why it was overgeneralised but only specifically for another preposition that is more semantically related. Semantic neighbours could be a consideration for future research into acquisition of prepositional phrases in bilingual children.

Omissions were also observed but only in narratives of the EL1CL2 group. Participants omitted *zai* as well as *dao*.

- K1: 男孩放小青蛙地上 *nan hai fang xiao qing wa di shang* (‘boy put small frog floor up’, *zai* would be appropriate here)
- S01: 大青蛙跳船了 *da qing wa tiao chuan le* (‘big frog jumped boat’, *dao* would be appropriate here)

Another observation was the usage of English syntax with Mandarin locative prepositions.

- K21: 旁边大青蛙 *pang bian da qing wa* (directly translated into 'beside big frog'). The accurate syntax in Mandarin is 大青蛙旁边 *da qing wa pang bian*
- P19: then 他就拿上一个卡片 *then ta jiu na shang yi ge ka pian* (directly translated into 'then he then pick up one (classifer) card'). Accurate syntax in Mandarin can allow for omission of the preposition in this situation
- K17: 那个男孩子看里面那个乐器 *na ge nan hai zi kan li mian na ge yue qi* ('that boy look inside that instrument')

This error was observed in narratives from both balanced bilingual participants and EL1CL2 participants, and the cross-linguistic transfer of syntax from English to Mandarin again suggests a higher proficiency in English than Mandarin.

Taken together, the results indicate that prepositional phrases are an area of difficulty for Singaporean English-Mandarin bilingual children of kindergarten age. This echoes previous findings that prepositions are challenging for children (Deng & Yip, 2015). Overall, compared to other linguistic domains of Mandarin, prepositional phrases have received less attention in research, and this is even more so for bilingual children. Future research into this area in bilingual children is warranted and clinically relevant, as it is known that prepositional phrases are a feature indicative of language disorders in monolingual children (To et al., 2010).

11.12 Conjunction

Cohesion is a key feature in English and Chinese (Yang, 2014) but the languages differ in how they achieve cohesive discourse. Chinese connectives (关联词 *guan lian ci*, 'relative word') are "words that are used to connect discourse fragments" (Su, 1999, p. 22). These

include conjunctions and other words and morphemes to link clauses together. The clinical need to investigate conjunctions is clear. It has been well-established that Mandarin-speaking children with language disorders use conjunctions significantly less frequently and produce discourse with less cohesion than typically developing children (Zhang, 2013). There is no comparable research in Singaporean bilingual children, and this is worth investigating given its clinical significance.

For the purpose of clearer comparison to English, this study primarily analysed conjunctions produced by the participants. Previous work comparing English and Chinese cohesive devices had established that English contains more hypotactic constructions (two clauses with one being the main clause and the other the subordinate clause), thereby using more conjunctions, while Chinese establishes coherence more implicitly through repetition and lexical choices (Yang, 2014). Therefore, Chinese has fewer conjunctions than English (Yip & Rimmington, 2015). Another differentiating feature between the two languages is that Chinese allows for double conjunctions or correlative conjunctions, which are a pair of conjunctions separated by clauses; this is grammatically acceptable in Chinese because of the equal status between the main and subordinate clauses (Yang, 2014). For example,

- 虽然我很饿，但我不想吃。*sui ran wo hen e, da wo bu xiang chi* (Although I am very hungry, but I do not want to eat)
- 因为我很饿，所以我吃了一粒苹果。*yin wei wo hen e, suo yi wo chi le yi li ping guo* (Because I was very hungry, so I ate an apple)

In contrast, these constructions are considered ungrammatical in English. Linguists have developed different frameworks for studying Chinese connectives, among which Xing's (2001) classification of connectives, as cited in Zhang et al. (2022), remains one of the most influential.

This study will adopt some of the relevant categories from Xing's framework corresponding to the analysis for conjunctions in English.

The main finding was that both language dominance groups produced conjunctions from the same categories but that the balanced bilingual group produced a wider variety of conjunctions within all of the categories, with an overall effect of language dominance. The main categories produced were:

- Coordinating: both groups produced *he* 和 and *hai you* 还有, both meaning 'and', but only participants from the balanced bilingual group produced *gen* 跟, also equivalent to 'and'.
    - J01: 狗、乌龟和男孩都很生气 *gou wu gui he nan hai dou hen sheng qi* ('dog, turtle, and boy all very angry')
    - K16: 小狗、青蛙还有乌龟 *xiao gou qing wa hai you wu gui* ('small dog, frog, and turtle')
    - S13: 那个男孩跟他的宠物在家里 *na ge nan hai gen ta de cong wu zai jia li* ('that boy and his pets at home')
- Causal: both groups produced *yin wei* (因为), 'because'; the balanced bilingual group also produced *suo yi* (所以), 'so'.
    - P01: 房间里穿着很漂亮的衣服。因为他们要去外面吃饭 *fang jian li chuan zhe hen piao liang de yi fu. yin wei ta men yao qu wai mian chi fan* ('room inside wearing very pretty clothes. Because they want to go outside eat rice')
    - P18: 发出 [sound]。所以他看在那个洞里面 *fa chu (sound). Suo yi ta kan zain a ge dong li mian* ('make [sound]. So he look at that hole inside')

An observation in this category was that both language dominance groups produced *suo yi* erroneously but only the EL1CL2 group made errors with *yin wei*. The conjunction *yin wei* is of a higher frequency than *suo yi* (Li et al., 2016), and while *yin wei* can be used in casual settings, *suo yi* is primarily used in expository or argumentative written discourse (Guo, 2006, as cited in Li et al., 2016). Chang and McCabe (2013) studied 3- to 9-year-old Mandarin-speaking children living in Taiwan and found that older children tended to use causal connectives more frequently than younger children. The literature on monolingual children showed that there is a correlation between age and production of causal connectives; however, there is not yet published evidence for bilingual children. The results from this study imply that both language dominance groups were developing causal conjunctions but the balanced bilingual group appeared to have a higher proficiency compared to the EL1CL2 group. This was based on their established usage of *yin wei* and developing usage of the more complex *suo yi*.

- Contrastive: both groups used *ke shi* (可是; 'but'), but only the balanced bilingual group used additional contrastive conjunctions *dan shi* (但是; 'but') and *bu guo* (不过; 'but').
    - S12: 可是小男孩没有看到 *ke shi xiao nan hai mei you kan dao* ('but the boy did not see')
    - P18: 我会给你回但是你要出去 *wo hui gei ni dan shi ni yao chu qu* ('I will give you back but you have to go out')
    - P07: 不过大青蛙没有笑 *bu guo da qing wa mei you xiao* ('but big frog did not laugh')
- Temporal: both groups produced *jiu* (就; 'then'), *ranhou* (然后; 'then') and *de shi hou* (的时候; 'when'). The balanced bilingual group also used *dang* (当; 'when') and *yi hou* (以后; 'after').

Fu (2002, as cited in Li et al., 2022) identified a sequence of acquisition of temporal connectives. For the connectives used by participants in this study, these were *jiu*, then *ran hou*.

Although *yi hou* was not specifically identified in the study, Fu (2002) reported that *hou lai* (后来; 'afterwards'), which is semantically related to *yi hou*, was acquired after *ran hou* and before three years of age. Both Fu (2002) and Chang (2004) found that older Mandarin-speaking children (up to 7 years old) used more temporal connectives than younger children. As with other conjunctions, this suggested a higher proficiency in the balanced bilingual group as compared to the EL1CL2 group, as evidenced by the larger variety of temporal conjunctions produced.

- Conditional: no EL1CL2 participant attempted any conditional conjunctions but a single balanced bilingual participant attempted *ru guo* ('if') but it was erroneous
    - K17: 如果他们在这里的时候那个青蛙偷看 *ru guo ta men zai zhe li de shi hou na ge qing wa tou kan* ('if when they are here that frog peep')

Instead of *ru guo*, *dang* ('when') should have been used. The inaccurate usage of this conjunction indicates that Singaporean bilingual children have yet to develop established production of this category of conjunctions by the end of kindergarten. This finding concurs with Zhang et al.'s (2023) observation that Mandarin-speaking children rarely use conditional connectives in personal narratives. Given the incomplete acquisition of different categories of conjunctions by this age, further investigation into development of conjunctions in this population is warranted.

