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The effect of executive function on referential use in returnee children

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Chapter 1

Introduction

In human connection, language is a vital component that enables us to communicate with others, and one of the important functions of language is reference. Speakers use referents to refer to the objects such as people or things happening around them so that listeners will understand the context without ambiguity. Interestingly, as for the various linguistic forms of the referents, the same entity can be described by the same form, and the same form can describe different entities (Gundel et al., 1993). For example, to refer to a girl they just saw, one may use the indefinite noun phrase:

"*a girl who just walked into a flower store*",

or the definite noun phrase:

"*the girl who just walked into a flower store*".

Or by calling her name *Lucy* or a personal pronoun such as *she* or *her*, even as a reflexive pronoun such as *herself*. In doing so, the speaker needs to take not only the linguistics choice of referential expressions into account, but also the listener's comprehension in context, which requires the former's executive function to step in and make the appropriate choice. Executive function, also known as executive control or cognitive control, refers to a set of cognitive processes that allows individuals to regulate their thoughts and behaviors directed by the specific goal(s) (Carlson et al., 2013; Miyake & Friedman, 2012). Which linguistic form to indicate the underlying referring, and how to manifest the referential expressions appropriately may be influenced by a number of factors, such as age, bilingualism, cross-

linguistic influence, individual differences, and so on. Acquisition and developmental trends of referents have drawn the researchers' attention in different subfields associated with linguistics over the past couple of decades, among the various factors that have been dedicated to quite a number of studies, the factor of executive function and how it correlates with individual referential choices are calling out for a closer investigation. Studies on the correlation between executive function and referential use remain scarce, perhaps for its extreme complexity and the fact that too many factors could be involved, which may influence narrators' choice of referents. Returnee children are a special group of bilingual children from immigrant families who were largely and naturally exposed to an environment where their second language was the majority language of the society, and then returned to their native language background after some years of continuous immersion in second language background. Focusing on this group of children allows us to track down their developmental trends in each of their languages in a natural setting longitudinally, which offers more perspectives and hopefully more approaches.

The aim of this study is to investigate whether executive function ability has an effect on the use of referential expressions in a special bilingual population, namely, returnee children. And if so, how did executive function predict bilingual returnee children's use of referents? Studies on returnee children are still inadequate, on the one hand, they are often limited to a small number of participants, on the other hand, the previous studies mainly focus on L2 attrition. The term attrition here is introduced to refer to the changes in children's use of language, especially when they do not get enough exposure to that language as much as they used to. We use this special trait of returnee children to investigate how executive function would affect their referential skills when they moved back to their L1 environment after spending several years in the L2 environment. Thirty-six Japanese-English speaking returnee children aged from 7 to 13 participated in a narrative task in Japanese and English, and executive tasks (DCCS, Simon task, and N-back task). Three sessions were included with an interval of one year after the first session, and four years after the second one. Narrative tasks are widely adopted in studies on returnee population to examine their language use (Flores, 2010, 2020; Kubota et al., 2020; Tomiyama, 1999). As a part of a larger research project on

language attrition of bilingual returnee children, the current study focuses on this specific objective and their L2 (English) results only. This study investigates the changes in referential use in returnee children after they moved back to Japan longitudinally, and correlates the results from the narrative task with the results of their executive tasks. As the characterized language experience of returnee children, language exposure changed drastically after they returned to Japan, hence, the effect of English exposure was also investigated for this correlation.

Chapter 2

Previous literature on the developmental trajectory of referential use among young children

In this current study, we are interested in the potential interaction between executive function skills and referential use in a specific group of bilingual children, namely, returnee children. Therefore, this section mainly focuses on the previous literature on (a) referential use, (b) executive function, and (c) returnee children respectively.

To start with, why do we use referents? In human connection, language is considered to be a vital component that enables us to communicate with others, and one of the fundamental features of human communication involves the choice of linguistic forms for referential expressions (Serratrice & De Cat, 2020). While doing so, it is essential to choose the expression carefully for what is needed to refer to as well as make oneself comprehensible to others. Interestingly, the same entity could be described by the different linguistic forms, and the same linguistic form could describe different entities (Gundel et al., 1993). A linguistic form that helps the listener or the reader to identify entities in a discourse is known as the referential expression (Chen & Lei, 2013). Expressions such as nouns used with indefinite determiners or numbers (e.g., *a boy* or *one boy*), pronouns (*e.g., she, he, they*), proper names (e.g., *Froggie*), nouns with definite determiners (e.g., *the boy*) are commonly used for referents. The use of referential expressions is one of the central components of communication and an essential part of the study of language development (Serratrice & Allen, 2015).

During communication, the proper use of referents helps us to understand the given information in a context unambiguously. In contrast, the inappropriate use of referents could easily lead to ambiguity or confusion for the listener. For example,

(A), "A girl with blond hair and another girl with ginger hair went into a flower store, and *she* bought some lilies."

(B), "A girl with blond hair and another girl with ginger hair went into a flower store, *and the blond girl* bought some lilies."

In sentence (A), the speaker might be aware of which character the referent pronoun "*she*" refers to; however, the referring remains unclear to the listener— "*she*" in this sentence refers to either the girl with blond hair or the other girl with ginger hair. To avoid this ambiguity, it is necessary to choose an explicit referent, such as the use of a noun phrase "*the blond girl*" as expressed in the sentence (B). In other words, this process reflects a choice of a more informative noun phrase (*the blond girl)* over a reduced informative expression (*she*). Also, when a speaker tries to convey a message to a listener, the speaker must consider how the latter's understanding is during the communication. So, in order to produce the proper referent, the speaker needs to take the listener's contextual knowledge into account, which requires not only linguistic competence but also non-linguistic domain-general control. To sum, the speaker was required to get executive function involved in this process and to choose the most appropriate expressions among other alternatives (Barber & Carter, 2005). Executive function refers to a mechanism that in the use of managing the cognitive processes in order to avoid possible interference and ambiguity (Miller, 2000; Miller & Cohen, 2001), which indicates that the use of referents in a context involves from pragmatics to discourse and asks for the speakers to understand the ongoing world around them. Hence, the related literature of these two main ideas, the use of referential expressions and executive function, will be reviewed and presented in this section respectively.

2.1 Referential Function and Expressions

In this current study, we adapt the concept of referents grouping which was brought up by Bamberg (Bamberg, 1987). According to Bamberg, referents can be grouped into three categories: introduction, maintenance, and reintroduction based on their functions, which has a great impact on how the listeners comprehend the information without ambiguity. The speaker uses a linguistic form that takes into account how the listener comprehends, and this linguistic form differs depending on whether the character is mentioned for the first time or the second time, as well as how recently it has been mentioned (Colozzo & Whitely, 2015).

Then we adapt from the work of Orsolini (1996) and Colozzo & Whitely (2015) for the functions of referents. Firstly, the introduction of referents is used to introduce an entity or a character for the first time in a context. Some certain linguistic forms, such as indefinite noun phrases or indefinite pronouns, are usually used in the introduction context to indicate newness. For example,

There was *a boy* that carried *two frogs* in a bucket.

The indefinite noun phrase *a boy* and *two frogs* are used as the first mention in this sentence.

Maintenance of referents is used for maintaining a noun phrase that has recently been mentioned. Under this circumstance, pronouns including personal pronouns, possessive pronouns, demonstrative pronouns, and relative pronouns, are commonly used to carry out the sustaining feature in the same clause, consecutive clauses, or cross clauses.

For example,

He had a pet dog.

The pronoun "*he*" is used to referring to the same character who has just appeared in the previous sentence.

Finally, the reintroduction of referents in a context has the characteristics of both introduction and maintenance, since the entity has already been introduced and known in the text and has been out of the narrative focus for some time. Linguistic forms such as definite noun phrases and proper names are used to bring the character back to the focus.

For example,

"once there was *a boy* who was holding a bucket with a tortoise and a frog inside it"

"the frog waved goodbye to the tortoise"

…

"and the cat ran away,

the frog was safe",

"while the tortoise was in the bucket *the boy* carried the frog".

The definite noun phrase "*the boy*" is used here to reintroduce the frog's owner who is previously mentioned at the beginning of the story but has been out of the narrative focus for a while.

2.1.1 Previous studies on the development of referential strategy

There has been an extensive amount of work dedicated to the studies on children's development of referential use in different languages, e.g., English, Mandarin Chinese, Japanese, French, Italian, Greece, German, etc. (see Andreou et al., 2015; Chen & Lei, 2013; M. Hickmann et al., 1996; M. Hickmann & Hendriks, 1999; Kail & Hickmann, 1992; Küntay, 2002; Orsolini et al., 1996; Power & Dal Martello, 1986). These studies widely examined how children acquired and developed their effectiveness in producing appropriate referents by taking the listener's perspective into account. In previous studies on referential function, different variables have been found to be related to modulating the acquisition and developmental trajectories. I will discuss some of the key variables below.

Age

A number of cross-sectional studies indicated that age might be playing an important role in the developmental trajectory of referential use in children. However, the literature provides mixed results about at what age children acquire the use of referential expressions. Although age seems to modulate the development of referential expressions (see M. L. Hickmann et al., 2015; Matthews et al., 2012; Serratrice & Allen, 2015; Serratrice & De Cat, 2020), it is uncertain at what age the use of referential expressions is acquired—even among those studies employing the same tasks, such as the narratives.

Earlier work (Bamberg, 1987; Orsolini et al., 1996; Power & Dal Martello, 1986) suggested that a major developmental change in referential expressions occurred at quite a young age. The seminal work of Bamberg's (1987) for instance, claimed that children learn to use referential expressions between the age of four and five years old. He also examined anaphoric strategies in the study. Anaphoric reference is used in a scenario where a word (or a phrase) refers to a subject mentioned earlier in the discourse. For example,

Lucy went to the flower store. *She* was happy to see that her favourite lilies freshly arrived in there.

She refers to Lucy and was used as anaphoric reference.

The anaphoric strategy, therefore, refers to how antecedent referential expressions influence the speaker's choice of referents. Twenty-five German-speaking monolingual children with ages ranging from 3;6 to 10;1 participated and were divided into three different groups based on age, including younger (3;6 to 4;1) middle (5;0 to 6;2) and older (8;10 to 10;1) group. In the test session, participants were asked to narrate the wordless booklet "*Frog, where are you?*" (Mayer, 2003). The book "*Frog, where are you?*" tells a story about a frog that escapes from its owner boy, and his pet dog, and goes on an adventure on his own while the boy and the dog search for the frog. Participants took part in four phases of story-telling tasks. The test session was conducted in multiple phases in order to familiarize the story to the children and to establish a baseline for each child's referential strategy use. The study examined how antecedent referential expressions influence the speaker's choice of referents. Their findings indicated that children preferred to employ noun phrases for reference introduction and reintroduction, while reference maintenance was accomplished by using pronouns or null forms. There were also no significant developmental differences in reference introduction and maintenance among the three different age groups. In other words, children were able to express reference introduction and maintenance by using noun phrases as early as 4 years old. Nevertheless, differences among the groups were found for the referential function of reintroduction context. Three-year-old German monolingual children used semantically less restrictive forms, such as personal pronouns in the reintroduction context for main characters, while older children (age 9 and 10) preferred to use noun phrases to reintroduce both main and side characters in the story plot, showing that they were less affected by the importance of a character under the contextual situation. Hence, the results indicated that the developmental change in referential expressions occurred at a young age, approximately between four and five years of age. In a similar vein, Power & Dal Martello (1986) suggested

that Italian-speaking 5-year-old children were already able to follow the correct rules in referencing, though some errors were made.

Moreover, Orsolini's study, later on, corroborated Bamberg's (1986) claim that children as young as four can differentiate the functions between maintaining and reintroducing referents (Orsolini et al., 1996). In order to take a better look at Bamberg's claim and to provide further evidence of a developmental trend in the reintroduction of referents, Orsolini examined how monolingual Italian-speaking children produced referents in the reintroduction at different ages by employing a narrative task. In his study, one hundred Italian-speaking monolingual children were recruited from preschool or elementary school in Italy, ages ranging from 5 to 10 years old. Five groups were divided based on their age, including the first group with an average age of 4 years old (4;3 to 4;9), the second group with 5 years old (5;3 to 5;9), the third group with 6 years old (6;4 to 7;3), and the last group with children of 8 years old (8;3 to 8;9). Participants were asked to narrate the same picture book "Frog, where are you" (Mayer, 1969) as in Bamberg's study. Results showed that, compared to the children aged six, eight, and ten, 3- to 4-year-old children primarily used null forms instead of noun phrases to express reference reintroduction. Results from the study also indicated that as children grew older, they seemed to use more appropriate referential forms in the reintroduction context. This finding supported Bamberg's claim that, firstly, children as young as four years old could differentiate the use of linguistic structures depending on the context. Secondly, younger children were more likely to use either a personal pronoun or a null form in the reintroduction context. The main difference in methodology was pointed out between Orsolini's study and Bamberg's, that the former coded for both main characters and other characters with referents, while the latter only coded for the main characters. Despite such methodological differences, interestingly, they came to a similar conclusion that the referential expressions were acquired at quite a young age.

