



An investigation into the knowledge of receptive vocabulary in a first and second language. A case study on Dizygotic twins

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My Undergraduate Dissertation assessed the receptive vocabulary levels of 2 Dizygotic twins age 2;7 in their first language, English, and their second language, Spanish. It used the standardised receptive vocabulary test, the British Picture Vocabulary Scale (BPVS), and a questionnaire. The questionnaire aimed to develop comprehensive background knowledge of the twins. Each twin's English and Spanish score was compared in relation to each other. The study also indicated the twins' results compared with the published BPVS 'norms' and age equivalents. Finally, a total vocabulary was calculated for the twins to assess whether their combined score gave them a higher vocabulary than the BPVS 'norms'.

The results indicated that their first language was higher than their second language, but that neither child's score in English was within the 'normal' limits for their age. It was concluded that as a result of the combination of their twinship and bilingualism, the twins were slightly delayed in their vocabulary acquisition. However, this was not to the degree of severity that much of the literature has suggested, especially for the older twin. When, however, their total vocabularies were compared, both children fell within the 'normal limits' and showed an age equivalent of above their chronological age.

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Chapter I – Introduction

1.1: Vocabulary

The study of vocabulary is one of the oldest approaches in language acquisition. Many studies conclude that vocabulary provides grammatical knowledge and phonological awareness, amongst many others skills (Muter, Hulme and Snowling, 2004). As a result, a child's vocabulary is deemed to be a decent predictor of overall language development.

Bates, Dale and Thal (1995) report that vocabulary understanding, or receptive vocabulary, first appears between 8-10 months and is transferred into productive language at 12 months. This study will investigate the receptive vocabulary of 2 Dizygotic (DZ) twins age 2;7 in the twins' 2 languages, English and Spanish. The twins are likely to perform higher in a receptive test than a productive one, as their Spanish proficiency is not as highly developed and studies have shown receptive knowledge to develop first (Schmitt and McCarthy, 1997).

First words in infants are initially added slowly but at the 50-word stage, usually around 18 months, children experience a 'word explosion' and lexical development increases rapidly (Nelson, 1973). Lenneberg (1967) states that at 30 months a child reaches the fastest point of increase in vocabulary. This accelerated stage of language learning is the optimal time to study the twins' vocabulary levels.

This study will use the British Picture Vocabulary Scale (BPVS), which is a standardised test of receptive vocabulary. The participant is asked to select the appropriate answer from 4 possible pictures (see Appendix 1). The items get progressively more difficult until the child's limit is reached. At this point a score is attained for both children in their first and second language.

1.2: Bilingualism

David Crystal estimates that 'some two-thirds of the children on earth grow up in a bilingual environment, and develop competence (in them)' (2003: 17). The term 'bilingual' is applied to very different populations and can be classified in many different ways; for example 'compound bilingual', meaning someone whose 2 languages are learnt in the same time and context, and 'coordinate bilingual', to describe someone whose 2 languages are learnt in separate contexts (Wei, 2008). This study uses the term 'bilingual' to refer to a basic understanding of 2 languages that has developed since birth.

One of the most important disadvantages of bilingualism is the negative effect it poses for vocabulary. As vocabulary is shared between 2 languages, progress is often initially slower (Kail et al., 2008). When considering each language separately, bilinguals frequently have smaller vocabularies than monolinguals (Umbel, Pearson, Fernández et al., 1992). Although often this shows a slight delay in their first language, increasingly more studies are showing that these children reach the expected age norms when vocabulary test scores in both languages were combined (Marchman, Fernald and Hurtado, 2010).

Reports for receptive vocabularies in particular show that separately they are smaller in bilinguals, but increase significantly when combined (Bialystok, Luk, Peets and Yang, 2010). Conversely, productive vocabularies are shown to have remained lower than monolinguals regardless of the size of total vocabulary (Yan & Nicoladis, 2009). For this reason, the study of receptive vocabulary in this study makes an interesting comparison.

1.3: Twins

The vast majority of studies on twins agree that they are more susceptible to language delay (Tomasello, Mannle and Kruger, 1986). This is believed to stem from the twins' parents having to divide their language and attention in half. This reduced language input, alongside additional factors, results in a tendency for delayed speech. Due to these reasons, Dale, Dionne, Eley and Plomin (2000) suggested that twins are usually delayed by 2-3 months, increasing up to 3-4 months for vocabulary.

Barron-Hauwaert (2010) commented on the lack of research into bilingual twins, who most likely experience delays as a result of their twinship, with the additional hindrance of their second language. She noted the case study of Stephen Caldas (2006: 47) who recorded the development of his identical twin daughters:

‘our twins had in essence two strikes against them: they had two languages to sort out and learn while being part of a twinship which researchers note inhibits speech’.