Chapter 12: Final Discussion and Conclusion

This chapter takes the results and discussions from the previous chapters and positions the new information in the larger scope of language development in bilingual children. Subsection 12.1 reviews the knowledge and clinical gaps and reintroduces the research questions. Subsection 12.2 summarises the key findings and Subsection 12.3 discusses the implications of these findings. Subsection 12.4 expands on the implications that emerge and how this study fits into the bigger discussion of language dominance. Subsection 12.5 furthers that by contextualising codeswitching in this population. Subsection 12.6 reveals and addresses the limitations of this study. Finally, Subsection 12.7 discusses how the findings from this study can guide future research.

12.1 Addressing the gap in the literature

Children with language disorders often demonstrate deficits in various language domains, such as form, content, and use (McGregor et al., 2020; Rudolph et al., 2019). Narratives are an effective and naturalistic method of assessment of language abilities (Gallagher & Hoover, 2020; Pico et al., 2021) and provide rich information about multiple areas of a child's language development, particularly clinical indicators of language disorders in bilingual children (Govindarajan & Paradis, 2019). Research into narrative skills in bilingual children is emerging but is mostly limited to Indo-European languages (e.g., Bitetti & Hammer, 2021; Bohnacker et al., 2022). It is important to understand languages in specific language pairs as different languages have different linguistic properties and affect each other differently within a community.

This study focused on the language pair of English and Mandarin in the Singaporean context. A review of the literature revealed few studies evaluating this language pair with most

of these exploring populations outside of Asia (e.g., United States: Chen & Lei, 2013; Hao et al., 2019; Australia: Yang et al., 2022). This study sought to contribute to literature on bilingualism via identifying patterns in narrative productions in populations with complex linguistic profiles through examining narratives by Singaporean English-Mandarin kindergarten children in both their languages. The results of this study have implications for clinical practice in Singapore and for assessment practices for clinicians working with bilingual children.

In Singapore, information on language development in English and Mandarin in English-Mandarin bilingual children is scarce. Specifically at the narrative level, Yan et al. (2017) explored narrative ability (specific macrostructure elements, temporality, and evaluative expressions) in Singaporean school-aged bilingual children. Zhou et al. (2022) explored the effect of both languages and working memory on reference production in stories produced by preschoolers. Aside from these two studies, however, there is limited research on Singaporean English-Mandarin bilingual children. To my knowledge, there is no published research exploring narrative macrostructure and microstructure in both languages in Singaporean English-Mandarin bilingual kindergarten children.

The clinical implication of this gap in knowledge is the potential for misdiagnosis of language disorders in Singaporean bilingual children. This study aimed to address this gap by evaluating and identifying patterns of narrative performances by the balanced bilingual group and English-dominant group and the differences in narrative performances between both language dominance groups. The findings from this study, exploratory in nature, form the first step to establishing a foundation for understanding narrative skills and could be the starting point to designing assessment tools relevant to this population.

12.2 Key findings

With incomplete knowledge of the population's language profiles, SLTs could unintentionally misdiagnose language disorders in bilingual children, leading to ineffective and inefficient service delivery. The novel findings from this study add to the limited information currently available to inform clinical practice in Singapore and are presented in this section.

The following are key results from this body of work:

Language dominance

- There appeared to be a trend towards English-dominance in the sampled Singaporean bilingual children. Based on the narratives produced in English and Mandarin, the participants demonstrated significant strength in English relative to Mandarin. While not unexpected for the English-dominant group, this was a surprising finding for the balanced bilingual group. It suggests a shifting linguistic landscape in Singapore, with implications for how language dominance is measured.
- The bilingual children in this study who were less skewed in their language proficiencies (i.e., the balanced bilingual group) appeared to have better overall narrative language skills as evidenced by their performances on macrostructure and Mandarin microstructure elements, particularly in their weaker language, when compared to those who had clear dominance in one language. This could have implications for how parents, educators and policymakers provide input in two languages and will be discussed in more detail in the 'Future directions' subsection.

Assessing language skills in Singaporean bilingual children

- There was overlap between characteristics of SCE and clinical indicators of language disorders at this age, such as errors with grammatical markers. This study confirmed

this to also be true at the narrative level and adds information for Mandarin markers. This reaffirms and reemphasises that standardised assessment tools normed on monolingual English-speaking children should not be used with bilingual children, as they invariably misinterpret language difference as language deficits.

- The MLU measures analysed were significantly and strongly correlated to each other within languages. Correlation was not observed between languages. This provides SLTs with information on what they have to elicit to obtain a more comprehensive understanding of the children's language skills.

12.3 Clinical implications

For clinical practice

For clinicians practising in Singapore, it is crucial that there is a valid method of assessment to differentiate between language difference in this specific context and a true language disorder. However, this continues to be challenging due to the overall lack of knowledge of ability for specific domains of language at all levels. At this point there are norms only at the word level (BLAB) and sentence level (SEAPT). While they are useful, and are pretty much the only standardised norms available, these norms were identified in 2013 and 2002 respectively, which is a considerable time ago. Taking into account the changing linguistic landscape of Singapore, it would not be surprising if the norms for this population have changed and require updating. Therefore, more recent data on these children's language development is necessary.

The main objective of this study was to understand Singaporean English-Mandarin bilingual children's language skills at the narrative level to support clinicians in effectively diagnosing language disorders in this understudied population. Information at the narrative level

prior to this study was scarce and insufficient in providing clinicians with useful information on typically developing language skills at the narrative level for this population. Clinicians need to understand what is typical for the specific population and context before they can identify what is atypical.

Based on the key findings in subsection 12.2, the results suggest a need for the following recommended actions:

Monitoring shifts in language dominance and linguistic landscape

- Clinical practice has to respond to the evolving language profiles of Singaporean bilingual children. Clinicians must be mindful that it is highly unlikely the population has reached an equilibrium in levels of language dominance. It is predicted that the population will continue to change, and the results from this study thus cannot be treated with finality. Clinicians and researchers alike should continue to study this population to ensure that knowledge and practice reflects the needs of the population.

Assessing language skills in Singaporean bilingual children

- Keeping in mind the overlap between characteristics of Singapore English and clinical indicators of language disorders, the difficulty for clinicians lies in how to differentiate between language difference and language disorders in bilingual children (Bedore & Peña, 2008). This is especially so given that they may present similarly when considering key grammatical markers. Future research should include Singaporean bilingual children at risk or diagnosed with language disorders to elucidate the differences between typically developing and language disordered bilingual children.
- There is a need for assessment tools produced specifically to account for the grammatical nuances and differences in Singapore English. Currently available tools

must be updated or adapted to reflect the changing linguistic profiles of Singaporean bilingual children.

- Clinicians often have limited time and the significant correlation between MLU measures indicates that the most convenient method of calculating mean length of utterance, whether in words (MLUw) or words in the five longest utterances (MLU5w) in a language sample, would give good enough information about the length and complexity of utterances. However, MLUw and MLU5w in English and Mandarin are only weakly correlated based on the results from this study, indicating that the two languages must be assessed and analysed separately. This likely reflects the difference in language proficiencies in the two languages given that there is a trend towards English dominance.
- There is a need for initial establishment of MLU data at the narrative level in English and Mandarin produced by typically developing Singaporean bilingual children. Although there have been many studies evaluating MLU in bilingual children (e.g., Bitetti et al., 2020; Hernandez et al., 2024), this has not yet been established for Singaporean bilingual children. It is exceptionally important for this information to be contextualised given the numerous omissions of grammatical markers in Singaporean English. At present there is no information for Mandarin, so clinicians can view the data in the present study as a starting point for using MLU as a tool, among others, to identify language difficulties. However, further investigation with a larger sample is warranted to confirm the findings.
- The analyses highlighted key microstructure elements that could potentially distinguish typically developing bilingual children from language-disordered bilingual children. These include pronouns and coordinating conjunctions in English and negation and pronouns in Mandarin. In contrast, microstructure elements with floor effects (e.g., past tense marker in English), which are a staple of commercially available standardised

assessments normed on monolingual English-speaking children but still widely used in Singapore, are unlikely to be clinically useful.