Despite the findings of Bamberg and Orsolini, results from other studies suggested that children did not acquire referential expressions until six years old or even later (see Chen &

Lei, 2013; M. Hickmann, 1991; Hickmann & Liang, 1990; Kail & Hickmann, 1992; Karmiloff-smith, 1985; Küntay, 2002; Warden, 1976, 1981; Wigglesworth, 1990; Wong & Johnston, 2004).

For instance, Hickmann (1991) , examined the narrative abilities of 120 English-speaking children, ranging from 4;7 to 10 years old. Children were asked to complete a narrative task by telling two short stories to a researcher who was not aware of the content. The findings showed that there were differences between younger and older children in the choice of referential expressions. That is, instead of using indefinite nominals, the younger children tended to use definite nominals and nominals with indefinite determiners for introducing a character, sometimes even in repetition from page to page, which indicated that they still had not fully acquired the use of referential expressions. As for reference maintenance, even children as young as age four used pronouns and null forms to maintain the same character, indicating that children have begun to take discourse information into consideration when making referential choices. Compared to the results of Orsolini (1996), Hickmann's results indicated that even children old as seven years old had not yet fully acquired the use of appropriate linguistic forms of referential function. Along with Hickmann's findings, Wigglesworth (1990) indicated that critical age for the acquisition of referential expression took place at eight years old, while Kail and Lopez (1997) suggested it was nine, Wong & Johnston (2004) and Küntay (2002) indicated it was seven. In conclusion, children's mastery of referential function seemed to be a late development.

Age has always been an important factor in different domains of linguistic studies, and so has the developmental trend in the referential choice of young children over the past several decades. Previous research has extensively investigated the developmental trajectories of referential use in childhood, however, the conclusion of at what age referential expressions are fully acquired remains inconsistent, sometimes even controversial. The debate between the acquisition of referential use in earlier childhood (before age five years old, see M.

Bamberg, 1986; Orsolini et al., 1996) and in later childhood (after age five years old, see Hickmann, 1991, 1982) still draws researchers' attention at some point.

Bilingualism

The literature discussed above provided a general point of view on developmental trends in the use of referents, which mainly concentrated on young monolingual children. In this section, I will discuss about the developmental trajectory of referential expressions in bilingual children. Much focus in this area of research has been on children who acquired two languages simultaneously from birth or at a very early age (Chen & Lei, 2013; Chen & Pan, 2009; Orsolini et al., 1996; Serratrice, 2007, 2007; Serratrice & Allen, 2015; Serratrice & Hervé, 2015; Sorace et al., 2009). Two seminal works that explored the potential influence of bilingualism with different language combinations on the developmental trend of referential expressions will be reviewed below.

Serratrice (2007) conducted a study to examine the use of referential expressions in a context by using a narrative task in eight-year-old Italian-English speaking bilingual children and their monolingual peers. The participants were divided into three groups: (a) 7-10 years old Italian-speaking monolingual children (b) 7-9 years old English-speaking monolingual children and (c) 7-8 years old Italian-English speaking bilingual children. The participants were instructed to narrate the wordless book "Frog, where are you?" (Mayer, 1994). The results showed that bilingual and monolingual children used referential expressions similarly in reference. Both Italian monolingual children and bilingual children were more likely to use the post-verbal form to introduce a new character since both languages preferred to introduce a new character using indefinite noun phrases in the post-verbal position. In reference maintenance, bilingual children and monolingual children performed similarly — monolingual and bilingual children used overt pre-verbal subjects in English and null forms in Italian. Additionally, there were no notable differences between the monolingual children and the bilingual children in their use of referential expressions for the reintroduction context,

since both languages used definite none-phrases in pre-verbal position to reintroduce the character. Hence, the findings together show that English-Italian speaking bilingual children behaved quite similarly to their monolingual counterparts in both Italian and English, suggesting that simultaneous bilingual children who were exposed to two languages regularly from birth were able to achieve a high level of referential strategy in each of their languages.

Similarly, Chen and Lei (2013) conducted a narrative task to examine nine-year-old bilingual children and their monolingual peers' production of referential expressions. In comparison to Serratrice's work, Chen and Lei focused on Chinese-English speaking bilingual children, which is more distant typologically than English and Italian (Yip & Matthews, 2010). In doing so, they recruited ninety children in total, and divided into three groups equally based on the language(s) they spoke, including Chinese-English bilingual children ages ranging from 8;7 to 10;9 (mean age 9;3); monolingual Mandarin Chinese-speaking children from China, with age ranging from 8;10 to 10;5 (mean age 9;1); and monolingual English-speaking children age ranging from 8;7 to 10;7 (mean age 9;5). Adapted from Serratrice's (2007) methodology for data collection, the participants were interviewed by a Chinese-English bilingual researcher, and were instructed to narrate the same picture book "Frog, where are you*?*" (Mayer, 1969). Regardless of the same methodology administered, their results showed quite some different patterns from Serratrice's (2007), in which significant differences were found between the Chinese-English speaking bilingual group and both of the monolingual groups in Chinese and in English and showed in choosing the preferred referents in discourse between the two monolingual groups. To be more detailed, the bilingual group differed from the English-speaking monolingual group in the distribution of choosing referents to introduce a new character, and from Chinese-speaking monolingual group to reintroduce the character. In comparing between the bilingual and monolingual groups, first of all, the bilingual group differed from the English-speaking monolingual group in reference introduction but not from the Chinese-speaking monolinguals and differed from the Chinese-speaking monolingual group in reference reintroduction but not from the English-speaking monolingual. And then, in reference maintenance, the bilinguals shared similarities with their monolingual peers in both English and Chinese, which indicated that there were no

significant differences between the bilingual and monolingual groups in both language groups. Also, robust differences were found in choosing the preferred referents in introducing, maintaining, and reintroducing a character into a discourse between the monolingual groups in Chinese and English. The results were denoted as a suggestion that simultaneous bilingual children who acquired two typologically distinct languages were more likely to confront more difficulties than their monolingual peers and less distinct language combination, for the different properties and usages in each language seemed to present additional problems for the child to deal with. Bilingualism might lead them to be lagging behind their monolingual peers (Qi, 2010; Yip & Matthews, 2000), which was exhibited in the sense of referential function for instance (Chen & Lei, 2013). Even though the results showed above seemed to suggest that bilingualism might help to skew the developing track in referential function compared to their monolingual peers, after all, simultaneous bilinguals were able to achieve a remarkable level of referential function for each of their languages, where they were considered to be able to separate the two languages from a very early age yet develop interdependently (Álvarez, 2003; Meisel, 2001; Müller & Hulk, 2001). Moreover, the bilingual children might have taken the advantage of dealing with the intervention between the two languages that they were growing up with so that they were able to enhance their abilities in executive function (Ye & Zhou, 2009).

The studies reviewed above indicated the complexity of trajectory in the developmental trend of the referential function of simultaneous bilingual children. Apart from the comparison between bilingual children and monolingual children, to explore the various influences that affect referential function, more factors may need to be observed. It is notable that different language combinations may have different effects on children comparing the studies of Serratrice (2007) and Chen and Lei (2013). Hickmann suggested that the development of acquiring the use of referents may vary from language to language (M. Hickmann, 1991). For example, a different developmental tendency was shown in reference introduction between Chinese-speaking children and English-speaking children, that Chinese children have acquired the use of noun phrases in reference introduction later than English children, given the different properties in referential expressions between Chinese and English. In Chinese,

noun phrases and different word order are allowed in reference introduction, while pronouns, nominal, or nominals with demonstrative determines were preferred in reference maintenance, mostly placed in preverbal position. Reviewing the two studies above gives the impression that bilingual children with two typologically different languages seem to be affected in their referential function development. While this effect might be a result of different factors, for example, cross-linguistic influence.

Cross-linguistic influences

The influential role of the cross-linguistic momentum of bilingual speakers has gained more and more attention in the last three decades. In this present study, cross-linguistic influence (CLI) refers to the influence on exhibited behavior that could be attributed from one language to another among bilingual speakers, other than the development also appearing and noted in monolingual speakers. For example, in a study investigating the choice of genitive forms between Japanese-English speaking bilingual children and their English-speaking monolingual peers after the former returned to their first language dominant environment from some residential years in their second language dominant environment, Kubota et al suggested that the changes happened to the bilingual children under the circumstance of extreme reduction in the input of English could not be attributed to cross-linguistic influence alone, both cross-linguistic influence and general processing consideration together to show the impact (Kubota et al., 2020).

The previously reviewed work of Serratrice (2007) offered a cross-linguistic view by examining the use of referential expressions on discourse context using a narrative task, among Italian-English speaking bilingual children and their monolingual peers. Even though positive evidence from earlier results (Serratrice et al, 2004) showed that English may have effects on producing and interpreting overt pronominals in reference maintenance when it came to the circumstance of English-Spanish or English-Italian bilingual children. Nevertheless, the differences were not significant between the bilingual and monolingual

groups overall, except that the cross-linguistic differences were found in the distribution of null and pre-verbal overt subjects. The mixed results were considered to be explained by the unbalanced language exposure and language dominance. Also, the referential strategies of the bilingual group who were living in Italy might have been influenced by getting more Italian exposure than English.

A later work by Sorace et al, (2009) examined factors that influence CLI on the acceptability of pronominal subject forms in maintenance and reintroduction contexts in bilingual children. They compared two groups of bilingual children, Spanish-Italian bilinguals (age range from 8 to 10) recruited from Spain, and English-Italian bilinguals (age range from 6 to 7) from UK and Italy, with three monolingual groups (a) English monolingual adults (b) English monolingual children, and (c) Italian monolingual children as control groups, 167 children in total. They administered an acceptability-judgement task (AJT) on the use of pronominal subject forms in maintenance and reintroduction contexts, in both English and Italian. The results showed that both monolingual English adults and children performed at the ceiling for choosing the appropriate overt pronouns in maintenance, while the Spanish-Italian and English-Italian younger bilingual children in UK and Italy showed lower accuracy compared to the other groups. Similar group differences in AJT performance were found for the overt pronoun choices in the topic shift (reintroduction) condition, suggesting that age and the majority language influenced bilingual children's performance on the AJT. In terms of their performance in Italian, monolingual children used more overt pronouns than the English-Italian bilinguals and the Spanish-Italian bilinguals in the maintenance context. This result was in line with Serratrice's (2007) findings that English-Italian speaking bilingual children accepted more overt pronominal subjects in the maintenance context than their Italian monolingual peers. Most importantly, Spanish-Italian bilinguals also over-accepted overt pronominal subjects, suggesting that CLI could not fully explain the acceptance of redundant overt pronouns in both groups of bilingual children. Other factors such as age, input, language combination, and language dominance had significant effects on bilinguals' referential processing.

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In view of all that has been mentioned so far, one may suppose that CLI was either significant or insignificant in the developmental trend of referential choices in young children, however, along with other predictors, such as age and bilingualism that had been reviewed earlier, various factors could be influencing or working together to modulate the process in the sense of acquiring and using referents. In fact, the extensive studies and mixed findings yielded more investigations, yet all together seemed to present us with a complex map of how different predictors could be affecting young children in acquiring and developing referential expressions in different ways.

2.2 Executive function

Chen and Lei (2013) cast doubt on whether cognitive process determined children's choices on referential expressions in both bilingual and monolingual groups. As a matter of fact, discussions on the influence of cognitive skills in choosing referents among children, even at an early age, increased expeditiously in the last three decades. The production of referential expressions appears to be in need of choosing between different alternatives, which may involve domain-general cognitive processes, namely executive function. Executive function, also known as executive control or cognitive control, refers to a set of cognitive processes that allow individuals to regulate their thoughts and behaviors directed by the specific goal(s) (Carlson et al., 2013; Miyake & Friedman, 2012). In the last few decades, extensive theories and models of executive function have been brought up and developed sophistically associated with psychological subdisciplines. Among others, the unity and diversity model (Miyake et al., 2000) has been widely accepted and adopted, especially in studies that examine cognitive effects. The model focused on three often postulated components of executive function: (a) shifting, the flexibility to switch tasks with different cognitive demands; (b) updating, to monitor the working memory constantly or adding/deleting the contents while working with it; (c) inhibition, to suppress the unrelated responses. In their study, it was concluded that the three target functions appeared to be distinguished from each other yet had certain fundamental representations in common at the same time, indicating that

these executive functions (shifting, updating/monitoring, and inhibition) were separable yet interlinked and affected each other.