1.4: Overview of the study

This case study investigates two 2;7 year old DZ twin girls being raised in a bilingual environment. The intention is to conduct a vocabulary test on each child in her first and second language, English and Spanish, to show their vocabulary knowledge. This will highlight the effects that their twinship and bilingual environment has on their lexical development.

The differing opinions of critics surrounding issues of lexical development and bilingual vocabulary, especially with regards to twins, have created some confusion; therefore this case study intends to achieve greater clarity. Furthermore, the bilingual influence is not from the primary caregiver but from a grandparent; this research will seek to expand on previous knowledge of this uncommon situation.

Moreover, a questionnaire will be conducted with the twins’ Mother. This will highlight the referents’ background information and therefore allow me to produce an accurate case study. It will focus on determining the major factors affecting the twins’ second language uptake and general vocabulary acquisition.

It is important to establish whether bilingualism affects vocabulary acquisition in both languages. This, teamed with the uncommon circumstances in this study, may significantly add to the research already in place. The study aims to show the reasons for acquiring a second language, and to promote learning one. It will serve as future reference and support for individuals seeking more information on second language acquisition for pre-school children.

1.5: Objectives

- 1) Assess the vocabulary level of both twins in their first and second language in relation to each other and individually
- 2) Discuss and analyse their vocabulary test scores in relation to the age equivalents specified by the BPVS and whether these suggest delays
- 3) Investigate whether there is a relationship between the vocabulary levels of their first and second language
- 4) Create a ‘total vocabulary’ for both children and assess this in relation to their age norms

Chapter II – Literature Review

2.1: Introduction

This section considers research surrounding vocabulary knowledge in 2 DZ twins age 2;7, in their first and second language. It considers vocabulary acquisition and age expectations, the effects of bilingualism on their vocabulary and further difficulties that their twinship poses. Background research has been undertaken to expand my knowledge of these independent variables, combining them to represent the uncommon circumstances the twins face in this case study.

This Literature Review focuses on vocabulary, and the differences between receptive and productive vocabularies. The rate of word acquisition and vocabulary size is also discussed. It considers assessment methods, which is beneficial as this study uses the BPVS. Research surrounding bilingualism is also presented; some advantages are stated, alongside

the disadvantages such as language delay and code switching. The specific research on vocabulary delay is pivotal to this investigation. It also considers twin studies, documenting their expected language delay and the explanation for this occurrence.

2.2: Vocabulary

Word Acquisition

It is important to differentiate between the receptive and productive nature of a word. Receptive knowledge requires a child to understand or react to a word in an appropriate way, and productive refers to the speaking of it (Pan, 2005).

Most studies agree that early receptive vocabulary is acquired sooner than productive vocabulary, at 8 – 10 months (Bates et al., 1995), and expands at a faster rate (Fenson et al., 1994). Receptive vocabularies are also documented to be larger than productive vocabularies (Benedict, 1979). The beginning of word use shows that a child has developed a new mechanism to make learning and participating in society easier (Pan, 2005).

Fenson et al., (1994) showed that vocabulary grows continuously from 1;3 to 3;0 and is ‘a smoothly accelerating exponential function’ (cited by: Rescorla, Mirak and Singh, 2000: 295). Clark (1995) estimates the rate of word acquisition to be 10 word per day from age 2;0 to 6;0, when a child will have around 14,000 words in his or her vocabulary. Similarly, Pinker (1995) claimed that children learn 1 word every 2 waking hours from 18 months into adolescence. However, these statements may be too generous as they rely on data generalisations.

By 16 months, a child’s mean receptive vocabulary size has been estimated at 190 words (Bates et al., 1995). By the age of 30 months, 1 month younger than the twins, Bates et al., (1995) reported a median vocabulary size of 573 words. He (Bates et al., 1988: cited by Bates et al., 1995) showed a correlation of +0.83 between vocabulary size at 28 months and the mean length of utterances at 28 months. This highlights how useful the knowledge of a child’s vocabulary size is as a prediction of overall language development.

Context

There is much evidence that children who are exposed to plenty of speech in their natural environment, tend to expand their vocabulary quicker (Hoff and Naigles, 2002). Associations have also been made between having a rich vocabulary in a child’s everyday surroundings, including ‘rare or sophisticated words’ (Hoff, 2009: 102), and more rapid vocabulary growth (Weizman and Snow, 2001).