Regarding the linguistic landscape of Singapore

The Dynamic Interactive Processing (DIP) theory proposes that language develops through language use across different communicative environments or contexts with different communication partners (Kohnert et al., 2020). It is of utmost importance for clinicians to keep up with the language context of Singapore to identify what is typical and atypical. It could be argued that it is challenging for research and clinicians to keep up with a linguistic landscape that has not yet reached a stable equilibrium. However, this is not sufficient reason to pause research in this area; there are children currently being affected by this lack of research, manifested as misdiagnosis of language disorders. Knowing what we do about the negative and persistent effects of language difficulties, dynamic research aiding growth of knowledge and translation into practice is crucial. In addition, a changing linguistic landscape does not mean that previous work would be rendered useless. Rather, newer research will build on previous findings to bring clinicians to a more accurate and updated picture of the population. For example, the fact that the BLAB and the SEAPT were normed on Singaporean children more than a decade ago does not mean they are no longer relevant, as they still offer service providers important information at the word and sentence levels. Instead, updating or adapting these assessments to reflect current skills and proficiencies would be more appropriate.

A point of consideration is that this body of work only explored language abilities in Singaporean English-Mandarin bilingual children. It should not be forgotten that there are other language pairs present in Singapore, such as English-Malay and English-Tamil. The results from this study can only be reliably applied to Singaporean English-Mandarin bilingual

kindergarten children. One might assume that the information on narrative skills in English might be transferrable as the children from the different language pairs are exposed to Singaporean English. However, this might not necessarily be true, given that Singaporean English is known to be affected by cross-linguistic transfer from Mandarin (Gupta, 1994).

Most of the research on language development in Singaporean children has focused on this language pair and therefore unintentionally presents a Mandarin-influenced perspective. This is not to say that there is no influence from Malay or Tamil (or the other many Indian languages used in Singapore) specific to people who speak these language pairs. It is unknown at this point if there are different types of cross-linguistic transfers from Malay or Tamil into Singaporean English that differs from that from Mandarin. It is highly possible that different language pairs might result in slightly different variants of Singaporean English specific to the language pairs, as the secondary language will have inherently different linguistic features. Researchers therefore need to include participants from these language pairs. It would be ideal to include researchers with lived linguistic experience and clinical experience with this group, but a practical challenge is finding such researchers. However, this should not deter researchers without specific lived experiences of these language pairs from exploring this area, possibly in conjunction with clinicians who speak these language pairs.

12.4 Language dominance

A key research question for this study was to evaluate whether there were differences in narrative performances between groups with varying language dominance. Language dominance refers to the relative proficiency in each language (Martin et al., 2020). This topic has been widely debated in research. Leopold's (1939–1949) longitudinal study of his first child, Hildegard, culminated in a detailed documentation of bilingual language acquisition and offered

strong support for the idea that bilinguals are often dominant in one language and weaker in the other. Later researchers have agreed that bilinguals are very rarely equally proficient in all domains of their two languages in every context (Baker, 2006; Romaine, 1989; Treffers-Daller, 2019). However, while researchers agree that bilinguals are usually not balanced in their proficiency, there is still considerable debate over how language dominance is measured. This has clinical implications for bilingual children, since evidence-informed guidelines recommend that both languages of a bilingual child be assessed and compared to norms adjusted for dominance (Thordardottir, 2015).

Different researchers have conceptualised language dominance differently. Many consider proficiency and use (e.g., Peña et al., 2021), others exposure (e.g., Argyri & Sorace, 2007; Kootstra & Doedens, 2016). There is also a more recent general trend towards considering a more integrated view (Birdsong, 2018). A combination of experiential measures (parent questionnaire) and language performance (vocabulary task normed on Singaporean children) was used to measure language dominance in the present study. It should be noted, however, that this study employed a secondary data methodology and so did not have independent control over how the participants were allocated to the two language dominance groups (balanced bilingual and EL1CL2 bilingual). A review of the measures showed that the participants in the balanced bilingual group were more equal in their vocabulary scores with respect to each language and parental perceived proficiency and frequency of use across the two languages. In contrast, the EL1CL2 participants had higher vocabulary scores and reported proficiency and frequency in English compared to Mandarin. It was therefore important to compare the participants' performance on the narrative tasks to their allocated groups, to evaluate the accuracy of their allocated rating of language dominance. To do so, the two groups were compared and their similarities and differences analysed.

The main conclusion is that, contrary to their allocated groups, both the balanced bilingual group and the EL1CL2 group were in fact English-dominant to varying degrees. This was illustrated by their quantitative performances on both macrostructure and microstructure elements. On all macrostructure elements, there was no difference between the language dominance groups. This implies that, overall, both language dominance groups had similar proficiencies in the two languages and suggests that they belonged to the same group. When evaluating total and specific story grammar elements, both language dominance groups demonstrated significantly stronger skills in English than Mandarin on at least one task (i.e., retell and/or recall). While this was not surprising for the EL1CL2 group, it clearly showed that the balanced bilingual participants were not truly balanced in their language proficiencies. Performances on the microstructure elements aligned with the macrostructure elements. For example, both language dominance groups produced a higher MLUw in English than in Mandarin and the balanced bilingual group produced a higher MLUw than the EL1CL2 group on the Mandarin narratives.

In terms of language-specific grammatical markers, there was no difference between groups on English markers but the balanced bilingual group outperformed the EL1CL2 group on some Mandarin grammatical measures, such as prepositional phrases. However, the lack of substantial difference between the two groups did not mean there were no differences at all. There were some qualitative differences between the two groups when the errors were analysed, which should be explored in more detail in future research.

The apparent mismatch between performances on the narratives and their allocated grouping needs exploring and adds to the discussion on how language dominance is measured. As mentioned, the participants were allocated after consideration of parental reports of proficiency and frequency of use as well as based on their standardised vocabulary scores. This

mismatch could have arisen because of a few factors. Firstly, it was possible that the parents did not have a fully accurate or complete picture of their children's proficiencies. There have been studies investigating and validating the accuracy of parental ratings of their bilingual children's language skills. Bedore et al. (2011, p. 489) explored parent and teacher ratings of 4- to 5-year-old Spanish-English bilingual children living in the United States and found that while parents could reliably rate their children's abilities in both languages, parental ratings correlated to their children's "broad language performance" but were not significant predictors of morphosyntax performance. Teachers were able to provide more accurate information on morphosyntax. They suggested that semantics might be a more salient feature for parents, as compared to grammar.

The findings from this study concurred with another study exploring language dominance in Mandarin-English bilinguals: Sheng et al. (2014, p. 364) compared parental ratings to the Multilingual Naming Test (MINT), finding that the MINT "indicated higher degrees of English dominance". They recommended that parental reports should not be used in isolation to classify children into language dominance groups. Another study compared experiential factors to performance measures, such as measures of vocabulary and language samples, finding that language use more reliably predicted proficiency as compared to measures of parental reports (Unsworth et al., 2018). Vocabulary was incorporated as a measure for classification of language dominance in this study, in addition to parental reports. However, the combination of these two measures did not fully reflect the children's proficiencies. The present study therefore goes a step further, suggesting that different levels of language also need to be considered to establish a complete understanding of a child's language proficiencies and language dominance.

Secondly, researchers have long maintained that bilinguals rarely achieve and maintain equal competencies in all domains of language (reading, writing, listening, and speaking) in both languages (Baker, 2006; Treffers-Daller, 2019). There could have been a mismatch between the metrics collected and the tasks, which might have resulted in the balanced bilingual group not actually performing in a balanced manner. The metrics collected included information on all four domains but the tasks mainly assessed skills in the speaking domain, and to a lesser extent the listening domain (via the narrative modelling before the first elicitation). The reading and writing domains were not considered in the tasks, which may have skewed the ratings and classification. It is possible that the allocation might be different if only factors for speaking and listening were considered.