Empirical studies over the past three decades indicated that from a very young age, even before preschool, various aspects of executive function started to immerge and keep their own development until early adulthood, despite significant individual differences (Carlson et al., 2013; Davidson et al., 2006; Mazuka et al., 2009; Rubia et al., 2006). As a set of cognitive processes, executive function plays a critical role in everyday life, enabling individuals to plan and achieve their goals, whether the goal is short-term or long-term, simple or complex (Mazuka et al., 2009). With the importance and necessity of executive function for human beings and the frequent use of it in everyday life, much work has examined the relationship between executive function and language. Different models in different cognitive domains have been developed in the last few decades, such as language switching in bilingualism, language processing, syntactic parsing (for more information, see Bialystok et al., 20080707; Hussey & Novick, 2012; Mazuka et al., 2009; Novick et al., 2005; Ye & Zhou, 2008), and so on. In the domain of language use, the speaker might largely be depending on executive control for choosing the appropriate linguistic form over competing alternatives (Badre et al., 2005), while bilinguals may also need to use executive control to select one language over the other in a given time (Hernandez et al., 2001).

Specifically, Ye and Zhou (2009) suggested executive control was practiced in order to avoid equivocation and confusion in the linguistic domain that might happen in the given context. Ye and Zhou (2008) conducted a study on the relationship between executive control and real-time sentence comprehension among 29 Chinese-speaking college students. They examined participants' sentential reanalysis process when encountering a conflict in a given context using the event-related potential technique (ERP). Four conditions, the active plausible sentences, the active implausible sentences, the passive plausible sentences, and the passive implausible sentences were provided to the participants. Including the active plausible condition gave a set of reasonable events which was described based on the real

world, in the active voice, the passive plausible condition expressed the same event in the passive voice; the active implausible condition came from the active plausible condition only reversed the subject and the object, which became an even that was unlikely to happen in the real world, in the active voice, while the passive implausible condition told the same event, only in the passive voice. For example, the passive implausible condition would be translated into English as below, which was unlikely to happen in real life:

Passive implausible: the policeman *bei (passive)* the thief *was kept* in the police station.

Translation   : the policeman was kept in the police station by the thief.

Additionally, the color-word Stroop task (MacLeod, 1991; Stroop, 1935) was administered to measure their executive control. The results indicated a positive association between their performance on the color-word stoop task and ERP measures, indicating that the participants with advanced executive function abilities were likely to show better performance of reanalyzing and resolving the conflicts when they appeared in a passive implausible context for instance.

Previous studies on the association between executive function and referential use

It has been postulated that the processing of referential expressions also may rely partially on executive function, since the recognition and use of appropriate referents in a given context required one to avoid ambiguity and misunderstanding. More recently, empirical studies examined the association between executive function and referential expressions. For example, Serratrice and De Cat (Serratrice & De Cat, 2020) examined how young monolingual and bilingual children produced referential expressions in a complex communication task, and how factors such as executive function, working memory, language

proficiency, and language exposure affected the production of referents. Eighty-five English-speaking monolingual children and eighty-seven bilingual children who were additionally exposed to a language other than English (age range from 5 to 7) participated in a complex referential production task, in which the linguistic mention and the visual presence of a competitor (alongside a target referent) were manipulated. In addition, the backward Digit Span task (Wechsler, 1991) was used to test the participants' verbal working memory, where they listened to a series of digits and repeated them in a backward sequence. The Simon task (Simon & Wolf, 1963) was administered to examine their executive function ability. The results showed that, first of all, executive function played a significant role in predicting the use of noun phrases in discourses. And then, both monolingual and bilingual children who had better executive function skills produced more noun phrases in a context where a competitor was mentioned. This indicated that those who were better at resolving conflicts between potential referents exhibited better chances to choose the appropriate anaphoric referential expressions. In sum, their findings highlighted the importance of executive function skills in choosing referential expression among young children, in both monolingual and bilingual groups.

Moreover, Torregrossa et al (2021) explored the influence of executive function and other potential factors from a different angle. Instead of comparing bilingual children with their monolingual peers as a control group, they did a study on the different patterns of the choices on referential expressions among bilingual children (age range from 7;2 to 13;1) by comparing the bilingual children to each other with different language combinations in addition to Greek. They also measured executive function skills of the participants via the *2-back task* (Jaeggi et al., 2010; Kirchner, 1958). Children needed to choose the same number that appeared two items back, and language proficiency with a Greek vocabulary task. The results suggested that children who achieved lower executive function scores had more difficulties in choosing the appropriate referential expressions than those who achieved higher scores. In addition, the results also highlighted the important effect of language experience on referential use in bilingual children. The more dominant language of the

bilingual children, either Greek or the non-target language, determined the difference in referential use.

To date, the literature reviewed above altogether gave the impression that the influential predictors such as age, bilingualism, and cross-linguistic influence on acquiring referential expressions among young children were investigated more in-depth than the effect of executive function. Researchers dedicated a large proportion of literature on the subject of referents, only a few of the most relevant was presented due to the research purpose and word limitation yet exhibited a broad picture of it, indicating the complexity of it in almost every possible perspective. Nevertheless, evidence was still inadequate regarding the association between executive function and choices of referential expressions in young children, how did executive function interlink with, and even, if possible, influences the speaker's choice towards referential expressions in a given context? The association between the two and their underlying mechanism call for a closer investigation.

Returnee children are considered to be a special group of bilingual children who move back to their L1 environment after spending their early childhood in an L2 language environment with a limited L1 setting such as a home or a small community. With such a unique setting, such as the baseline of individual default active bilingualism and L2 exposure, provides us with a different possibility to investigate the potential correlation between the use of referential expressions and executive function skills. In this present study, a longitudinal design with an approach to examining executive function skills and referential use in a particular bilingual group, namely, returnee children will be presented below. To our knowledge, this is one of the first attempts to investigate returnee children's referential choices longitudinally while taking their executive function skills into account.

2.3 Returnee children

Who are returnee children?

Typically speaking, returnee children are a special group of bilingual children who move from their native language environment to a foreign language dominant environment, which normally becomes their second language, and they return to their native country after spending some significant years in their formative period (Flores, 2010; Flores & Snape, 2021; Kubota, 2020; Kubota et al., 2020, 2021; Yoshitomi, 1999). Under these circumstances, returnee children have to confront significantly reduced exposure to their native language when they immigrate to the foreign environment. The exposure to their native language is often limited to a home setting or a small community potentially, at the same time, they are likely to get more exposure to the majority language from the wider community. To put it simply, in this present study returnees refer to the children from immigrant families who were prolongedly exposed to a naturalistic environment of their second language (English) and then moved back to Japan, their native language (Japanese) environment. Returnees fall into a special category of child bilingualism, by its nature of the relatively uncommon bilingual experience, which provides us a natural setting to track down their developmental trend in each of their languages, even in different aspects. It makes a longitudinal approach more feasible in two ways, firstly, the baseline of individual default active bilingualism is easily captured in this group of children, which happens to be the time when they return to their native language environment; secondly, the longer time they stayed in their native language environment, more default active bilingualism decreases.

Previous studies on returnee children

Studies on returnee children were still limited, the previous studies mainly focused on second language attrition (Flores, 2010; Flores & Snape, 2021; Kubota, 2020; Tomiyama, 1999, 2009). The term attrition was first acknowledged around the 1980s, which generally refers to

the loss of one's language use when they do not get exposed to that language or language environment as frequently as they once had. For example, Tomiyama (2009) did a study to investigate the difference in the degree of second language attrition with two Japanese-English speaking siblings (age 10;0 and 7;0 when they returned to Japan after a more than four-year stay in an English-dominant speaking country) using a narrative task ─ storytelling over the period of 31 months. The results showed that their lexical and grammatical knowledge was generally maintained except for some fluctuations. Similar attrition patterns showed in two siblings, suggesting the importance of acquiring literacy skills in maintaining L2 proficiency.

The previous studies on how returnee children's executive function skills correlated with language in different domains are seminal yet still limited. For example, Kobuta's (2020) longitudinal study on how losing access to a second language would affect executive function was examined by a category verbal fluency task. The participants were 36 Japanese-English speaking returnee children, and the results indicated that inactivated bilingual activities showed correlation with weakened effects in children's executive function development. On the one hand, returnee children who remained to get exposure to English were more likely to improve their executive control in updating and monitoring than those who failed to sustain that exposure after returning back to Japan. This suggested a possibility that the ability of updating and monitoring of executive functions might be affected by not only the increasing exposure of L2 from the earliest age but also vulnerability to the instant influence of the decreasing exposure of L2 later on. On the other hand, however, the continuous exposure to their second language did not show an influence on modifying their executive control in inhibition, indicating that the access to English did not modulate the development of inhibition ability. Note that children's executive function generally improves with age growth. Nevertheless, the results highlighted the significance of continuous second language exposure for returnee children, and the amount of reduction in L2 exposure showed consequences on young children's executive function development.

Furthermore, Flores' (2020) study looked at the dynamic nature of childhood language in attrition and reactivation by analyzing oral speech. The participants were 14 Portuguese-German speaking returnee children who grew up in Germany and reimmersed in German after they returned to Portugal for four years. The results indicated that returnee children's language competence was highly susceptible to language exposure changes, especially in childhood, which did not only affect their first language at a home setting but also their second language, which happen to be the majority language of the society. Additionally, age and language exposure largely affected language retention in childhood.

With such unique properties remaining within, returnee children showed us different possibilities associated with the linguistic domain. However, studies on returnee children were still scarce. Yet they provided us a new angle to explore certain new topics and existing ones by their own special nature in bilingualism. In that case, focusing on this particular population might help us to take a closer look at whether the developmental trend of using referential expressions would be affected by executive control. In this current study, three independent lines that have been presented earlier, including executive function, referential choices, and returnee children, will be combined together to explore new possibilities in the long debating topic of acquiring referents in childhood. Therefore, the influence of executive function in acquiring referential expressions among returnee children and the latent association will be discussed below.

Chapter 3

Methodology

3.1 Participants

This current study was conducted based on the corpus of *Narratives in Japanese-English Bilingual Children* (Kubota, 2018)*.* The initial sample consisted of 36 Japanese-English speaking bilingual returnee children, who acquired Japanese from their Japanese-speaking parents from birth, and all speak English as their L2, and they had recently moved back to Japan. Two children dropped out in the second round, and eight in the third round thus were removed from the final sample which consists of 28 participants. All children's parents speak Japanese as their native language, and they all have the similar socioeconomic backgrounds (at least one of the parents had a bachelor's or a post-graduate degree). The average age of the participants was 9;8 years old (range 7;6 – 13;0, SD = 1.42) when they took part in the first test session. The second session was performed approximately one year after the first one, hence the average age was 10;8 (range 8;6-14;0, SD = 1.42). The third round of testing took place approximately five years after the first session, and the average age was 15;2 (range 13;0 – 18;4, SD = 1.42). The average time between their returning and attending first test session was three months (range 0; 1-0; 6, SD = 0.1). The average age of L2 onset was 5;0 years old (range 1; 0-9; 6, SD = 2.5), and all of them had residence in an English-dominant environment and spent 4;0 years (range 2; 0-9; 9, SD = 2.0) there. The participants exported minimal English exposure before they moved abroad, hence, they began to acquire English as a second language after they left their first language environment, Japan. Half of the participants had lived in countries where English is the main language of the society (U.S., UK, Australia), and the other half had lived in a country where English is not the dominant language (Malaysia, France, Netherlands), but still attended school with English as a medium of instruction. All participants acquired English in a naturalistic environment, and

mainly in an English-speaking environment while they lived in their respective locations. Even though some children were exposed to a third language environment (by virtue of living in a country where English is not the dominant language of the society), none of the parents indicated that their children could actually communicate in the third language.

The participants in this study were recruited through Japan Overseas Educational Services (JOES), which provided weekly English maintenance courses for Japanese returnee children. The course was taught by English native speakers and aimed to maintain the returnee children's English skills after their return to Japan. The course was held in each Saturday and lasted for 90 minutes; all the participants took this course in central Tokyo.

3.2 Materials

3.2.1 Background material

Before the children took part in the experiment in each session, a questionnaire Bilingual Language Experience Calculator (BiLEC) was administered to the children's parents to evaluate their exposure to English and Japanese when they were abroad and a year after they returned to Japan. This questionnaire has been widely adopted in previous studies associated with bilingualism to evaluate experimental variables (Correia & Flores, 2017; De Cat, 2020; Hoff, 2018). BiLEC provides specific algorithms regarding the children's relative amount of exposure to each of the two languages in both school and home settings (for more information, please see *Unsworth, 2016*). In general, there are nine sections in the questionnaire, covering from social background information to linguistic background information. Questions relate to the target language and other languages used in school, family, and other activities, in addition, were asked, as shown in detail below:

- General background information, regarding to the child's basic information, including, e.g., the name, gender, place of birth, date of birth, date of arriving the country of residence, siblings (if any) and parents of the child;

- Child's exposure to and use of target language and other language(s), which gives the fundamental linguistic background of the child, e.g., what is the name of the target language, what time was the first exposure to the target (and other) language(s), how is the approximate ability of the child to speak and understand the target (and other) language(s) ;

- Languages spoken by people in (regular) contact with child at home, in order to get a clear picture of language input of the child on a daily basis, the part which concerns with the linguistic background of the family members (or the caregivers) around the child, both target language and other languages were included, e.g., frequency of each person speaks target (and other) language(s) to the child, estimate of each person's ability to speak and understand target (and other) language(s), age of first exposure to target (and other) language(s);

- Languages spoken by child to other people at home, this section along with the next one offer an indispensable view of language output of the participant, e.g., how much target language and other language(s) spoken by child to other people at home;

- Languages spoken outside home, e.g., target (and other) language(s) spoken by current teacher(s) and other children at day-care, present teacher(s) and other children's estimation of ability to speak and understand target (and other) language(s);

- Holidays, e.g., average length of holiday per year the child spends, child's estimate of total quality and quantity of target (and other) language(s) exposure during holidays;

- The person who spends time with child on average day during week and at weekend, e.g., a timetable during a week's time spent at home and outside home for different activities;

- Other sources of language exposure, e.g., the child's average time spent on extracurricular activities per week, such as sports and clubs;

- Amount of language exposure in the past, e.g., the child's target (and other) language(s) exposure in different scenarios in the past.