MacArthur Communicative Development Inventories (CDI)

The MacArthur CDI is a vocabulary checklist that is given to the parents of participants. There are 2 versions, the CDI: Infants, which tests the child’s receptive and productive vocabulary from the first word acquisition up to 16 months, where the CDI: Toddlers begins. This second checklist tests an enhanced body of 680 words but only tests productive vocabulary levels. This is due to the unreliability of parents using a checklist to record a child’s understanding when they are above 16 months old (Rescorla et al., 2000; Bates et al., 1995).

The MacArthur CDI is seen as a reliable and valid method of vocabulary collection and allows for a wide sample range to be tested inexpensively (Jorgensen, Dale, Bleses, 2010). However, because of the twins’ age it cannot test their receptive vocabularies, therefore a standardized test such as the Peabody Picture Vocabulary Test or the BPVS is more appropriate.

Peabody Picture Vocabulary Test (PPVT)

The BPVS is associated with PPVT, which is a very similar, well-established

American receptive vocabulary test (Dunn, 1959). Both are extremely valuable and tell us a lot about how participants perform, providing their age equivalent and a Standardised Score. The PPVT is a widely used measure of vocabulary skill and offers non-subjective data that does not rely on the interaction of parent and child.

2.3: Bilingualism

Very few bilinguals show equal proficiency in both of their languages, 1 language is usually stronger and more developed than the other (Baker and Jones, 1998). When learning 2 languages simultaneously, it is understandable that language delays may present themselves. Grosjean (2008: 36) also reported that 'deficiencies' such as smaller vocabularies and language mixing would appear in bilinguals.

It was traditionally thought that bilingualism was harmful to language development; however some research now finds bilinguals to be similar to monolinguals, producing their first words at a similar age (Genesee, 2003). Furthermore, many recent studies have shown a plethora of benefits to early bilingualism. Bialystok (2001: 134) argued that early bilingualism 'increased metalinguistic abilities and those in turn led to higher levels of reading acquisition and academic achievement'. It was also reported that bilinguals had higher IQ scores, much to the researcher's surprise (Peal and Lambert, 1962). Additionally, they concluded that bilinguals profited from a 'language asset' as opposed to the 'language handicap' previously assumed (Bialystok, 2001: 187).

Receptive and Productive Vocabulary

A number of studies showed that in pre-school age children, bilinguals have smaller receptive vocabularies in each language compared with monolinguals (Bialystok et al., 2010). Nonetheless, other studies show that once these children have started school, their receptive vocabulary level increases to equal that of the monolingual (Yan and Nicoladis, 2009). It is productive language that appears the most diverse in monolinguals and bilinguals, with the productive vocabulary of bilinguals being smaller even when both languages are combined (Yan and Nicoladis, 2009).

Vocabulary Acquisition

Many researchers regard the effects of bilingualism on vocabulary negatively. Macnamara (1988) investigated 24 bilingual/ monolingual pairs, finding that in 6 cases bilinguals were equal to monolinguals, but on 18 occasions vocabulary levels were higher in monolinguals. As a result, he concluded that bilinguals had 'vocabulary deficits' (cited by Bialystok, 2001: 59). This prognosis is unsurprising considering that a bilingual child's vocabulary is distributed between their 2 languages; for instance a child at the 50-word stage may have a 40 words vocabulary in English, with the additional 10 words moved to their Spanish vocabulary.

In general, many studies show that bilinguals have smaller vocabularies for each separate language than monolingual children of the same age (Ben-Zeev, 1977). The majority of these studies show no relationship between the developments of each language. Marchman et al., (2010) reported weak associations between both languages, finding big vocabularies in English not necessarily correlating with large vocabularies in Spanish.

Total vocabulary

In bilinguals under 3;0, studies have reported that receptive and productive vocabularies are much closer to a monolingual's level when the total vocabulary is compared (Oller and Eilers, 2002). Poulin-Dubois, Blaye, Coutya and Bialystok calculated this as the total of both languages minus the translational equivalents (2010: 2). Other studies agreed that bilingual children had smaller vocabularies separately but the same or higher when combined (Pearson et al., 1993). However, some studies still concluded that bilinguals at school age still

had smaller vocabularies, even when combined (Yan and Nicoladis, 2009).

Contexts

Meisel (2008a) and Hoff (2006: 309) reported that:

‘not only do children learn the particular languages to which they are exposed, but they appear to learn them in some measure to the degree that they are exposed to them’.

Consequently, it seems reasonable to assume that the twins’ second language, Spanish, will have a less developed vocabulary than English. Marchman et al., (2010) suggested that the early vocabulary outcomes of different languages reflect the child’s lifetime experiences.

Most researchers agree that success is dependent on the constant exposure of both languages in a number of different contexts (De-Houwer, 1995). There is also consensus that the interlocutor is pivotal to the development of 2 languages (Saunders, 1988). Even a person’s presence in a room or a specific toy affects the particular language’s development (Meisel, 2008b).