Thirdly, balanced bilinguals performing similarly to EL1CL2 bilinguals could be an outcome specific to Singaporean Chinese bilingual children. Previous research has been mostly undertaken in countries and cities where the two languages are distinct without much inter-mixing (e.g., Chinese-English bilinguals in the United States: Hao et al., 2019, and Canada: Jia & Paradis, 2015). In contrast, Singapore has an unique mix of and interaction between the many languages and dialects, leading to languages that are intrinsically intertwined with cross-overs, as discussed in Chapter 2. More investigative research into this particular area would be beneficial to clinicians understanding the context and the children they work with.

The finding that balanced bilinguals performed similarly to English-dominant bilinguals is an important reflection of the current linguistic context of Singapore. There are few studies on Singaporean bilingual children and those that investigated language dominance as a factor were conducted with data collected more than a decade ago (e.g., Brebner, 2010; Teoh et al., 2012). In these older studies, there were enough participants in each group to have sizeable groups of English-dominant and Mandarin-dominant participants. In the time period (2016–

2019) in which the data for this study was collected, the primary researchers who collected the data initially intended to have English-dominant, Mandarin-dominant and balanced dominance groups. However, there were insufficient Mandarin-dominant children in the sample to achieve this. (It must be pointed out that this does not mean that there are no Mandarin-dominant children in Singapore; it simply means that this population is steadily decreasing, which may have implications for whether further research into this group is urgently needed.) The finding that the balanced group appeared to be more English-dominant shows that, over about a decade, English has become increasingly dominant among Singaporean English-Mandarin bilingual children. It is extremely likely that this trend will continue. The question, then, is what it means for Singapore's growth and development. Singapore's long-established multiculturalism and multilingualism are defining and competitive features, with bilingual education a key government policy. As evidenced by population censuses over the years, however, there is a shift towards more English being used as the home language (Singapore Department of Statistics, 2021), indicating increasing English dominance. The shift towards English dominance is likely to have a major impact on identity, education, and economy and therefore it is of utmost importance that it continue to be studied.

It must be restated at this point that the findings from this study only apply to English-Mandarin bilingual children. While there is a general shift to more Singaporean households speaking English as their home language, this change has been more rapid for Chinese families compared to other ethnic groups. This was evidenced by a sharper drop in Mandarin being spoken as a home language (Singapore Department of Statistics, 2021), in comparison to other races and home languages. This means that this shift towards more English being spoken at home may be more pronounced for the Singaporean Chinese population. The Chinese form the majority racial group in Singapore and this is often reflected in the research, as evidenced by

most research on Singaporean bilingual children focusing on this particular language pair and, by extension, this ethnic group (e.g., Brebner, 2010; Li et al., 2022).

Cavallaro et al. (2020) summarised language use in the Singaporean Chinese, Indian and Malay populations and predicted that there will be a shift towards increasing use of English, but that this is likely to happen at different rates for different reasons. Although there was a concerted effort by the Singapore government to move away from Chinese dialects towards Mandarin through the Speak Mandarin Campaign (Ng & Cavallaro, 2021), the same cannot be said for the Indian languages and variants of Malay. For example, Tamil is the allocated mother tongue of Singaporean Indians but there are many different non-Tamil Indian languages spoken in Singapore. While Tamil is taught in school and is considered an official language of Singapore, students have the option of studying other Indian languages such as Hindi, which has seen a much increased enrolment in recent years (Jain & Wee, 2019). Malay is also differentiated by speakers into Baku Malay, the standardised form taught in school, and Pasar Malay, the variety used in informal settings (*pasar* means 'market' in English) and this conflict between the two forms might result in Malay speakers using English instead (Cavallaro & Ng, 2020; see also Nur'Ifah, 2019).

Considering all the information currently available, it is clear that equilibrium of the different languages in Singapore has not been reached. However, it is equally clear that clinicians and researchers cannot wait for such equilibrium to research and understand these populations' linguistic skills. The need for research into the different language pairs in a complex and changing linguistic landscape such as Singapore's is pressing and necessary in order for clinicians to effectively and efficiently diagnose language disorders and provide appropriate support. It is highly unlikely that the language profile is changing only in Singapore; other countries are also facing changing populations and changing language backgrounds (e.g.,

Australia: Zhang et al., 2023). This pressing need must be addressed through more extensive research into this area.

12.5 Codeswitching

Codeswitching describes a complex and pervasive linguistic phenomenon involving alternation between two languages in a single discourse (following Yow et al., 2018). There is some debate about what codeswitching suggests regarding a child's language skills. While language proficiency can be reflected through the frequency of codeswitching (Ribot & Hoff, 2014), codeswitching in and of itself does not indicate a language disorder (Kapantzoglou et al., 2021). Some researchers claimed that codeswitching indicates confusion between languages and delayed development of language skills (e.g., Deuchar, 2006) while others supported the idea that codeswitching can also be observed in bilinguals with high proficiencies in both languages (Yow et al., 2018) and demonstrates linguistic resourcefulness (Kapantzoglou et al., 2021). It has also been well established in the literature that both language disordered bilingual children and typically developing bilingual children alike will codeswitch in formal and informal testing situations similarly to how they do in conversational settings (Gutiérrez-Clellen et al., 2009). Research on codeswitching in Singaporean bilingual children has mostly focused on the conversational level, but the general consensus is that codeswitching is a common phenomenon (Wu et al., 2022).

At the narrative level, Pavlenko (2003) found that bilinguals tended to switch to the language that contains lexical items that best convey nuances and concepts. Gross and Castilla-Earls (2023) confirmed that codeswitching at the narrative level is typical bilingual behaviour. In the present study, the primary reason for codeswitching appeared to be stronger relative English abilities. This was reflected in English dominance and lexical gaps in Mandarin,

and evidenced by codeswitching to English vocabulary on most occasions. One obvious observation was that participants in both language dominance groups only codeswitched to English on the Mandarin narratives, not vice versa. This was a very telling finding and adds to the previous argument that both groups were English-dominant. This conclusion was also informed by Gutiérrez-Clellen et al.'s (2009) study of English-Spanish bilingual children (mean age of children with LD = 5;11, mean age of TD bilingual children = 6;1). They found that English-dominant children more frequently codeswitched in narratives elicited in Spanish as compared to Spanish-dominant children on narratives elicited in English, and concluded that children appeared to refrain from codeswitching in their dominant languages. While it was possible that saliency of lexical items had an effect on which language the participants used, both narratives used in this study were similar in the type of vocabulary they contained. Saliency and language-specific relevance and their effect on codeswitching might be presented more obviously if the stimuli were more complex.

The patterns of codeswitching from the participants in this study closely aligned with those described in previous literature. Firstly, codeswitching in preschool and school-aged children is constrained by grammatical boundaries (Gutiérrez-Clellen et al., 2009). Poplack (1980, p. 586) proposed that instances of codeswitching "tend to occur at points in discourse where [it did] not violate a syntactic rule of either language, i.e., at points around which the surface structures of the two languages map onto each other". The instances of codeswitching observed in the present study obeyed the morphosyntactic rules of the utterances in which they occurred and usage of specific vocabulary in English directly translated from Mandarin was observed. Given the influence of Mandarin on Singapore English, it was difficult to ascertain with certainty if the grammatical forms were more in line with Mandarin or English. For example, most English verbs in Mandarin narratives omitted the regular past tense marker. However, as

the marker is also omitted in Singaporean English, it was difficult to conclude the underlying origin of the omission. On few occasions, it was observed that the codeswitched verb added the regular past tense marker, as demonstrated below.

- P12: 还有它 landed 在那个 uh 大青蛙的头 . *hai you ta landed zai na ge uh da qing wa de tou* ('And it landed at that uh big frog's head')

Sentence structure was easier to analyse as this differed between the two languages and usage of English vocabulary with Mandarin sentence structure was more obvious. It was observed that the English lexical terms were substituted in the positions where the Mandarin lexical terms would be, i.e., following Mandarin syntax. Mandarin syntax was maintained regardless of whether the codeswitching occurred in sentence-initial, medial, or final position. This is illustrated in the following examples.