In the current study, BiLEC was administered to the parents before the experiment with the child, each parent was interviewed by the researcher individually. The questionnaire offers a broad and better view to evaluate the returnee children's exposure to Japanese and English, both when they lived abroad and after they returned to Japan. It quantified the child's language input and output for each language respectively, both at home and outside the home.

3.2.2 Experimental Materials

In order to assess the production of referential expressions, we administered a narrative task, in which all the participants were asked to tell the story of a wordless picture book named "Frog on his own" (Mayer, 1973) in English. This wordless book contains thirty pages without any written text, only the location "city park" was pointed out on the first page. One example from the story plot portrayed in pictures is presented in Figure 1. The thirty pictures in sequential order tell a story about how a frog escaped from his owner, which is a little boy who has some other pets, including a dog on his side and a turtle in a bucket. After he broke free, he then met some other characters, both human beings and animals, long words short, they shared some fun or terrifying encounters, eventually, he was saved by his owner's dog, and they went home happily together. In this story, there were 13 characters in total, human and animal characters, including a boy, a dog, a turtle, butterflies, a bee, a man, a girl, a little boy, the boy's mom, a woman, a baby, and a cat. The reason why this particular book was introduced in the narrative production task was for the specific problems presented to the narrator. With the changing scenes, the narrator needed to change the perspective along with the main character in different scenes, who had encounters with other characters, and those characters might be the previous main character of the last scene. This allowed us to closely observe how would the participants perform in choosing the referents under this circumstance.
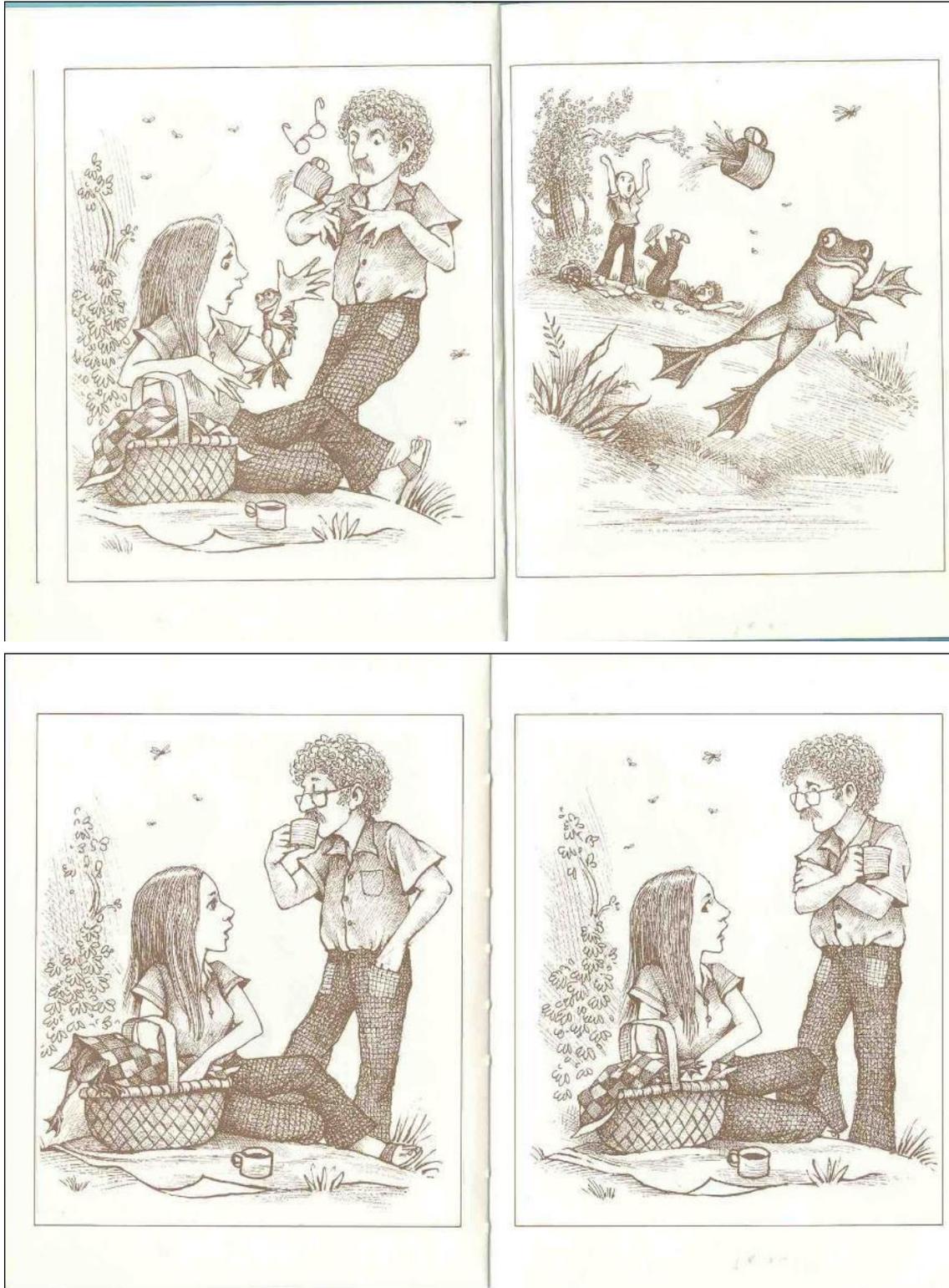
Figure 1 Where the frog tried to hold on to the girl's arm from the book "Frog on his own"

3.3 Instruments and procedure

The narrative task was conducted by a bilingual Japanese-English researcher with the participant alone in a comfortable environment for the participants, either at the child's home or in a classroom provided by Japan Overseas Educational Services (an organization that offers educational help to the returnee children). The child was introduced to the picture book "Frog on his own" (*Mayer, 1973*) and was told to read each picture and then tell the story in their own understanding. Before narrating, the participants were given enough time to prepare themselves as well as go through the pictures, so that they could start whenever they felt ready. In order to minimize shared information, the researcher was sitting in front of the participant to make sure that he (she) was not able to see the images while the participants were narrating. In addition, all participants were told that there would be another adult listening to the recording of their narratives afterward to encourage the participants to narrate in detail as much as possible. The narratives were audio-recorded during the session and later transcribed using CLAN. As for the tasks to measure children's executive function skills, a Japanese-English bilingual researcher shared a conversation with the children in whichever language they felt comfortable with (either Japanese or English). The executive function tasks took approximately 30 minutes to finish for each participant and were administered in a counterbalance sequence. While the executive tasks were conducted the same day as the narrative task and were conducted between the narrative tasks in Japanese and English, e.g., Japanese narrative task - executive tasks - English narrative task or English narrative task - executive tasks - Japanese narrative task. The first session was conducted shortly after the participants moved back to Japan from a foreign environment (mean interval time = 3.6 months), the second session was conducted a year after the first one, and the third session was conducted five years after the first session, using the same administration, including the sequence, location and given instructions. As a part of a larger research project on language attrition of bilingual returnee children, this current study focused on English tests only, and tests on Japanese were not reported here.

3.3.1 Executive function tasks

In this current study, three tasks were administered to measure participants' ability to executive function, including the Simon task, the N-back task, and the DCCS task, which will be detailed below. This compound was prepared by adapting the procedure used by Kubota (2018).

Simon (inhibition)

The Simon task (Simon & Wolf, 1963) was designed to measure the ability to suppress irrelevant reactions and control interference. The Simon task was considered to be one of many complex inhibition tasks that have been used in the developmental literature to measure children's ability to inhibit a prepotent response while responding to a salient conflicting response option (Garon et al., 2008). During the task, participants would see a white background screen with a frog or a shoe in the two corners at the bottom of the screen. The position of the frog and the shoes was counterbalanced across the participants. In each trial, a target (a frog or a shoe) appeared at the top of the screen, either on the left or on the right. The participants were instructed to press the key on the side of the response image that matched the target. In a congruence trial, the position of the target matched the position of the correct response image (e.g., lower-left corner = shoe, upper-left corner = shoe). While in an incongruent trial, the target location did not match the correct response image (e.g., lower-left corner = shoe, upper-right corner = shoe). Therefore, the incongruence trials required participants to suppress the location of the target to respond based on its identity. The participants completed 13 practice trials first, and 40 experimental trials after a short break. One-third of the test trial were congruent trials, and two-thirds were incongruent trials. The task was implemented so that the target disappeared after a certain period of time. This was tailored based on each participant's reaction time (RTs) in the practice trial, ensuring that the task was equally challenging for all the participants in spite of individual differences in processing speed. The limit was calculated by multiplying the average reaction time in the

practice test by 1.5. The explanations were given in the language that is most familiar to the participants. The participants were asked to press the correct button on the keyboard as soon as possible. The children completed the task in about 5 minutes. The Simon effect was calculated by subtracting the average reaction time on the congruent trials from the incongruent trials.

N-back (updating)

The N-back task (adapted from Chevalier, 2018) was designed to measure the ability to update information in working memory and monitor sets of tasks. In this task, children viewed a series of images exhibited one at a time, and they pressed the space bar each time the current image matched the displayed image *n* trials back. The participants completed all three difficulty levels of the *N-back* task (1-back, 2-back, and 3-back) and each level contained a series of 32 images. On each level, there were four different images (smiley face, cat, house, airplane). These images were presented one at a time for 1,500 ms, followed by a fixation cross of 500 ms. Each image was displayed eight times on each level in random order. The participants were required to press the space bar if the same image was presented one trial back (1-back), 2trials back (2-back), or 3 trials back (3-back). In order to allow the participants to familiarize themselves with the simplest level (1-back), then the most difficult level (3-back), the order of the three levels was fixed. In each level, there were 8 target images (paired) and 24 non-target images (unpaired). The participant had 1,500 ms to press a spacebar before the target disappeared. When the participant pressed the space bar on the target image, a green check mark appeared as positive feedback. Conversely, if the participant pressed the space bar on a non-target image, a red cross appeared as negative feedback. Correct trials are when the participant pressed the space bar on the target image (i.e., hit trial) or did not respond to the non-target image (i.e., correct rejection). Trials were regarded as incorrect when the participant failed to press the space bar on the target image (i.e., miss trial) or responded to the unmatched image (i.e., false alarm). After completing each block, the total percentage of both correct and incorrect answers was displayed on the

screen. There was a practice test before each trial and a short break between. The accuracy was recorded as 1 for correct response and 0 for incorrect response. Response time and accuracy were collapsed across all three levels and used for further analysis.

DCCS (switching)

The Dimensional Change Card Sorting (DCCS) task required participants to switch flexibly between classifying stimuli based on color or shape. The task-switching task such as DCCS, requiring multiple cognitive processes and showed the greatest effect of bilingualism. In this current study, the advanced DCCS task (adapted from Chevalier, Blaye, Dufau, & Lucenet, 2010) was conducted to measure children's shifting abilities. In each trial, the participants selected answers based on visual cues (i.e., color cues: boxes with different colors; shape cues: boxes with different shapes), in which an image with the same color or shape as a target image. For example, if a color cue was displayed with a red bear stimulus, the participant must press the button with a red object (*not* a bear). Mixed blocks included switch trials (color-shape or shape-color) and repetition trials (color-color or shape-shape). In addition, one-third of the trials were switch trials, and the other two-thirds were repetition trials. The response options were a red-bear and a blue-car placed in the lower left or lower right corner of the screen (the position is counterbalanced). The participants gave a response by pressing the key located below the response options. The task included a total of 84 experimental trials under three blocks: color-only, shape-only, and mixed-color and shape. The color- and shape-only blocks were counterbalanced but always preceded the mixed-color and shape block. Each block included 20 experimental trials and 5 practice trials. The mixed block consisted of 44 trials divided into two blocks with 22 trials each, followed by 16 practice trials. The cost of switch was calculated by subtracting the response time of the repetition trials from the switch trials. Mixing cost was calculated by subtracting the reaction time of single trials (block-color and shape) from repetition trials in the mixed block. The accuracy was coded as 1 for the correct answer and 0 for the incorrect answer.