Code Switching

Bilingualism is thought to have certain disadvantages aside from vocabulary acquisition. One example is language mixing, where elements of both languages are combined. A ‘code switch’ refers to the shift to the other language for a word, a particular phrase or even an entire sentence (Grosjean, 2008). Bilinguals before the age of 3;0 generally will choose to insert nouns from 1 language to the other (Meisel, 2008b). This can create difficulties in institutional situations such as school.

Bilingual children that mix both their languages show evidence of experimentation and perhaps a lack of word knowledge in 1 language. Mixing 2 languages shows a degree of confidence that is often referred to as the ‘performance phenomenon’. This describes how the child may choose to manipulate his or her knowledge for effect (Meisel, 2008b).

Peabody Picture Vocabulary Test (PPVT)

The PPVT is sometimes used to indicate the balance between a bilingual child’s 2 languages and to compare their proficiency. Studies frequently report the differences between the PPVT scores of monolingual and bilingual children (Ben-Zeev, 1977), some showing significant differences between the 2 languages (Bialystok, 2001).

2.4: Twins

Language Delay in twins

A number of different studies have suggested that twins are more likely to have language delays (Day, 1932). Fenson et al., (1994) found delays of 3-4 months. Dale et al., (2000) however, stated that twins are only delayed by 2 to 3 months, but that for vocabulary this may extend to 3-4 months. Barron-Hauwaert boldly reported that twins ‘can be about six months behind in language development’ (2010: 142). Slightly more conservatively, Mittler (1969) stated that twins show language immaturity levels of 3-6 months. Bornstein (2002) provided evidence for a vocabulary delay, without specifying a time frame. His study showed twins scoring lower on the PPVT, a result further evidenced by Lytton, Conway and Sauve (1977).

Reasons for language delay

Tomosello, Mannle and Kruger (1986) suggested that the 2 main factors explaining language delays in twins are postnatal and perinatal factors. Postnatal factors describe the

environment of twins after birth, and perinatal factors refer to physical issues, such as birthing complications.

Plomin and Dale (2001: 38) refer to 'shared environmental influence' as one of the major factors contributing to the slightly slower language development of twins. It is these similar environmental conditions that result in parents of young twins being unable to spend as much time talking to each twin independently, creating less individual parental linguistic input than singletons receive. This leads to the language delay seen in twins regardless of their zygosity.

The similarities between them are increased as they share the same socio-economic status, the same family and a similar quality and quantity of language input. However, there are a number of non-shared factors that may affect each individual twin, such as traumas, peer difference and different child treatment by parents (Kovas et al., 2005). Often twins talk later because there is not the same necessity for speech, as they are usually already able to communicate with each other through gestures and eye contact (Barron-Hauwaert, 2010).

Perinatal factors affecting the development of twins include that twins are 5 times more likely than singletons to be born prematurely. Length and traumatic nature of labour, the time gap between children and any complications such as brain injuries, are all also used to estimate the impact of 'intrapartum complications on language development in twins' (Stromswold, 2005: 130). Additionally, twins are also 10 times more likely to be born at low birth weights than singletons. If the child was born weighing less than 2500 grams (Center for Disease Control, 1999: cited in Stromswold, 2005), this was understood to be extremely problematic for overall language development.

Twins Early Development Study (TEDS)

TEDS is a longitudinal research project that focuses on twins. Over 15,000 pairs of twins have taken part in the project to date and have been assessed from 2;0-7;0. The major areas of research are the genetic and environmental contributions to language and cognitive development. The TEDS experiments observed that vocabulary test results for both twins were very similar to each other. They also investigated early language development delays seen in twins, which TEDS found to be present (Dale et al., 1998). Nevertheless, they proposed that by 4;0 this differentiation had almost disappeared (Kovas et al., 2005).

2.5: Conclusion

There is general consensus that early receptive vocabulary is acquired sooner, faster and is larger than productive vocabularies (Fenson et al., 1994; Benedict, 1979). By the age of 2;6, vocabulary size should be around 570 words (Bates et al., 1988; cited in Bates et al., 1995). Additionally, children with richly linguistic natural environments have been seen to possess larger vocabularies (Hoff and Naigles, 2002).

It is uncommon for bilinguals to show balance between both their languages because of uneven exposure levels (Baker and Jones, 1998). For this reason, it is likely that the twins' Spanish proficiency will be considerably lower than their English. A number of studies showed that bilinguals have smaller receptive vocabularies in each language compared with monolinguals (Bialystok et al., 2010), however when their total vocabulary were combined they scored the same as monolinguals, sometimes even higher (Pearson et al., 1993).