- P12: then 那个大青蛙就爬上那个狗的头 *then na ge da qing wa jiu pa shang na ge gou de tou* ('Then that big frog then climb up that dog's head')
- K22: 小男孩要 leave 的时候他讲 *xiao nan hai yao leave de shi hou ta jiang* ('Little boy want leave (poss) time he say')
- P18: 但是青蛙, 青蛙也是 [pause] wave his hand *dan shi qing wa, qing wa ye shi [pause] wave his hand* ('But frog, frog also [pause] wave his hand')

The second similarity was where the codeswitching occurred. Participants in both language dominance groups produced similar codeswitching patterns. They most frequently codeswitched on single lexical items with few verb phrases. None of the participants spontaneously produced entire English utterances on the Mandarin narrative tasks until explicitly prompted by the primary data collectors. This only occurred when it was obvious that the children were having difficulty formulating sentences in Mandarin. Although this appeared to

be a syntax difficulty, as the participants could not start the utterances, the difficulty is more likely rooted in their limited lexicon as these participants were able to narrate the following events in Mandarin. While this was not unexpected for the EL1CL2, it was surprising that some participants in the balanced bilingual group faced the same difficulty and, again, supports the idea that both groups were in fact English-dominant.

12.6 Limitations

Secondary data

There were practical reasons for using secondary data as primary data collection was impossible. This research project was conceptualised in 2020 and the degree commenced in 2021. At that point in time, research activities in Singapore were ceased due to the ongoing COVID-19 pandemic. Due to the unpredictable nature of the pandemic, it was unknown when research activities would resume. I proceeded to consider secondary data analysis, instead of primary data collection, as the method of data collection that could provide robust results for the research questions to be the most viable and practical option.

Many steps were taken to control the dataset and ensure that it was suitable to answer the research questions. The procedure was carefully analysed. The particular dataset was chosen as it addressed the proposed research questions. Firstly, the demographics of the sampled population were appropriate: this project aimed to evaluate language skills in English-Mandarin speaking Singaporean bilingual children. The participants were recruited from local kindergartens and were representative of the target population. At this time, there is no known demographic information about language dominance in Singapore so this could not be controlled for. Secondly, the materials used in the study were appropriate. A locally-normed tool and a locally-adapted questionnaire were used and these were appropriate for the sampled

population. In addition, the materials used to elicit the available samples (wordless picture books) were also appropriate. The ‘Frog’ series in particular has been used in previous studies of bilingual children (e.g., Gross & Castilla-Earls, 2023; Hao et al., 2019) as it contains themes relevant to children across different cultures. Thirdly, the elicitation process was also scrutinised. All samples, including the prompts, were transcribed. The different prompts were identified and the selection criteria was established based on the available information. Some samples were excluded based on whether the target responses were included in the prompts provided by the examiners. Different methods of analyses were considered, such as only including samples without prompts (i.e., all spontaneous productions). However, this analysis would have resulted in further reducing the already modest sample size, which would have implication on the ability to draw appropriate conclusions. In addition, the prompts (without the targets) would be clinically relevant and could inform further research. Careful weighing of the different facets of the samples was done and steps were taken to control the data, resulting in the dataset being deemed suitable and appropriate to address the research questions.

There were many advantages to using secondary data, such as savings in terms of resources as the original data had already been collected and establishing new knowledge based on previous research, leading to advances in knowledge. However, there were also challenges created by this method of data collection.

Understanding the dataset

Understanding the data was pertinent to ensuring that it provided answers to the research questions of the secondary analysis. The data used in this study was retrieved from TalkBank; although the corpus webpage contained broad information about the subjects (e.g.,

language dominance), more detailed information was necessary to conduct analyses into the data obtained, e.g., age, gender and parental reports of language proficiencies.

In addition, it was also important to understand the method of data elicitation and collection in order to comprehend the output in totality. This information was not available on the TalkBank corpus webpage. To address this issue, I contacted the primary researchers to discuss the dataset to better understand the processes undertaken and to obtain additional information about the subjects.

Different purpose of data collection

The secondary analysis used the data for a different purpose from the primary analysis. Using an already collected dataset means that there was no control over how the data was collected. The original researchers obtained the data to evaluate fluency in bilingual Singaporean children and so their primary aim was to elicit an adequate number of utterances for evaluation. Upon examination of the raw data, it was noted that there were inconsistencies in how the investigators elicited the samples, e.g., some investigators asked more open-ended probing questions while others were observed to ask close-ended questions with more immediate support. These discrepancies in method of elicitation might not be of much consequence when evaluating fluency, but for this project they resulted in some samples being excluded from analysis as the productions were not spontaneously produced. As suggested in Chapter 3, it was challenging to determine the reason for the inconsistency in the elicitation of the narrative samples with only audio samples. If there were video samples, a clearer distinction could possibly be made between the differences in provision of prompts and consequently a more stringent exclusion criteria.

To address this issue, I established rules for scoring the output measures and an exclusion criteria (outlined in Chapter 3) was created in order to make more objective comparisons. This in turn resulted in fewer samples considered to be appropriate for analysis. Additionally, I conducted sensitivity measures in the form of more complex data analysis to ensure that the statistical analysis undertaken and presented in the results chapters were robust.

In addition, the number of utterances elicited for analyses differs from purpose to purpose. A review of the literature showed that there is no agreed-upon guideline for the length of language samples. Narrative production can be challenging for young children (Westerveld et al., 2004), resulting in short samples of fewer than 20 utterances, on average, while existing data from narrative language sampling measures are based on sample sizes of 30, 50, or even 100 utterances achieved by combining multiple retells (Murphy et al., 2022). This study utilised only retell and recall, obtaining between 50 and 100 utterances for analysis. Previous studies (e.g. Eisenberg & Guo, 2015) also found that grammatical markers can be measured and analysed reliably in samples averaging approximately 30 utterances. This was achieved for most narrative samples elicited in this study, which suggests that the dataset was valid for the purpose of analysis. However, further research with a larger number of utterances elicited would be beneficial to confirm the findings.

Data quality

As with the inability to control the method of data collection, conducting secondary analysis meant that I could not control the quality of the data obtained. There were instances in the audio samples in which environmental noise was present. For example, the data was sometimes collected in kindergartens with teachers' and other children's voices captured on the

recordings. This resulted in the productions being more challenging to transcribe and analyse. This was managed through having two other Singaporean English-Mandarin bilingual SLTs independently transcribe and score the transcripts to achieve inter-rater reliability.

Modest sample size

Another limitation of using secondary data was that the sample size could not be controlled. The sample size of 36 participants studied in this research study could be considered modest when compared to larger studies on bilingual children (e.g., n = 1029, Peña et al., 2012; n = 175, Peña et al., 2020). However, modest sample sizes are also not uncommon in this area of research (e.g., n = 21, Hao et al., 2019). There is no literature that conclusively defines a small sample size, although some researchers maintained that research studies with sample sizes of fewer than 30 subjects can face challenges such as lacking heterogeneity or a skewed distribution (Fain, 2009). The complete lack of variance was observed only on some outcome measures, such as macrostructure elements like ‘character’, which was explained by the ceiling effect. For other outcome measures where there was some variance but still an overall skewed distribution, this was managed by conducting non-parametric tests.

A small sample size could also have an effect on statistical power. An underpowered study can result in a lack of significant differences in the data. The alpha in this study remained at .05 in accordance with other studies on language development in multilingual children (e.g., Brebner, 2010). If this study was underpowered, it would be reasonable to expect that no significant differences between groups and very small effect sizes across different outcome measures. This was not the case here; there were multiple outcome measures which had medium to large effect sizes. This indicates that although this study had a small sample size, it

was not underpowered. In addition, the alpha level was adjusted through the Bonferroni correction being applied to all relevant statistical analyses.

12.7 Future directions

The results of this study have direct implications for clinical practice with Singaporean bilingual children. Future research could and should expand on these findings to advance the knowledge base.