To summarize in chronological order, the experiment administered in this current study consisted of three main sections. The first one was a parental questionnaire called BiLEC, and then a narrative task to test children's use of the referential expression, the last one was a compound test including the Simon task, the N-back task, and the DCCS task, together to qualify children's executive function. There are three test sessions in total, and all of them using the same administration, including the sequence, location, and given instructions.

3.3.2 Reference encoding

Referential expressions

The type of referential expressions was determined by the lexical form used to refer to the characters in the story. The classification system of coded referential expressions used in this study, which will be detailed and explained below, was developed by Colozzo and Whitely (2015), who adapted the system from Halliday and Hasan (1976) and Gundel et al. (1993).

A.   Indefinite nominals: Includes nouns used with indefinite determiners (e.g., a boy), numerals (e.g., one frog), or a colloquial use of this (e.g., Once upon a time this frog jumped out of a bucket).

B.   Indefinite pronominals: Indefinite and interrogative pronouns (e.g., everybody, all, who, which).

C.   Identifiable nominals: Includes nouns which are used with definite or demonstrative determiners (e.g., the boy, that dog), possessive pronouns (e.g., his frog), nouns marked as possessors using the clitic 's (e.g., the woman's cat), and proper names (e.g., Froggie).

D.   Referential pronominals: Includes personal pronouns (e.g., she, he, they), possessive pronouns (e.g., his, her, their), demonstrative pronouns (e.g., this, that), relative pronouns (which, that, who), and ellipses of the noun phrase (e.g., the frog saw a bug and ø ate it.)

Referential function

After the participants completed the narrative task, we transcribed the audio recording using CLAN and then coded it in a certain way that we can analyze. We coded the referential function according to Colozzo and Whitely (2015), in which all references to characters in the story were encoded for two dimensions: referential functions and referential expressions. Each mention of a role was classified as one of three potential types of referential functions, as detailed in Bamberg's (1987) system below.

E.   First mention / introduction: The speaker mentions a character for the first time in the story.

For example,

"once there was *a boy* who was holding a bucket with a tortoise and a frog inside it".

A boy is regarded as a first mentioned referent since it is the first time this referent has been mentioned in the narrative.

F.   Maintenance: The speaker mentions the same characters in the same clause, consecutive clauses, or cross clauses (as in descriptive statements with existing verbs).

For example,

"and *he* didn't notice the frog slip out of the bucket and escape*"*,

The overt pronoun *he* is maintaining the referent *"a boy"* which was previously mentioned in (E).

G.   Reintroduction: The speaker refers to the previously mentioned character who is temporarily out of focus in the story. If a character is not mentioned in the clause above, it is generally considered a reintroduction. If the speaker goes from referring to several characters as referring to a smaller subset of these characters, a reintroduction can also occur, and vice versa.

For example,

"the frog waved goodbye to the tortoise"

…

"and the cat ran away,

the frog was safe",

*"*while the tortoise was in the bucket *the boy* carried the frog*"*,

the boy was out of the focus since he was mentioned quite some time ago, therefore, *the boy* here plays a role as a reintroduction.

The noun phrases generated by each participant were coded based on two factors: the type of referential expression and the referential function. Each type of referential function (first mention, maintenance, and reintroduction) was considered best performed with the preferred type of referential expression. In general, infinitive expressions (type A and B) are used for first mention, identifiable nouns (type C) are used for reintroduction, and reference pronouns (type D) are used for maintenance.

For example,

(a)   once there was ***a boy*** who was holding a bucket with a tortoise and a frog inside it.

(b)   and ***he*** didn't notice the frog slip out of the bucket and escape.

(c)   while the tortoise was in the bucket ***the boy*** carried the frog.

In the coded transcription, all transcribed data was classified and marked in a certain way, and each transcription fell into the categories respectively. To be precise, *Referential Function* indicates whichever it is to introduce, maintain, or reintroduce a character; the *Syntactic Function* clarifies whether the character in the context is a subject or an object, *Reference* specifies what referential expression the participant produces; the *Primary or Secondary* points out what role did the character play in that scene; *Main or Subordinate* clause to provide more information on the production, and finally, *Distance to the last same referent* refers to how many sentences between the same referent were mentioned.

Table 1 provides an example of coding the transcriptions in the corpus of *Narratives in Japanese-English Bilingual Children* (Kubota, 2018):

Table 1 Example of transcription

Subject	Sentence	Context	Syntactic Function	Reference	Primary or Secondary	Referential Function	Main or Subordinate	Distance to last (same) referent
biengone4	there was a boy that carried two frogs in a bucket	FM	subject	a boy	P	IN	Main	0
biengone4	there was a boy that carried two frogs in a bucket	FM	object	two frogs	P	IN	Main	0
biengone4	he had a pet dog	M	subject	he	P	RP	Main	2
biengone4	he had a pet dog	FM	object	a pet dog	P	IN	Main	0
biengone4	he was going to the city park	M	subject	he	P	RP	Main	2
biengone4	his dog became [: was] [*] chasing butterflies while one of his frogs jumped out <to do &+s> [/] to &+s	R	subject	his dog	P	DN	Main	2
biengone4	his dog became [: was] [*] chasing butterflies while one of his frogs jumped out <to do &+s> [/] to &+s	FM	object	butterflies	S	DN	Main	0
biengone4	his dog became [: was] [*] chasing butterflies while one of his frogs jumped out <to do &+s> [/] to &+s	R	subject	one of his frogs	P	IN	Subordinate	6
biengone4	and then he went to say goodbye to the boy	M	subject	he	P	RP	Main	1
biengone4	and then he went to say goodbye to the boy	R	object	the boy	P	DN	Main	5
biengone4	he found some flowers	M	subject	he	P	RP	Main	2
biengone4	he found some flowers	FM	object	some flowers	S	IN	Main	0
biengone4	he found something to eat	M	subject	he	P	RP	Main	2
biengone4	he found something to eat	FM	object	something	S	IP	Main	0
biengone4	so he stuck his tongue out	M	subject	he	P	RP	Main	2
biengone4	so he stuck his tongue out	FM	object	his tongue	S	IN	Main	0

In this current study, we only included the animate characters in the transcription, such as the frog, the dog, the boy, the butterflies, and so on (13 in total), and only coded the English transcriptions for both first session (shortly after they returned to Japan, marked as Time1) second session (one year after the first session, marked as Time2) and third session (five years after the first session, marked as Time 3). Table 1 shows the narratives of the anonymous participant identified as *biegone4* during the first session. In Table 1, the abbreviation FM represents for the referential function of the first mention, M for maintenance, and R for reintroduction. Indefinite nominal is abbreviated to *IN*, identifiable nominal to *DN*, referential pronominal or null forms to *RP,* and indefinite pronominal to *IP*.

Chapter 4

Aims and Predictions

The aim of this longitudinal study was to investigate whether executive function ability has an effect on the use of referential expressions in a special bilingual population, namely, returnee children. And if so, how did executive function predict bilingual returnee children's use of referents? Upon reviewing the previous studies dedicated to the related subject, I predict that firstly, children with better executive function skills would tend to show more efficiency and accuracy in the use of referential expressions. In other words, children who showed better executive function ability are expected to behave more coherently and adult-like in producing referents, even after their return back to the L1 environment (Japan).

Also, cross-linguistic influence is expected in the developmental trend of producing referential expressions, in which negative language transfer from Japanese to English might appear after the returnee children switched from the English environment to the Japanese environment. Language transfer refers to the phenomenon where L1 influences L2 acquisition. And this phenomenon has two sides, one is positive transfer, which facilitates the learning process of L2, and the other one is negative transfer, which impedes it. As a topic pro-drop language, Japanese allows the pronoun to be omitted when it can be deduced in a context.

For example,

In English: The apple pie tastes so good, who baked it?

In Japanese: The apple pie tastes so good, who baked (*it*)?

When returnee children moved back to Japan, their exposure to English would have inevitably decreased from society and other settings, and they produced less English as a consequence. When it comes to referential expressions, they might start producing less target-like noun phrases with identifiable nominal in the reintroduction context; or more pro-drop-like referent in maintenance, where referential pronominals are omitted like some Japanese learners do with their L2 English. So, I predict that it is possible for the returnee children to transfer this feature into referential use in English. Therefore, in reference to maintenance, the child is expected to produce a sentence *going to the city park* instead of *he was going to the city park* after some years returning to Japan (Time2 or Time3).

At last, as an inevitable consequence of returning to the L1 environment, a drastic decrease in L2 exposure is expected, since continuous English exposure would not be guaranteed by the family or the society. Besides the changes that may happen, different English exposure among the participants is also expected, for they do not necessarily have the same background in education or other settings. Note that we introduced BiLEC questionnaire to measure the English exposure of the participants. The important effect of L2 exposure was postulated on returnee children from the previous literature review. Hence, the potential effect of English exposure is anticipated to be observed in the production of referents, that is, participants who experienced continuous English exposure would also sustain their referential strategies, and those who failed to sustain their English exposure would show a decrease in choosing the preferred forms of referents.

Chapter 5

Results

In this section, I will present the results of the production of English referential expressions over the course of three testing sessions and how its change is predicted by experiential and domain-general factors. The first analysis looked at the change in using referential expressions over the course of 5 years with 3 testing sessions, and the second analysis examined what factors predict the change in referential expressions those returnee children used during the testing sessions.

5.1 Referential choice throughout three sessions

Figure 2 provides an overview of the descriptive results over time, split by referential functions (first mention, maintenance, and reintroduction), linguistic functions (indefinite nominals, identifiable nominals, and pronouns), and Time of testing (Time1, Time 2, and Time 3).
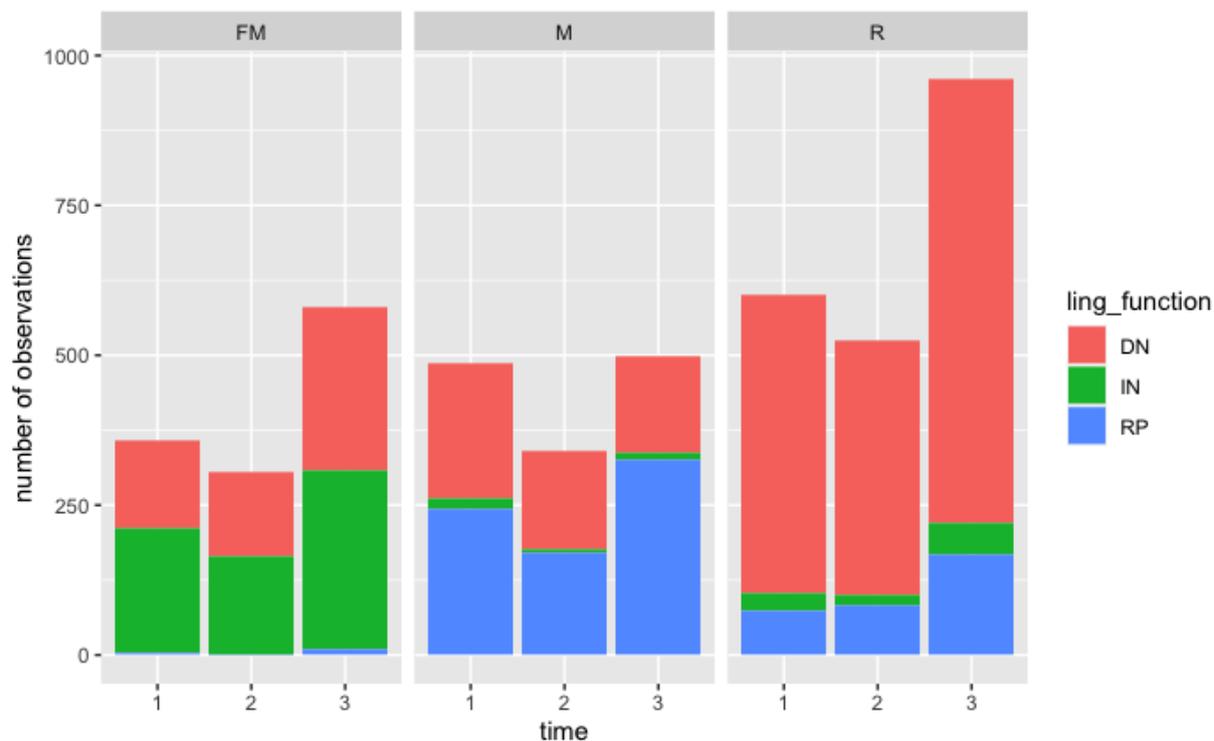
Figure 2 Summary of referential use slip by linguistic function (IN = indefinite nominals, IN = identifiable nominals and RP = pronouns), referential functions (FM = first mention, M = maintenance and R = reintroduction) and sessions (Time1, Time2 and Time3)

a) Time1

Table 2 provides the summary of the total production and the proportion in using referential expressions in returnee children split by time and linguistic function. In the sum of the total use of the linguistic function for the first mention in Time1, the participants mainly used indefinite nominals such as *a boy, one frog*, (*the percentage of the total usage of introduction ≈57.66%*) to introduce a new character, and then identifiable nominals such as *the boy, the frog* (*the percentage of the total usage of introduction ≈41.22%*). While for maintenance, pronouns (*the percentage of the total usage of maintenance ≈50.20%*) such *as he, she,* and *I,* were the most frequently used form, and then identifiable nominals (*the percentage of the total usage of maintenance ≈46.72%*). As for reintroduction, identifiable nominals were

50

mostly used (*the percentage of the total usage of reintroduction ≈83.03%*) to reintroduce the character which has been out of the picture for some time. Pronouns and indefinite nominals were seldomly used, indicating that the returnee children were able to choose the preferred form according to the respective context in a narrative task when they shortly returned to Japan from an English-dominant environment. Note that (A) infinitive nominals are considered to be the most appropriate expression to use in a first mention context (B) pronouns for maintenance, and (C) identifiable nominals for reintroduction. For example, to introduce the owner boy of the frog from the book "Frog on his own" (Mayer, 1973), the preferred forms can be described as below:

(A)   There was *a boy…*

(B)   *He* had a pet dog.