Dale et al., (2000) found delays in twins of around 2-3 months, which extended to 3-4 months for vocabulary. Tomosello et al., (1986) suggested that this was due to postnatal and perinatal factors such as reduced language input and physical issues.

Their situation is very uncommon and offers an interesting insight into studies of bilinguals, twins and vocabulary levels in children generally. A degree of variation is expected between the twins due to individual differences, however their results may be more similar than normal siblings as they share the same environment (Plomin and Dale, 2001).

From the literature presented above, it appears likely that some form of language delay

will be recorded in the twins from their vocabulary test results. This seems probable because of the combination of their twinship and bilingual environment; both factors proved to independently caused delays.

Chapter III – Methodology

3.1: Participants

The participants are 2 DZ twins age 2;7. They were born 5 weeks premature and Lucy is 20 minutes older than Charlotte. Lucy weighed 2495 grams at birth and Charlotte weighed 1814 grams, making both twins within the 2500 grams limit that Stromswold (2005) concluded would have major language delays. Charlotte weighed less at birth; therefore her language development may be more delayed than Lucy's. Both children suffered traumatic births; nevertheless Charlotte's birth was more distressing as she suffered a small cranial bleed. Although Stromswold (2005) suggested that these factors led to further language delays, observations show that both twins appear to be developing normal language functions.

Lucy and Charlotte are being brought up in a bilingual environment, speaking English as their first language and Spanish as their second. Although their parents are both monolinguals, their Grandmother is a Spanish teacher. The children's parents, Lauren and Jim, made the decision for the twins' Grandmother to communicate with them solely in Spanish from birth so that the twins would learn a second language. The twins' household is monolingual, however they receive approximately 10-15 hours of Spanish input per week through their Grandmother. As a result, they have acquired some proficiency in Spanish. Nonetheless, their Spanish exposure is confined to time spent with her, watching television and reading books.

This study focuses on Lucy and Charlotte because of the large amount of variables that independently state that that their language will be delayed, especially their twinship and bilingualism. To the contrary, my interaction and observations with the family have highlighted that the children do not appear to have significantly delayed speech. One such example was the production of first words for the twins, which occurred around 12 months. This is within the age appropriate range as specified by Bates et al., (1995).

This study also performs a questionnaire on Lauren, the twins' Mother. This allows her to reflect on her language experiences with her daughters and offer a valuable insight into the twins' background. This will be combined with the BPVS, allowing me to achieve informative and substantial data.

3.2: Case Study

This investigation is in the form of a case study, as is normal for the majority of studies into bilingual children (Wei, 2008). The case study format allows for the use of multiple data sources, the obtaining of rich, meaningful data and permits the intensive study of extremes (Wei, 2008). This is greatly relevant to this investigation, as research into two 2;7 year old bilingual twins living in a monolingual house is highly specialised.

There are disadvantages attached to carrying out a case study. Firstly, they are very specific; this makes generalising the data collected to a population near impossible (Wei, 2008). Additionally, a case study is more susceptible to bias. This is especially relevant as I am related to the twins and therefore have a personal relationship with them.

3.3: Questionnaire

The twins' Mother, Lauren, was issued with a questionnaire to enhance my background linguistic knowledge of the twins. As Lauren is from a medical background, she takes a keen interest in their language development. The study uses her information to supplement the standardised vocabulary test.

The questions were formed alongside the literature review and the objectives of the

study. This guaranteed that the questions were appropriate and relevant to the study. Various questions investigate the amount of linguistic input that their Spanish language learning receives and whether they mix their languages, as is common in young bilingual children. It also questions the extent of their productive language in Spanish.

The questionnaire takes less than 30 minutes to complete, thus maintaining the responder's concentration (Dornyei, 2010). The study uses both open-ended and closed questions. The use of open-ended questions allows the respondent to add her own opinion (Oppenheim, 1996), but is more time consuming. The closed questions are tick boxes and multiple-choice questions that are quick and easy to answer, but can result in responder bias. This risk was reduced by introducing an 'Other (please state)' option (Oppenheim, 1996).

3.4: British Picture Vocabulary Test (BPVS)

The main test used was the British Picture Vocabulary Test, which assesses the twins' receptive vocabulary levels in English and Spanish. This method of assessment was chosen as it is reliable (Raban-Bisby, Brooks and Wolfendale, 1995). It provides normative scores and age equivalents that will compare the receptive vocabulary levels of both twins. The test takes approximately 10 minutes to administer (Dunn, and Dunn, 2009).