Research on a larger scale

Firstly, the field will benefit from a larger scale study evaluating the narrative language skills of Singaporean bilingual children. This should be done to confirm the findings from this study and to ensure that the findings are generalisable to the larger Singaporean English-Mandarin bilingual population. Analysis with a larger sample size might also reflect trends more obviously.

In addition, this body of work presented one method of analysis of macrostructure and microstructure. As researchers and clinicians are still learning about how narrative language skills develop in bilingual children, alternative methods of analysis will facilitate confirmation of the results. For example, for fine-grained microstructure elements in both languages, most grammatical markers were accuracy-based measures in alignment with one another and with previous research on the population in question. There is emerging research that suggests that certain Chinese grammatical markers, such as aspect marking, would benefit from rate-based measurement as they are preferred but only discretionary in certain contexts (Sheng et al., 2023). The lack of obligatory marking renders it more difficult for researchers to identify the range of typical development and what falls outside of it, making measurement challenging. This

developing area warrants more research to establish appropriate norms and method of measurement.

More inclusive research

Research should be expanded to include other language pairs and racial groups. Although the Chinese form the largest racial group, making English-Mandarin the most common language pair for bilingual speakers in Singapore, it is important to remember that there are other ethnic groups and language pairs used. Since there are English-Mandarin cross-linguistic transfers in Singaporean English, it is possible that there might be different patterns for non-Chinese bilingual children. It is important to have accurate information to assess bilingual children to effectively diagnose language disorders. However, it might not seem feasible to have different standards purely based on ethnicity and language pair. In a multilingual and multicultural society such as Singapore, the social risks of identifying different standards for different racial groups should also be considered. Research to aid advancement of knowledge should not inadvertently lead to social unrest or tension between the racial groups if certain groups are found to possess higher language skills than others. A potential solution might be to study Singaporean English as spoken by Singaporean bilingual children as a whole with subgroup analysis, complemented by research into the other language in the language pair.

Review and update relevant assessment tools

The only two assessments available and normed on Singaporean children are the BLAB at word level (receptive and expressive vocabulary) and the SEAPT at sentence level (picture description to elicit sentences in response to ‘wh’ questions). While appropriate for the population, these assessments were developed one to two decades ago and may not be as true a reflection of the population now as they were at the time they were developed, considering

Singapore's changing linguistic landscape. It is suggested that the stimuli as well as the norms of these assessments be adapted and updated to better reflect the current language skills of the community. In addition, while the BLAB includes Singapore's four official languages, the SEAPT has norms only for English-Mandarin bilingual children and the tasks (and norms) were developed only in English (as the tool is an adaptation of a tool developed for monolingual English speakers). In addition to an update, Singaporean children and clinicians will benefit from an expansion of the SEAPT to include Singaporean bilingual children speaking other language pairs, i.e., English-Malay and English-Tamil.

Continue to build knowledge base on Singaporean bilingual children's language development

There needs to be more information on Singaporean children's linguistic development. This study, like the assessments normed on Singaporean children, focused on kindergarten-aged children and there is no available information on language development in children under four years old (or school-aged children). There is ample research emphasising the effectiveness and importance of early intervention (e.g., Roberts & Kaiser, 2015). It is key, then, to be able to identify which children would benefit from timely referrals to early intervention. As with the kindergarten-aged children, clinicians need to know how typically developing young children use language before they can identify the young children who require support.

Clinicians also need to know how language use changes as children develop. This crucial information is lacking and I suggest that a longitudinal study following development from birth would be the first step to understanding how these bilingual children develop language skills. In Australia, this research is being conducted via the Early Language in Victoria Study (ELVS) (University of Melbourne, n. d.), albeit without a specific focus on bilingual children. In

Singapore, there is a large-scale longitudinal study underway to examine factors that facilitate early childhood development in Singaporean bilingual children (Yeung & Chen, 2024). A subproject specific to language focuses on evaluating the effect of bilingual environments on social, cognitive and language development. While the focus of this study suggests that there might not be adequate information about how language is acquired in Singaporean bilingual children, it could provide some insight into the process and inform later research. Particular attention to grammatical markers which, through this research, were identified to be emerging but not yet established in the sampled population could be beneficial to include in studies with at-risk populations for identifying clinical indicators of language disorders.

In addition, the narrative samples were taken at a single timepoint and form a 'snapshot' of the children's abilities. In more recent research, there is an increasing shift towards dynamic assessments of language skills in bilingual children. Peña et al. (2014) employed dynamic assessments at the narrative level in English-Spanish bilingual preschool children, finding that sensitivity increased from 80.6% (single time point) to 97.2% at post-test. The procedure consisted of three sessions across a seven- to 14-day period and included pre-test and post-test narrative tasks and two mediated learning experience sessions which focused on "modeling and practicing the creation of complete and complex episodes" (Peña et al., 2014, p. 2211). Petersen et al. (2017) also found that dynamic assessments at the narrative level with kindergarten to early primary school students achieved 100% sensitivity and specificity after two dynamic assessment sessions. In Singapore, Teoh (2019) investigated the effectiveness of the dynamic assessment approach with English-Mandarin bilingual preschoolers. She found that the dynamic assessment approach differentiated between typically developing bilingual children and bilingual children with suspected language disorders more effectively than standardised assessment tools. These studies demonstrated that dynamic assessments are a valid and

useful tool for clinicians working with bilingual children, especially if the clinicians do not speak the same language pair as the children. This is an area that would benefit from further research.

Finally, one of the main findings in this study is that these Singaporean bilingual kindergarteners were using SCE and there were often omissions of a variety of grammatical markers. On the other hand, Singapore is frequently in international news for being a country that has a strong English (referring to Standard English) proficiency. How, then, do Singaporean children go from using Singaporean English in their everyday lives to excelling in Standard English at the global level? This seems to be a clear disconnect between the two time points and the factor that transports the children from the first to second timepoint has the potential to inform educational pedagogies. This is clearly another gap in our knowledge of development in this population and warrants further investigation. A more extensive longitudinal study might be the key to filling this knowledge gap and potentially inform intervention practices with Singaporean bilingual children with language disorders.

Continue to build knowledge base on Singaporean English

There is an emerging literature on features of Singaporean English (e.g., Lee, 2022; Leimgruber, 2011; Leimgruber et al., 2021) but limited knowledge of whether language development in Singaporean children follows the developmental trajectories established from bilingual children in other countries with different language profiles. Without a basis for comparison, the data could be interpreted in various ways. Future and more comprehensive investigation with a larger sample would be beneficial to confirm the findings from this study.

Research has shown that there are some culture-specific differences in production of certain macrostructure elements (e.g., Gillam et al., 2012; Mills et al., 2013). At this time, there

are no known norms about production of narrative structure in this culture-specific context and how they might differ from those for bilingual children from other cultures.

Given that research in this area is emerging, there is not yet established consensus regarding syntax in Singapore English (for example, including but not limited to omission of subjects, conjunctions) or, by extension, as to what constitutes an utterance. For example, ‘and then’ and ‘then’ function as coordinating conjunctions in Standard English. In Singaporean English, both can also be used as discourse markers at the start of an utterance to indicate an event that occurs next. In this study, ‘and then’ and ‘then’ used to connect related clauses were considered conjunctions and therefore part of a longer utterance but were considered to start separate utterances when used with unrelated events. At this time, this differentiation is not yet reflected in the literature and its absence demonstrates the need for further research into this area.

12.8 Conclusion

This study achieved the primary aim of evaluating the narrative language skills of Singaporean English-Mandarin Chinese bilingual kindergarten children, with secondary aims of investigating the effect of language dominance, language elicited, and task types on narrative performance. The findings from this body of work will help clinicians working with this population to have a more comprehensive understanding of the population they work with, in order to more effectively and efficiently diagnose language disorders. However, this is merely a step on the way to improving service provision for these children, as evidenced by the directions that future research can take. I hope that this study will advance the knowledge of clinicians, which can then be transferred into clinical practice that supports bilingual children.

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Appendices

Appendix 1: Language Questionnaire

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Appendix 2: Narrative Scripts

One Frog Too Many

English

There was a boy who had three pets, a dog, a frog and a turtle. One day he saw a large box with a bow on it. The card on the box said that the present was for him.