(C)   *The boy* came back for him…

b) Time2

Time 2 data were collected one year after Time1 when changes had taken place. In the first mention context, returnee children used indefinite nominals (*the percentage of the total usage of first mention ≈54.10%*) and then identifiable nominals (*the percentage of the total usage of first mention ≈45.25%)* to introduce a character. Not only did the proportion of identifiable nominals slightly increase compared to Time1 (*the proportion ≈ 41.22%*), but also a decrease was showed in the total production of the nominals, which may indicate that returnee children were getting mixed with the use between indefinite nominals and identifiable nominals in the first mention context during the second session of the testing. However, this needs further analysis with the mixed effect model. Furthermore, as was mentioned earlier in the section on prediction, Japanese allows the pronoun to be omitted when it can be deduced in a context.

Hence, a larger distribution difference was expected in maintenance, where they might start producing less target-like referential forms after a one-year stay in Japan. In other words, they were expected to use fewer pronouns in a maintenance context. The results from Time 2 data seemed to support this anticipation by using fewer pronouns (*n=173*) compared to Time1(*n=245*). However, the percentage of the total use of pronouns in Time2 was found slightly increased compared to Time1 (*Time2:Time2 = 50.88%: 50.2%*). That might indicate that the participants showed vulnerability in using referents when they exposed themselves back to their first language environment in a relatively short period of time. Then for reintroduction, identifiable nominals were used in most cases (*the percentage of the total usage of reintroduction ≈80.73%*).

c) Time3

The data from Time3 was collected five years after Time1. More interesting results appeared. Participants overall produced more referential expressions for the first mention, maintenance and reintroduction compared to the previous two sessions. Children used indefinite nominals (*the percentage of the total usage of the first mention ≈51.64%*) and identifiable nominals (*the percentage of the total usage of introduction ≈46.63%*) for the first mention. They chose pronouns the most to maintain the same character (*the percentage of the total usage of maintenance ≈65.26%*), and then identifiable nominals (*the percentage of the total usage of maintenance ≈32.33%*). Even though they still used identifiable nominals in the maintenance context, the proportion of it decreased considerably compared to Time1 and Time2, indicating the improvement in returnee children for using more target-like referential forms (pronouns) when it came to maintaining referring to the same character. Lastly, they used identifiable nominals the most (*the percentage of the total usage of reintroduction ≈77.19%*) for reintroduction, however, the percentage keeps decreasing over time. And they used slightly more indefinite nominals (*≈5.21%*) and pronouns (*≈17.60%*) in Time 3 compared to Time1 and Time2.

Summary

To conclude the descriptive results from above, returnee children were able to choose the appropriate referents under different contexts according to the respective referential function when they shortly returned to Japan after several years of residence in a naturalistic English-speaking environment. And they have been developing their referential strategies in English generally even after five years spent in Japan. In the total amount of production, participants produced fewer referential expressions in general in Time2 compared to Time1, while they produced much more referents in Time3 compared to both Time1 and Time2. The data through three sessions showed the changes over five years, it is worth noticing that there might be a decreasing trend in producing referential expressions in Time2, both in the total production and in producing target-like forms. But again, further analysis was required with the mixed-effect model. Other than that, the proportion of identifiable nominals in the reintroduction context was decreasing as well.

Table 2 Summary of the total production and proportion in using referential expressions in returnee children split by Time and linguistic function

(A)   First mention (introduction):

FM	IN (proportion)	DN (proportion)	PR (proportion)
Time1	207 (58.66%)	147 (41.22%)	4 (1.11%)
Time2	165 (54.1%)	138 (45.2%)	1 (0.33%)
Time3	299 (51.64%)	270 (46.63%)	10 (1.73%)

(B)   Maintenance:

M	IN (proportion)	DN (proportion)	PR (proportion)
Time1	15 (3.07%)	228 (46.72%)	245 (50.20%)
Time2	7 (2.06%)	163 (47.94%)	173 (50.88%)
Time3	12 (2.41%)	161 (32.33%)	325 (65.26%)

(C)   Reintroduction:

R	IN (proportion)	DN (proportion)	PR (proportion)
Time1	28 (4.66%)	499 (83.03%)	74 (12.31%)
Time2	17 (3.24%)	423 (80.73%)	87 (16.60%)
Time3	50 (5.21%)	741 (77.19%)	169 (17.60%)

5.2 Effect of time

I ran a generalized linear mixed effects model with the binary dependent variable (0 = use of
pronouns, 1 = use of NPs) and Time (Time1, Time2, and Time3) and Context (first mention,
maintenance, and reintroduction) and interaction between Time and Context as fixed effects
and subject as a random intercept. Nominal phrases were coded as "1", and pronouns as "0".
Then I ran pairwise comparisons using the emmeans package in R to examine whether the
proportion of use of NPs changed over time within each context. The results of the posthoc
pairwise comparison are provided in Table 3.

Table 3 Estimated coefficients of posthoc pairwise comparison for Time and Context

Fixed effects	Estimate	Std. Error (SE)	z value (t)	Pr(>|z|)
(Intercept)	2.13649	0.15161	14.092	<2e-16 ***
time1	0.06953	0.16903	0.411	0.681
time2	0.36458	0.24083	1.514	0.130
context1	2.69481	0.26006	10.362	<2e-16 ***
context2	-2.33585	0.13692	-17.060	<2e-16 ***
time1: context1	-0.32493	0.32545	-0.998	0.318
time2: context1	0.61927	0.46537	1.331	0.183
time1: context2	0.13900	0.17354	0.801	0.423
time2: context2	-0.17837	0.24142	-0.739	0.460
Random effects	**Variance**	**Std.Dev.**	**Corr**	

(Intercept)	0.135728	0.36841	
time1	0.008049	0.08972	1.00
time2	0.055712	0.23603	0.17

Number of objects: 4658, group of subjects: 28

Context = First mention (introduction):

time_pairwise	estimate	SE	df	z.ratio	p.value
1 - 2	-1.2392	1.120	Inf	-1.106	0.2686
1 - 3	0.4731	0.600	Inf	0.788	0.4307
2 - 3	1.7123	1.054	Inf	1.624	0.1044

Context = Maintenance:

time_pairwise	estimate	SE	df	z.ratio	p.value
1 - 2	0.0223	0.154	Inf	0.145	0.8850
1 - 3	0.6033	0.151	Inf	4.001	0.0001
2 - 3	0.5810	0.178	Inf	3.265	0.0011

Context = Reintroduction:

time_pairwise	estimate	SE	df	z.ratio	p.value
1 - 2	0.3318	0.185	Inf	1.798	0.0722
1 - 3	0.4346	0.171	Inf	2.547	0.0109
2 - 3	0.1028	0.181	Inf	0.568	0.5704

Figure 3 provides an overview of the distribution of NPs split by Time and Context. For the first mention, no significant differences were found between Time1 and Time2 ($E = -1.23, p = .26$), Time1 and Time3 ($E = .47, p = .43$), Time2 and Tim3 ($E = 1.71, p = .10$), indicating that for the first mention, the participants managed to sustain the skill to produce the preferred referential expressions to introduce a new character for the first time in a story plot. And then we will look at the change in the maintenance context. Table 4 illustrates the different proportions in NP use between testing sessions within each context. The difference was significant between Time1 and Time3 ($E=.6033, z=4.001, p=.0001$), as well as between Time2 and Time3 ($E=.5810, z=3.265, p=.0011$). The results show that the proportion of nominal phrases (NPs) used by participants did not change from Time1 to Time2 but decreased significantly from Time 1 and Time 2 to Time3. They used more pronouns instead of the NPs to refer to the same character, in which the pronoun is the expected type to use in the maintenance context.

Summary

To conclude, over the three testing sessions in five years, returnee participants successfully sustained their referential ability in the first mention context, and they showed improvements in the maintenance context. While in the reintroduction context, a decreasing trend was strongly implied.
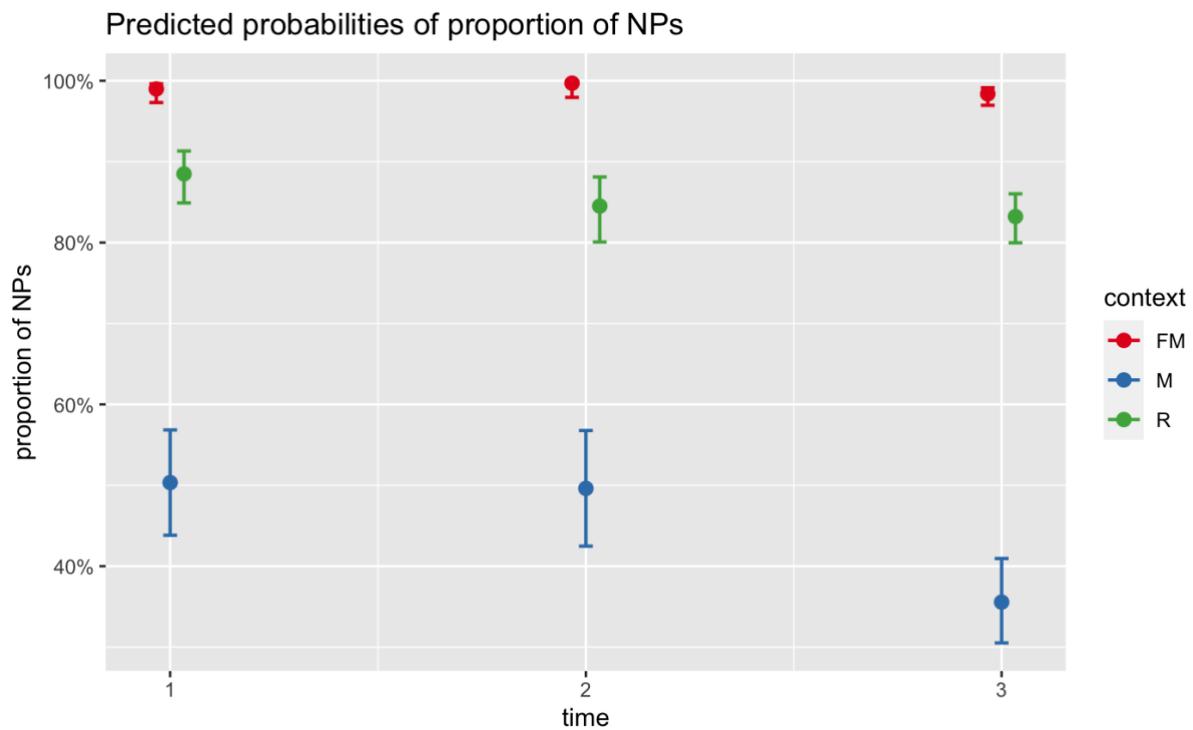
Figure 3 Predicted probabilities of proportion of nominal phrases interacted with Time and Context

The first set of analyses examined the impact of time in general and how the participants performed over time. In the next section, I will look at whether these changes in the use of NPs are modulated by English exposure or executive function skills.

5.3 Effect of executive function

Since we were interested in the possible correlation between executive function and referential choices, we needed to sort out all the variables that are relevant. First of all, we will look at the context of reintroduction, since this context is considered to be in need of executive function while choosing the appropriate referential expression to avoid ambiguity in a context.

5.3.1 Results of reintroduction

Since the first part of the analysis showed a significant change in the production of NPs for maintenance and reintroduction context, I built a generalized linear mixed effects model separately for maintenance and reintroduction context. I then included English exposure (at Time 1), switch costs, mixing cost, Simon costs, and N-back RTs and Time as well as its interactions as fixed effects and Subject as random intercepts. I used a backward step-wise selection model by starting out with the full structure and reducing the fixed effects by running a Likelihood Ratio Test. I report the final best-fit model (see Table 5).