The Testbook provides 4 images for each question, the child must point to the appropriate picture to signal their answer (See Appendix 1). On each page the children were asked: 'Where is X'? Articles such as 'the' were avoided which would highlight the correct answer as a noun and offer any further indication of the correct answer (Dunn and Dunn, 2009). The results were then recorded in the Performance Record provided (See Appendix 2). The answer recorded was the final picture that the participant pointed at, in accordance with Dunn and Dunn (2009).

Due to the children's young age, I was required to start the test from the first set and was next obligated to work through each subsequent set until they got 8 out of the 12 items in a set incorrect. I subtracted the total number of errors from this score, thus equating a 'Raw Score'. I was then able to obtain a Standardised Score and their age equivalent, by matching the Raw Score and correlating interpretation, using the norm tables provided by the BPVS (Dunn and Dunn, 2009).

The tests were video recorded, which allowed observations of the twins' behaviour to be made (Wei, 2008). Additionally, the level of accuracy was increased, as I was able to check the answers documented on the Performance Record with what appeared on the video recording. This allows for support of the main claims made.

3.5: Procedure

Permission was sought from the participants' Mother, allowing the use of her children to form the basis of this study. Firstly, she was issued her with a questionnaire, asking for its return after the administration of both tests. This allowed her time to reflect on her answers.

We arranged a suitable date to record the first vocabulary test in English, which was at the participants' house so that the twins felt comfortable. The test was administered using the Testbook provided, only saying the specified prompts, and giving the twins sufficient time to answer. The test was intended for execution in a separate room, but because of my personal relationship with the twins they both wanted to stay in the room with me. A compromise was made, with the other twin engaging in a play session with another adult at the other end of the room.

A week later the vocabulary test was performed again, this time in Spanish. This gave enough time for the twins to forget the answers in English. The twins' Grandmother administered the test as I recorded it. We chose to administer the test in their Grandmother's home, as this is their main Spanish learning environment. No problems were encountered whilst doing either test. Lauren then returned the questionnaire, supplying with rich information that proved useful to the investigation. Additionally, this study draws upon

observations gathered from my longitudinal knowledge of the twins.

3.6: Ethical Considerations

In order to protect the rights of the participants, pseudonyms were used throughout (Bowern, 2007). Complete informed consent was obtained, and documentation was signed to state this from the University of Nottingham (See Appendix 4). I also ensured the value of the research (Bowern, 2007), by providing a useful measure of vocabulary acquisition, highlighting current levels alongside potential issues. Additionally, the pre-school test can be used as a comparison to a later test in school, thus further increasing this study's value.

3.7: Reliability and validity

Observer's paradox was avoided to some degree, as I knew the twins personally. This was beneficial because I was an insider; therefore the children were more likely to behave naturally (Wei, 2008). Nevertheless, there are disadvantages to being an insider, for instance my questions may not be answered as seriously (Wei, 2008). There is also always the potential risk of observer's paradox regardless of my relationship with the twins; for instance the use of a video camera may have influenced their behaviour.

Although I am an insider, I have limited Spanish ability; therefore their Grandmother was asked to administer the BPVS after demonstrating the required testing procedure (Wei, 2008). This worked well as the twins associate Spanish learning with their Grandmother. My relationship with the twins is in English; therefore they may be less inclined to answer appropriately in Spanish. However it did pose some disadvantages, as their Grandmother was less conversant with administering the test. On more than one occasion, she repeated an incorrect prompt, for instance substituting 'empty' for 'no water'.

Chapter IV – Results

4.1: Vocabulary level of both twins in their first and second language

The results will be presented under the headings of each objective, with one additional section to show a summary of the questionnaire results. An explanation of these findings will be provided in the 'Discussion' section. For the full BPVS test results see Appendix 2.

Standardised Scores

The twins' Standardised Scores are presented here as opposed to their Raw Scores. Standardised Scores are useful as they enable individuals to be compared with a large, nationally representative sample that have taken the test prior to publication. A child's Raw Score will increase with age, but their Standardised Score will usually remain similar. The median score is 100, and covers the same range as most standardised test, from 70 to 140. Consequently, these results allow for comparisons to be made with other tests, thus increasing the validity of this study.