So he opened the box and was very excited when he saw what was in it. Inside the box was a little frog. The boy, the dog and the turtle liked the little frog. But the big frog didn't like the little frog.

The boy set the little frog down next to his pets and said, 'This is my new little frog.' The big frog said, 'I don't like you.'

Then the big frog bit the little frog's leg. The little frog cried, 'Ouch, ouch!' The boy picked up the little frog and scolded the big frog, 'That was a very mean thing to do frog.'

The boy's pets followed him outside to play. The two frogs rode together on the turtle's back but the big frog still didn't like the little frog. The boy, who was dressed up like a pirate, led the way.

The big frog thought nobody was looking so he kicked the little frog off of the turtle's back. But when the others heard the little frog crying, they knew what had happened. They were all angry at the big frog for being mean to the little frog again.

The boy led them all to a pond where he had a raft. He wouldn't let the big frog get on the raft with them. The big frog didn't like being told that he couldn't come with them.

So he ignored what the boy told him and jumped on the raft just as it was leaving the shore. The little frog was the only one who noticed that the big frog had jumped on the raft. The big frog glared at the little frog.

Then he kicked the little frog off the raft. And stuck out his tongue at him.

The big frog was happy with himself. Now he was the only frog- just the way it used to be. The turtle tapped the boy on the leg to get his attention. When the boy turned around, he was shocked at what he saw. 'How did the big frog get there? And where was the little frog?'

The boy and his pets got off the raft and searched for the little frog. They looked all around the pond.

They couldn't find the little frog anywhere. The boy was so sad he began to cry as he walked home. The frog felt sorry for what he had done.

When the boy got home he went to his room and cried. His pets were sad too. Then they heard a noise out the window. It sounded like a frog.

All of a sudden the little frog jumped through the open window. Everyone was excited to see the little frog. The little frog landed right on the big frog's head and laughed.

The big frog decided to be nice to the little frog from now on. Everyone was happy.

Mandarin Chinese

男孩收到了一份礼物。卡上有他的名字。

他打开了礼物。他们/他 很 开心。青蛙不开心。

男孩拿起了小青蛙。大青蛙不开心。

男孩放下了小青蛙。

大青蛙说了/在说 我不喜欢你。

大青蛙咬了/在咬小青蛙的脚。小青蛙哭了一声。

男孩骂了大青蛙。他们很生气。

男孩带着他们出去。大青蛙和小青蛙坐在乌龟的背上。

大青蛙踢了小青蛙。

男孩骂了/在骂大青蛙。他们很生气。

男孩说他不可以跟他们上船。

大青蛙跳进了船。

没有人看到。只有小青蛙看到了。

大青蛙把小青蛙踢出了船。

小青蛙掉进了水里。大青蛙对他吐舌头。

乌龟碰了男孩的腿。

男孩看到了大青蛙。 没有小青蛙。他吓到了。

他们再找/找了小青蛙。可是找不到。

他 哭着回家了。他们很伤心。他们不要大青蛙跟他们回家。

男孩在床上哭。

他们听到了窗口外的声音。

小青蛙跳进了房间。他们很开心。

小青蛙坐在了大青蛙的头上。

他们成为了好朋友。

Frog Goes to Dinner

English

A boy was getting dressed in his bedroom. His pet dog, frog and turtle watched as he put on his best clothes.

While the boy was petting the dog, the frog jumped into his coat pocket. The boy didn't know he was there. As the boy left with his family, he waved and said 'Goodbye' to his pets. The frog waved goodbye too.

When the boy and his family arrived at a fancy restaurant, the doorman helped them out of the car. The frog peaked out of the boy's pocket but no one noticed him.

The boy and his family sat down at a table in the restaurant. While they were looking at the menus, the frog jumped out of the boy's pocket towards the band.

The frog landed right in the man's saxophone! 'Squeak' went the saxophone. The man looked inside the saxophone to see why it made that awful noise.

Then the frog fell out of the horn and landed right on the saxophone player's face! The saxophone player was so surprised that he fell backwards into the drum.

The drummer yelled at the saxophone player, 'Look what you did to my drum- it's broken!' While they were arguing, the frog jumped away on a plate of lettuce salad.

The waiter didn't notice the frog. He served the salad to a woman. Just as she was about to take a bite, the frog popped out of the lettuce. The woman was shocked to see the frog.

She screamed and fell back on her chair. The frog was frightened and he jumped away. There was a man at the next table who was having a glass of wine with his wife. The frog landed right in his glass.

The woman complained to the waiter about getting a salad with a frog in it. She was very angry!

Meanwhile, when the man went to take a sip of his drink, the frog kissed him right on the nose.

The angry waiter was about to grab the frog who was waving goodbye to the man and his wife.

The waiter, who had caught the frog, was going to throw him out of the restaurant. But the boy saw the waiter carrying his frog and shouted, 'Hey, that's my frog!' The boy's mother told him to be quiet.

The boy asked the waiter to give him back his frog. The angry waiter told the boy and his family, 'Take your frog and get out of this restaurant at once. Don't you ever bring that frog in here again!'

On the way home the boy's family was angry with him. The frog had ruined their dinner!

When they got home the boy's father scolded him, 'You go to your room and stay there!' The dog and the turtle peeked around the corner to see what was going on.

When they got in his room, the boy and the frog laughed about everything that had happened at the restaurant. The more they thought about it, the more they laughed.

Mandarin Chinese

男孩在他的房间了换衣服。

当他摸着狗的头的时候，青蛙跳进了他的口袋。

他们出去了。/男孩说了再见。青蛙也说了再见。

他们到了餐厅。

服务员帮了他们开车门。

他们在看菜单。

青蛙跳进了萨克斯管。

音乐家吹了很大力但还是吹不出声音。

他看进了萨克斯管。

青蛙掉在了他的脸上。

他跌进了鼓里面。鼓手很生气。

鼓手骂了/在骂萨克市管家。你弄坏了我的鼓。

青蛙跳进了沙拉里。

服务员把沙拉给了女客人。

她要吃一口的时候，青蛙跳了出来。

她下了一跳。青蛙跳出来了。

青蛙跳进了男客人的杯子里。

女客人在骂/骂了服务员。

青蛙亲了男客人的鼻子。

服务员要抓青蛙。青蛙在说/说了再见。

女客人要晕倒了。

服务员拿着青蛙要把它丢出去。

男孩看到了。

他说 那是我的青蛙。不可以丢。

服务员叫他们出去。

在车里 他的家人在生他的气。

到家的时候 爸爸叫他回去他的房间里。

他们在笑/笑了。

Appendix 3: Target Responses for Narratives

One Frog Too Many

Narrative element	1 point	2 points
Character	Boy or frog	Mentions boy and frog
Setting	Any other place reference e.g., water	Pond, boat
Initiating event	IE1: The boy has a new (small) frog	+ the big frog didn't like it
	IE2: The big frog bit the small frog's leg	+ (the small frog cried and) the boy scolded the big frog / was angry at the big frog
	IE3: The big frog kicked the small frog off the turtle's back	+ the small frog cried/everyone was angry with the big frog

	IE4: The boy said that the big frog couldn't come on the boat/went on the boat without the big frog	+ big frog jumped on the boat
	IE5: The big frog kicked the small frog off the boat	+ the turtle tapped the boy/the boy was shocked and/or asked where the small frog was
	IE6: They couldn't find the small frog	+ they were very sad/the boy cried or the big frog was sorry
Internal response	Any emotion vocabulary	Any emotion vocabulary related to an event
Action/attempt		They searched for the small frog
Consequence	C1:	Couldn't find the small frog
	C2: Boy went home	Indication at home (e.g., bed) + cried
	C3:	Small frog jumped through the window
	C4:	Big frog decided to be nice to the small frog/the big frog likes the small frog/they are friends now