Firstly, I examined the correlation among independent variables by running non-parametric correlations. The independent variables included: time+ English exposure, time+ switch cost response time, time+ mixing cost, time+ Simon cost response time, and time+ N-back mean response time. The results showed that the variable time+ English exposure and time+ mixing cost were not significant and therefore excluded. Estimates from the final model are provided in Table 5. The dependent variable was the subject, and the fixed intercepts included each time session and the response time of each executive task. Significant differences showed in the main effects of Time3 (*z= -4.710, p-value=2.48e-06*) and English exposure (*z= -2.742, p-value=.0061*) where returnee children used fewer NPs compared to Time1 and Time2. In the last step before running the final model, I ran Spearman's Rank correlations between each two fixed effects to make sure that there were no strong correlations to interfere with issues

of collinearity. And the results showed no significant correlation in all pairwise comparisons (see Table 6).

Table 5 Summary of estimated coefficients the final model

Fixed effects	Estimate	Std. Error (SE)	z value (t)	Pr(>|z|)
(Intercept)	0.02405	0.11105	0.217	0.8285
time2	-0.02991	0.14565	-0.205	0.8373
time3	-0.64488	0.13693	-4.710	2.48e-06 ***
mixcostrt_1	0.14727	0.08004	1.840	0.0658
Exp_Eng	-0.22069	0.08048	-2.742	0.0061 **
Random effects	Variance	Std.Dev.		
Subject (Intercept)	0.08582	0.08582		

Number of objects: 1329, group of subjects: 28

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 6 Correlation matrix of independent variables

Correlation of Fixed Effects	(Intr)	time2	time3	Exp_En	swcs_1	smnc_1	nbck_1
time2	-0.573						
time3	-0.631	0.453					
Exp_Eng	-0.035	0.016	0.088				
swcostrt_1	-0.055	0.013	0.058	-0.227			
simncstrt_1	0.032	-0.015	0.010	0.282	-0.400		
nbackrtmn_1	-0.086	0.057	0.091	-0.034	0.526	-0.060	
mixcostrt_1	-0.017	-0.015	0.051	0.015	0.207	0.093	-0.002

Table 7 shows the interaction between Time and Context in reintroduction is significant in Time2 (*z= -2.135, p-value=.0328*) and Time3 (*z= -2.542, p-value=.0110*). Figure 4 shows the main effect of Time on the reintroduction context. The X-axis represents the main effect of Time and the Y-axis represents the use of NPs for reintroduction. The figure indicates a

decreasing trend showed in using NPs when reintroducing the character from Time1 to Time3, which was aligned with the results from the previous model illustrated in Figure 3. Moreover, the decline appeared in Time 2 as well, which was one year after they returned to Japan, even though the descriptive results presented earlier showed the difference was only significant statistically between Time1 and Time3. In summary, returnee children used more pronouns and fewer nominals to reintroduce the character who was out of focus and came back to focus again, indicating their referential skills of reintroduction were reducing over time. And no significant interaction showed between reintroduction context and executive function.

Table 7 Estimated coefficients of the referential use for reintroduction context in Time2 and Time3

Fixed effects	Estimate	Std. Error (SE)	z value (t)	Pr(>|z|)
(Intercept)	1.9830	0.1424	13.924	<2e-16 ***
time2	-0.3689	0.1728	-2.135	0.0328 *
time3	-0.3907	0.1537	-2.542	0.0110 *
Random effects	Variance	Std.Dev.		
Subject (Intercept)	0.1124	0.3353		

Number of objects: 2088, group of subjects: 28

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
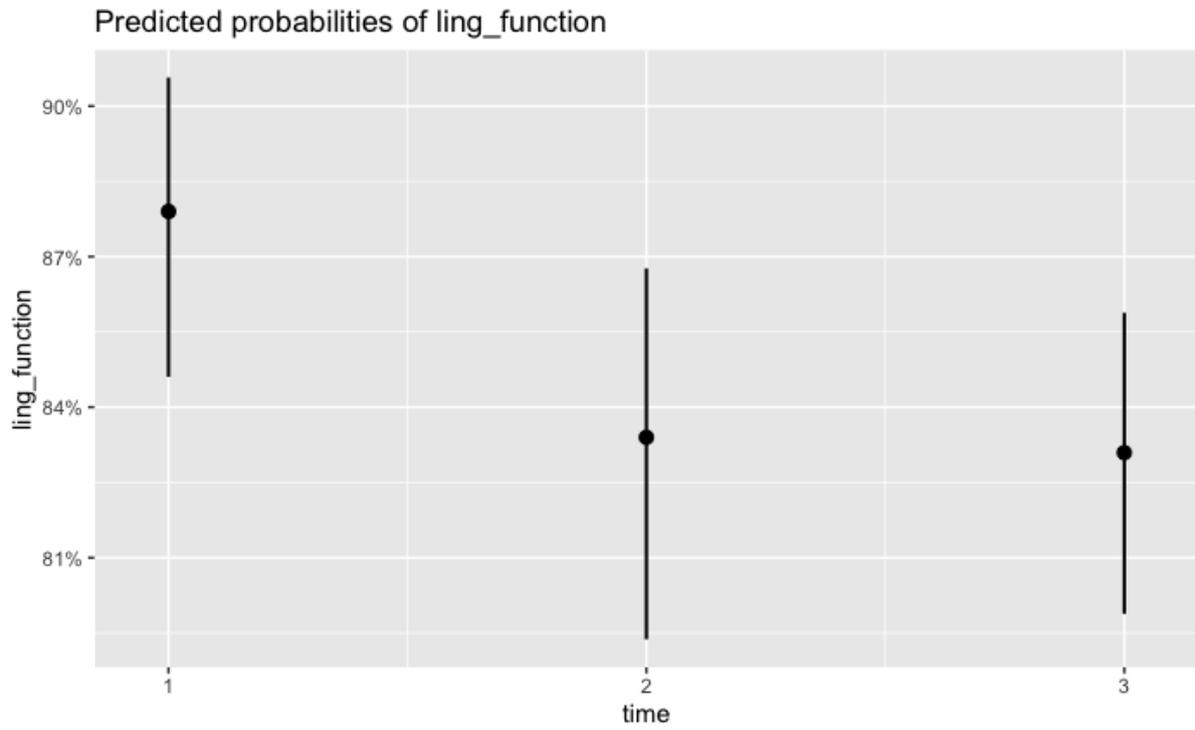
Figure 4 Referential use of nominal phrases for Reintroduction under the main effect of Time

5.3.2 Results of maintenance

To our surprise, the observation from maintenance exhibited interactions with executive function scores, since reintroduction was expected to be in need of executive function skills to avoid ambiguity in a context. Similar to the process in *Reintroduction*, I used a generalized mixed effects model to sort out all the variables in order to exclude the insignificant ones. The final model is reported in Table 5. Table 8 shows the estimated coefficients of using the referential expression in maintenance. For this set of analyses, I only included the main effect of mixing cost from the DCCS task and English exposure in the end.

Table 8 Estimated coefficients of using referential expression in maintenance

Model	npar	AIC	LRT	Pr(Chi)
<none>		1779.2		
time	2	1802.4	27.2199	1.228e-06 ***
mixcostrt_1	1	1780.3	3.1439	0.076213 .
Exp_Eng	1	1783.8	6.6423	0.009958 **

a)   Results of mixing cost

Figure 5 illustrates the interaction between mixing cost and the proportion of NPs that participants used to maintain the same character who appeared the most recently. Mixing cost indicates the flexibility between two different tasks, which is considered to be one of the methods to evaluate switching skills. Mixing cost describes the different response times between the circumstance where only one stimulus is involved and where participants need to switch to different stimulus dimensions. The results showed that returnee children who had larger mixing costs used more NPs and fewer pronouns, and those who had smaller mixing costs used fewer NPs and more pronouns. Note that the smaller the mixing cost is, the better performance is expected in the DCCS task. Hence, the correlation between Switching and the proportion of the use of NPs appears to be positive. That is, returnee children with better performance in the DCCS task showed better referential skills in maintenance by using more pronouns and fewer nominals.

Main effect of Switching on proportion of NPs in Maintenance
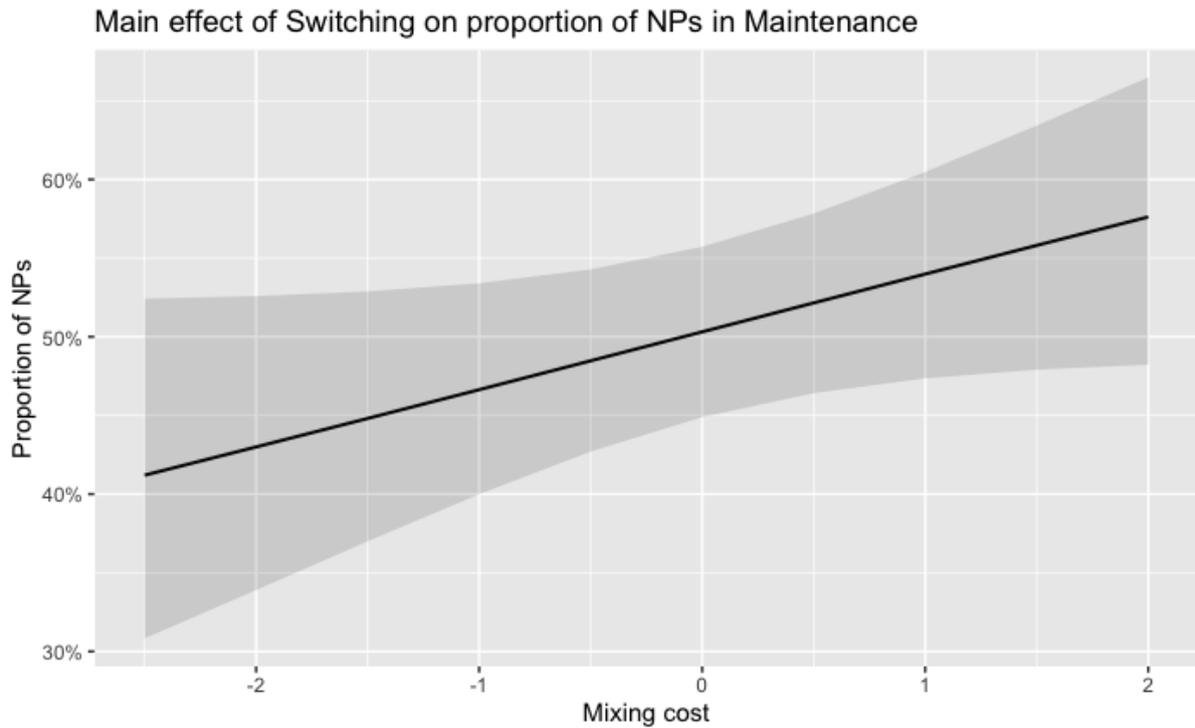
Figure 5 Interaction between mixing cost response time in DCCS task and the proportion of NPs in Maintenance; error bars= standard error

b)   Results of English exposure

Figure 6 illustrates the interaction between English exposure and the proportion of NPs that participants used for maintenance. The figure shows that participants who experienced more English exposure over the past five years used fewer NPs and more pronouns, and those who experienced less English exposure chose more NPs and fewer pronouns. In other words, returnee children who had more English exposure tended to manifest more coherent referential skills in maintenance than those who had less English exposure by using more pronouns and fewer nominals.

Main effect of English Exposure on proportion of NPs in Maintenance
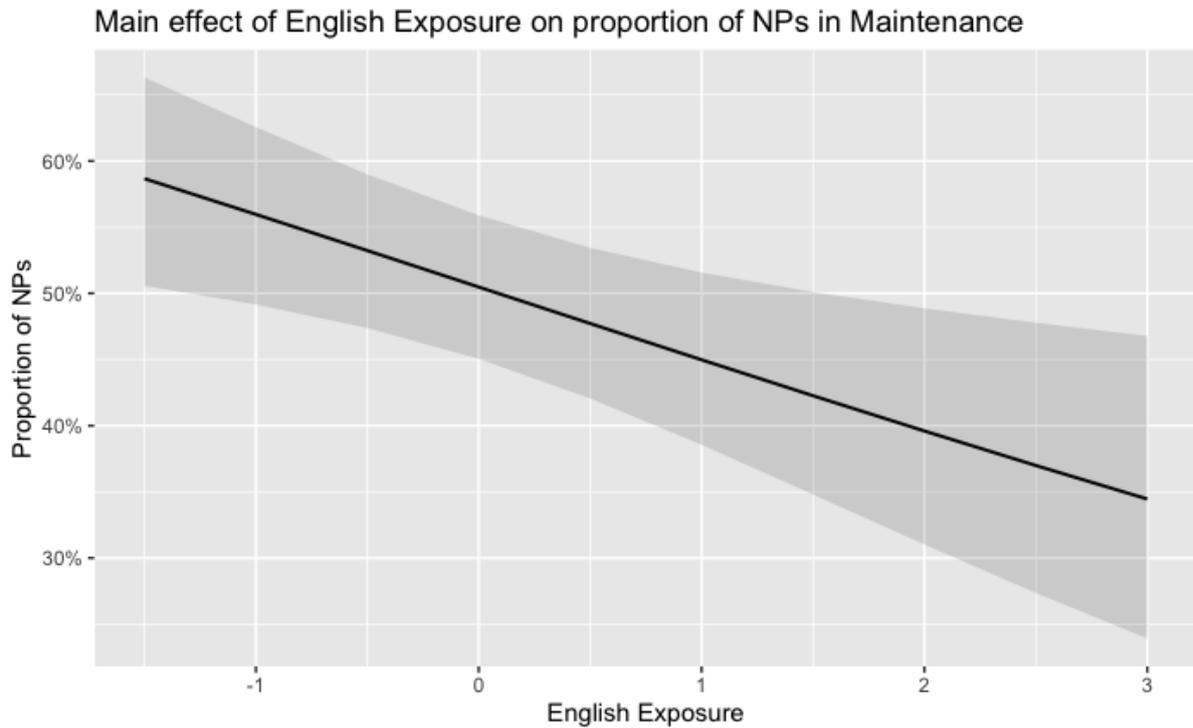
Figure 6 Interaction between English exposure and the proportion of nominal phrases in Maintenance

Summary

To summarize the results from the second set of analysis, the interaction between Time and Reintroduction context seemed to be significant, in which returnee children used more pronouns and fewer NPs over time, indicating their referential skills of reintroduction were declining over time. Then, the main effects of mixing cost and English exposure appeared to be significant in the maintenance context, where a positive correlation showed in the interaction. In other words, returnee children who performed better in switching tasks also chose more target-like forms in the maintenance context, and so did the children who had more English exposure.

Chapter 6

Discussion

As stated earlier, the aim of the current study was to investigate whether executive function ability (inhibition, switching, and working memory) had an effect on returnee bilingual children's use of referential expressions under a specific context, where their natural immersive L2 exposure was getting interrupted when they moved back to their first language environment. The objective of this study was two folds ─ returnee children's executive function skills and their use of referential expressions. These two aspects were examined respectively along with the interaction in between. The main effect of executive function skills was anticipated to predict returnee children's referential choice. Other than that, English exposure was expected to show an influence on returnee children's referential use. The findings showed that returnee children's referential strategy was predicted by their executive function skills and English exposure in the maintenance context. In other words, returnee children who had smaller mixing costs in one of the executive tasks ─ the DCCS task and experienced more English exposure after their return to Japan produced more target-like referential forms when referring to the same character who was just being mentioned.

Effect of executive function

There are very few studies on the correlation between returnee children's referential use and their executive function skills were scarce. From a broader point of view, previous studies on this correlation between referential use and executive function in young children, both bilingual and monolingual, were also limited. The previous investigation tended to fall into a more general category, where executive function skills were investigated along with other effects. For example, in Serratrice and De Cat's work (2020), in addition to the potential

effects of executive function skills, predictors such as working memory, language proficiency, and language exposure were examined and measured at the same time for the production of referents. On the other hand, the lack of sufficient observation on this specific subject was calling for a closer look and more supporting evidence.

To start with, it was predicted that returnee children's referential function skills would help to modulate their developmental trajectory of referential choice in a positive way — children with better scores in executive function tasks were expected to use more appropriate referential forms and acted more adult-like in using referential expressions. The finding presented in Figure 5 was in line with this prediction. In the maintenance context, children who showed smaller mixing costs produced more pronouns, which were the preferred referential form for maintenance; and children who had larger mixing costs showed less proficiency and accuracy in choosing the target referential forms in the maintenance context. However, the effect of executive function skills on referential choice was found only in maintenance, instead of reintroduction, which was in contrast to our expectations. As was mentioned earlier in the literature review section, the latter has been postulated to rely partially on executive function, since the recognition and use of appropriate referents in a given context required one to avoid ambiguity and misunderstanding. For example, in the instrumental material "Frog on his own" (Mayer, 1973) the narrator was expected to use the identifiable nominal to refer to the dog and the owner boy of the frog when they reappeared to save the frog. In other words, the participants were better understood by using the identifiable nominal phrase "*the dog*" instead of the pronoun "*he*" under this circumstance. That raised the question of why the significant interaction was only found in the maintenance context. Hendriks (2016) argued that the use of underspecified pronouns resulted from low working memory and insufficient speed of sentence processing when switching topics. The appropriate use of pronouns required sufficient working memory capacity and sufficient processing speed. It was also predicted that those with sufficient working memory tended to use more pronouns when referring to the same character who had just been mentioned, and those with insufficient working memory tended to use more NPs and fewer pronouns in the same situation. In a similar vein, Figure 5 showed that bilingual returnee children who had

larger mixing costs used more redundant NPs than those who had smaller mixing costs. Mixing cost indicates global inhibition skills, and refers to the performance costs of mixing two different tasks in the switching task paradigm, while switch costs indicate the costs of switching between two tasks presented in sequential order (Rogers & Monsell, 1995). The smaller the mixing costs showed that better performances were expected in the switching tasks. Hence, the smaller mixing costs that the participants had, the better skills in switching between the two different tasks were expected. For example, when referring to the same frog who just showed up and continued doing something else, the narrator was expected to use the pronoun *"he"* instead of *"the frog"* to refer to the same character in the maintenance context after the first mention context. This process involved executive function skills of inhibition, where the switching skill between NPs and pronouns was required. So, using the overexplicit identifiable nominal phrase "*the frog*" instead of switching to the pronoun "*he*" in the maintenance context might be a way to avoid inhibition at some level. Children who had a smaller mixing cost may find it easier to switch to the pronoun "*he*" than those who had a larger mixing cost. In other words, participants who showed better mixing skills used more appropriate forms of referential expression when referring to the same character who was just being mentioned, indicating that they were faster in switching between different contexts and avoiding the overexplicit use of NPs.

Cross-linguistic influence

And then, the potential effects of cross-linguistic influence were also expected on returnee children's referential choices in English from their Japanese exposure after they returned to Japan. Note that as a topic pro-drop language, Japanese allows the pronoun to be omitted when it can be deduced in a context. Hence, the effect of cross-linguistic influence was expected to influence returnee children's referential choice in a maintenance context where they might start producing less target-like forms and more pro-drop-like forms in Time2 and (or) Time3. For example, the child was predicted to produce the sentence *going to the city park* instead of *he was going to the city park* after some years returning to Japan (Time2 or

Time3). Our finding might postulate this prediction where the total production of the pronouns was observed to show a decreasing trend in Time2 (*n=173*) compared to Time1 (*n=245*), however, the evidence was not enough to support the prediction. Nevertheless, this phenomenon was only observed in Time2, and they produced significantly more pronouns in Time3 (*n=325*) compared to Time1 and Time2. Moreover, in Time2, the production of referents decreased in general in all three contexts. Despite that, aside from the total production, the results showed that participants successfully kept up with producing target-like forms (pronouns) with a similar proportion in Time2 (*the proportion ≈ 50.88%*) compared to Time1(*the proportion ≈ 50.2%*), which was contrary to the initial prediction. While in Time3, both the total pronominal use and the proportion of it (*the proportion ≈ 65.26%*) showed an increasing trend, indicating that returnee children were most likely not affected by cross-linguistic influence from their L1. However, revising from earlier analysis, in order to get a clean plot, we had all the NPs and pronouns recoded as "*NPs=1*" and "*pronouns=0*", which made it difficult to predict how this effect would have influenced the results. Additionally, in the previously reviewed work of Serratrice (2007), she found that English-Italian speaking bilingual children accepted more overt pronominal subjects in the maintenance context than their Italian monolingual peers. And more importantly, Spanish-Italian bilinguals showed more tolerance for overt pronominal subjects, suggesting that CLI cannot fully explain the acceptance of redundant overt pronouns in both groups of bilingual children. We did not pursue a further investigation on this question due to the time limitation. Future research should address this question more delicately with more elaborated coding for instance.

Effect of English exposure

Last but not least, as a special trait of returnee children, the changes in English exposure — mainly reducing — were also expected after they moved back to Japan. This factor turned out to be a significant role that played in referential choice. The findings showed the significant effect of English exposure that interacted with returnee children's

referential use in the maintenance context. Participants who had more English exposure tended to produce more target-like referential forms than those who had less English exposure, indicating that second language exposure played a significant role in sustaining and even developing referential strategies. This finding was aligned with the previous literature where the importance of L2 exposure was strongly indicated for returnee bilingual children. For example, Kubota's study (2020) emphasized the significance of continuous L2 exposure for returnee children, in which the quantity of reduction in L2 exposure turned out to be consequences on young children's executive function development in updating and monitoring. Moreover, Flores' study (2019) also highlighted the effect of second language exposure on returnee children, where their language competence was highly susceptible to language exposure changes. In this current study, L2 exposure was naturally measured since the baseline was set when returnee children moved back to Japan. Figure 6 corroborated the prediction that children who experienced more English exposure showed better mastery in the maintenance context than those who experienced less English exposure. It was worth noticing that the significant correlation was found only in the maintenance context, as well as the main effect of executive function.

Besides that, as was demonstrated in Figure 2, the results overall showed that the participants were able to use the most appropriate and preferred referential forms for each given context. They used indefinite nominals (e.g., a boy, one frog, this dog) in the introduction context most; indefinite pronominals (e.g., everybody, all, who, which) in the maintenance context; and identifiable nominals (e.g., the boy, that dog, his frog, the woman's cat) in the reintroduction context. Other than that, their mastery of referential strategy improved generally over time even after returnee children left the English-dominant speaking environment and returned to Japan. Except that the total production of referential expressions decreased in Time2, indicating that returnee children could be potentially vulnerable to the change of language exposure, especially when they moved back to their first language environment after one year. This indication was in line with Flores' work (2020), where she indicated that returnee children's language competence was highly susceptible to language exposure changes, especially in childhood, and these affected both their first language and

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second language. Previous studies on returnee children's L2 attrition also came to a similar conclusion that they were able to retain most of their L2 knowledge in spite of the drastic decline of L2 exposure after they returned to their L1 environment (Flores & Snape, 2021; Tomiyama, 1999, 2000, 2009). In a similar vein, descriptive results in Figure 2 showed a decreasing trend in the reintroduction context gradually over time, however, the evidence was not sufficient enough to conclude that the participants have undergone attrition, future research should look into this question further. Last but not the least, the significant interaction found between English exposure and referential use in maintenance showed that the participants were influenced by L2 exposure regardless of the change of time, indicating the important role that L2 exposure played in returnee children's use of reference maintenance. A similar trend was also found in the main effect of mixing cost, indicating the significance of the two predictors, and time did not modulate the change.

To summarize, after returnee children moved back to Japan, they were able to use the preferred referential forms for each context (first mention, maintenance, and reintroduction). They have sustained and even developed their referential skills in the first mention and the maintenance context over time, except that a slight decrease showed in the reintroduction context. A significant interaction between referential use and English exposure was found, as well as the interaction between referential use and mixing cost, as predicted. The effect of time was not found significant in the results, suggesting that returnee children were influenced by the main effect of L2 exposure and mixing cost throughout all three sessions. In contrast to our prediction, a significant effect of CLI was not found.

Chapter 7

Conclusion

In conclusion, the aim of this study is to investigate whether executive function ability (inhibition, switching, and working memory) has an effect on returnee bilingual children's use of referential expressions under a specific context, where their natural immersive L2 exposure was getting interrupted when they returned to their L1 environment. Results from the narrative task and executive function tasks showed the significant effect of mixing cost on predicting returnee children's referential use. Mixing cost is considered to be one of the parameters of executive function skills in switching. Other than that, data collected from BiLEC questionnaire showed the significant effect of L2 exposure on modulating returnee children's referential use. They are able to produce the appropriate referential expressions for each context in L2 (first mention, maintenance and reintroduction) even after they return to their L1 environment. Moreover, they sustain and develop their referential skills in L2 when introducing a character for the first time in a story plot and referring to the same character even after some years spent in their L1 environment. The results of this study indicate that executive function and L2 exposure have predictive power over referential use in returnee children. Descriptive results show a decreasing trend in the reintroduction context gradually over time, future research may further look into this trend over a longer period of time. The cross-linguistic influence was not found significant in this study due to the encoding choice we made for statical analysis, future research should take a look at this effect with a more elaborated approach. Our findings highlight the significance of executive function and L2 exposure in returnee children's referential strategy. There is still much we do not yet know about the main effect of executive function on bilingual children's referential use, nevertheless, the findings offer a glimpse of the interaction in between with new perspectives, adding up to the existing body of research on the developmental trend of referential strategies by exploring from a less observed angle. It invites future research for a more nuanced view,

especially to further our understanding of how executive function and bilingual language experience help to modulate bilingual children's language use.

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