Frog Goes to Dinner

Narrative element	1 point	2 points
Character	Boy or frog	Mentions boy and frog
Setting	Any other place reference e.g., home, bedroom Or vague e.g., outside	Restaurant
Initiating event	IE1: Frog in his pocket	+ boy didn't realise
	IE2: Frog jumped into saxophone or squeaky sound from saxophone	+ saxophone player checked the saxophone
	IE3: Frog jumped out of the saxophone/jumped on the man's face	+ saxophone player was surprised
	IE4: Saxophone player fell into the drum	+ drum player was angry and/or scolded the saxophone player
	IE5: Frog peeped out of the salad	+ lady screamed/and fell back in her chair
	IE6: Waiter caught the frog	+ boy said that the frog is his
Internal response	Any emotion vocabulary	Any emotion vocabulary related to an event
Action/attempt	Boy shouted/said	Boy said the frog is his +/- to return to him

Consequence	C1:	Waiter said to not bring frog back again OR get out/don't come back again
	C2:	Family was angry +/- with the boy and frog
	C3:	Father told him to return to his room
	C4:	Boy and frog talked and laughed +/- about what happened

Appendix 4: Sensitivity Measures

3.1 Total macrostructure

1. Missing data imputed with EM

	F	*p*	η_p^2	Similar to analysis with missing data?
Language dominance x language x task type interaction	.04	.853	.001	Yes
Language dominance x language interaction	.95	.338	.027	Yes

Language dominance x task type interaction	.20	.661	.006	Yes
Language x task type interaction	1.63	.114	.072	Yes
Language dominance	5.05	.031	.129	Yes
Language	32.51	<.001	.489	Yes
Task type	24.93	<.001	.423	Yes

2. Using data without exclusion criteria

	F	*p*	η_p^2	Similar to analysis with missing data?
Language dominance x language x task type interaction	.30	.585	.009	Yes
Language dominance x language interaction	.54	.468	.016	Yes
Language dominance x task type interaction	.71	.406	.020	Yes

Language x task type interaction	1.34	.254	.038	Yes
Language dominance	4.18	.049	.109	Yes
Language	31.45	<.001	.480	Yes
Task type	21.27	<.001	.385	Yes

Comparison between sensitivity measures

Analysis of the data obtained from imputed data via EM and all participants (without exclusion criteria), revealed similar statistical results to those presented in the main body of the thesis, indicating robustness of the findings.

3.2 'Initiating event' element

1. Missing data imputed with EM

	F	*p*	η_p^2	Similar to analysis with missing data?
Language dominance x language x task type interaction	.21	.652	.006	Yes
Language dominance x language interaction	.13	.719	.004	Yes

Language dominance x task type interaction	.26	.613	.008	Yes
Language x task type interaction	1.07	.652	.006	Yes
Language dominance	3.79	.060	.100	Non-significant here but both have a medium effect size
Language	14.39	<.001	.297	Yes
Task type	24.76	<.001	.421	Yes

2. Using data without exclusion criteria

	F	*p*	η_p^2	Similar to analysis with missing data?
Language dominance x language x task type interaction	.11	.745	.003	Yes
Language dominance x language interaction	.20	.660	.006	Yes

Language dominance x task type interaction	.12	.730	.004	Yes
Language x task type interaction	1.44	.238	.041	Yes
Language dominance	4.19	.048	.110	Yes
Language	15.13	<.001	.308	Yes
Task type	23.77	<.001	.411	Yes

Comparison between sensitivity measures

Analysis of the data obtained from imputed data via EM and complete dataset revealed largely similar statistical results to those presented in the main body, indicating robustness of the findings.

There were slight differences between the analyses from EM model, complete dataset, and the missing data:

- Language dominance: analyses from the missing dataset and the complete dataset showed a significant effect of language dominance with a medium effect size but analysis from the EM model showed a non-significant effect albeit also with a medium effect size.
- Task type – retell: analysis from the missing dataset showed a significant effect of language dominance on the retell tasks. Analyses from the EM model (p = .063, η_p^2 = .098) and the complete dataset (p = .063, η_p^2 = .098) showed a non-significant effect with a medium effect size of language dominance.

3.3 ‘Consequence’ element

1. Missing data imputed with EM

	F	*p*	η_p^2	Similar to analysis with missing data?
Language dominance x language x task type interaction	.30	.586	.009	Yes
Language dominance x language interaction	.16	.694	.005	Yes
Language dominance x task type interaction	.01	.942	.000	Yes
Language x task type interaction	.18	.678	.005	Yes
Language dominance	3.52	.069	.094	Yes
Language	7.51	.010	.181	Yes
Task type	2.90	.098	.079	Yes

2. Using data without exclusion criteria

	F	*p*	η_p^2	Similar to analysis with missing data?
Language dominance x language x task type interaction	.02	.892	.001	Yes
Language dominance x language interaction	.00	.983	.000	Yes
Language dominance x task type interaction	.54	.466	.016	Yes
Language x task type interaction	.07	.795	.002	Yes
Language dominance	2.20	.147	.061	Yes
Language	5.66	.023	.143	Yes
Task type	1.29	.263	.037	Yes

Comparison between sensitivity measures

Analysis of the data obtained from imputed data via EM and complete dataset revealed largely similar statistical results to those presented above, indicating robustness of the findings in Chapter 4.

There was one main difference between the analyses from EM model, complete dataset, and the missing data:

- Task type – retell: analysis from the missing data showed a significant difference with between the balanced bilingual group and the EL1CL2 group with a medium effect of language dominance. Analyses from the EM model (p = .066, η_p^2 = .096) and the complete dataset (p = .066, η_p^2 = .096), whilst not statistically significant, demonstrated a medium effect of language dominance.

Appendix 5: Results of Statistical Analysis of Other Macrostructure Elements

4.1 English

A Mann-Whitney *U* test was performed to evaluate whether the macrostructure elements in each task type differed by language dominance group.

Macrostructure element		*U*	*z*	*p*	*r*
Character	Retell	160.00	.00	1.000	.000
	Recall	160.00	.00	1.000	.000
Setting	Retell	164.00	.23	.912	.039
	Recall	154.00	-.40	.863	.067
Internal response	Retell	170.00	1.12	.765	.186
	Recall	152.00	-.89	.814	.149
Attempt	Retell	153.00	-.47	.838	.078
	Recall	166.00	.30	.863	.049

4.2 Mandarin Chinese

A Mann-Whitney *U* test was performed to evaluate whether the macrostructure elements in each task type differed by language dominance group.

Macrostructure element		*U*	*z*	*p*	*r*
Character	Retell	160.00	.00	1.000	.000
	Recall	160.00	.00	1.000	.000
Setting	Retell	130.00	-1.07	.352	.178
	Recall	153.00	-.25	.838	.041
Internal response	Retell	144.00	-1.28	.626	.214
	Recall	142.00	-.76	.582	.127
Attempt	Retell	136.00	-1.60	.459	.266
	Recall	160.00	.000	1.000	.000

Appendix 6: MLU Differentials

A three-way repeated measures ANOVA was run on the sample of 36 participants to examine the effect of and interaction between language dominance, measure, and task type on MLU differentials. The between-factor was language dominance, which included two levels (balanced bilinguals and English-dominant). The within-factors were measure, which included two levels (MLUw and MLU5w), and task type, which included two levels (retell and recall). Assumptions of independence, normality, and sphericity were checked and found to be observed. An alpha value of .05 was used for all statistical tests. Bonferroni correction was performed for multiple comparisons within each three-way ANOVA analysis (Feise, 2002).

Descriptive statistics

	MLUw differential retell		MLU5w differential retell		MLUw differential recall		MLU5w differential recall	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Balanced	1.5	1.6	2.7	3.6	1.2	1.6	2.9	3.9
EL1CL2	2.0	.9	3.9	2.5	2.3	1.2	3.9	3.1

Multivariate tests

Effect	*F*(1, 34)	*p*	η_p^2
Language dominance	2.27	.141	.063
Task type	.44	.835	.001
Language dominance x task type	.06	.816	.002
Measure	18.58	<.001	.353
Language dominance x measure	.13	.719	.004
Task type x measure	.03	.865	.001
Language dominance x task type x measure	.97	.331	.028