Fig. 4.1: Graph to show the Standardised Scores of Lucy and Charlotte in Spanish and English in relation to their expected level:

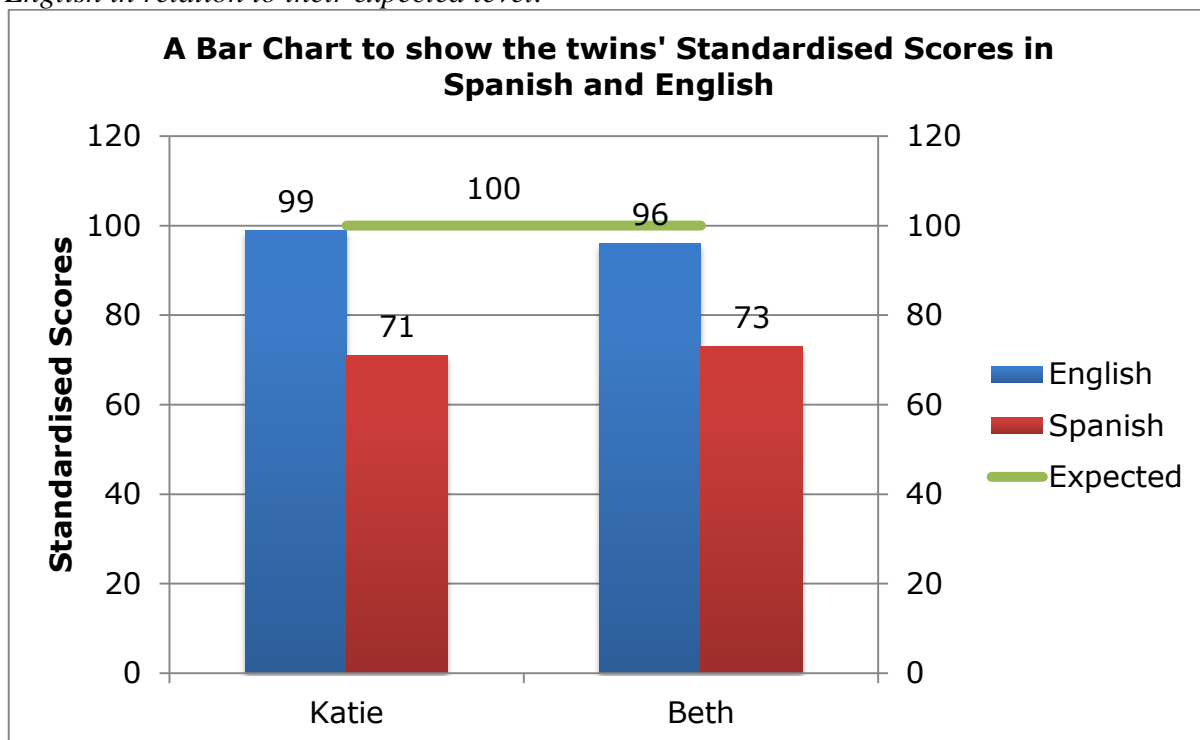


Fig. 4.1 shows the twins' Standardised Scores from the BPVS and their proximity to the median Standardised Score of 100, with 50% of the sample appearing either side of this mark. Lucy scored higher than Charlotte by 3 marks in English, and Charlotte scored 2 marks higher than Lucy in Spanish. Lucy is especially near to the median score in English, at only 1 mark below, in comparison to the 4 marks difference seen in Charlotte. Neither child, however, reaches the expected score for their age. Both children are significantly further away from the median score in Spanish.

4.2: Relationship between the vocabulary levels of their first and second language

Using Fig. 4.1, we can see the differences between the standardised vocabulary score in English and Spanish for each twin. Although both children generally score significantly higher in English than Spanish, Lucy has a 16% higher score in English than Spanish, as opposed to Charlotte who is only 14% higher. This illustrates Charlotte's slightly higher consistency in both languages, albeit at a lower level. Comparatively, Lucy has a wider attainment gap between her English and Spanish levels. There appears to be no relationship between each twins' first and second vocabulary levels, but there is a negative relationship between Lucy and Charlotte's languages, with both scoring higher in the opposite language.

Fig. 4.2: Graph to show the percentage of correct answers for the twins in Spanish and English:

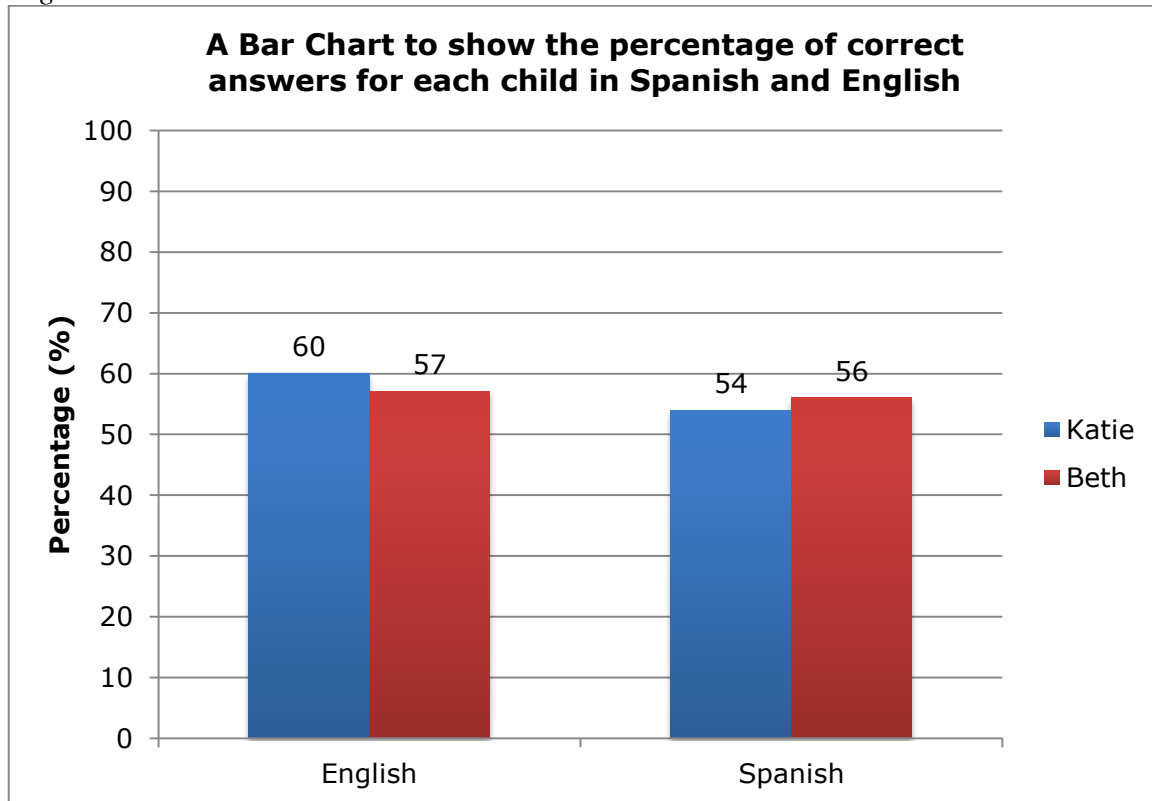
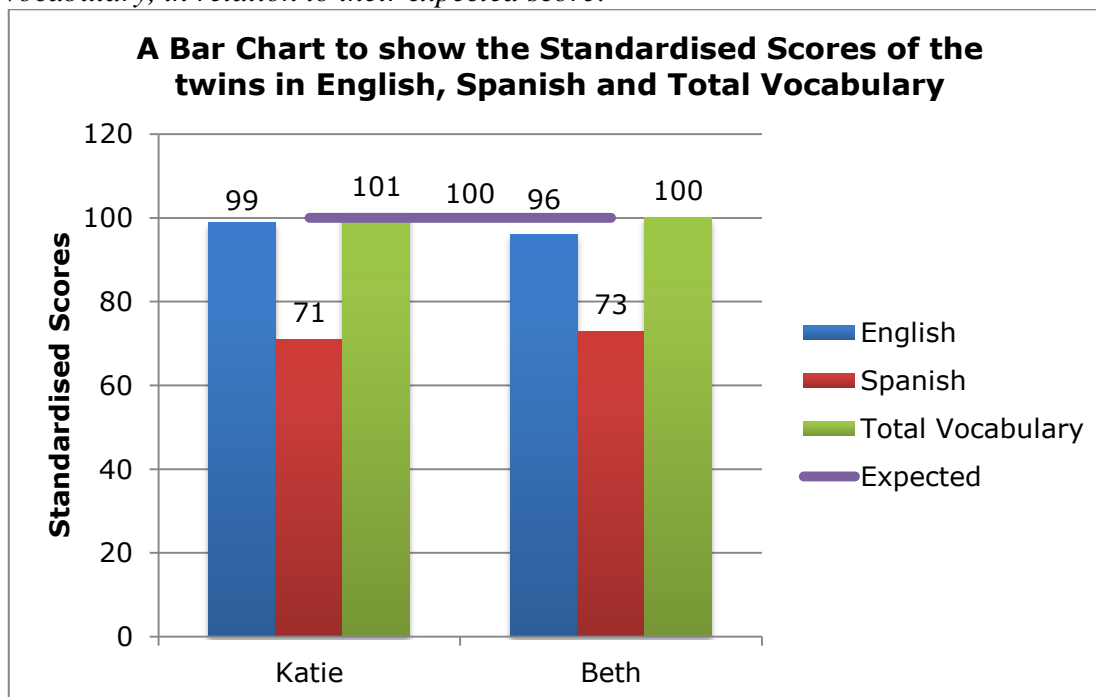


Fig. 4.2 shows the percentage of correct answers each child gave for both languages by dividing their correct answers by the overall amount of answers given. Charlotte shows a higher level of consistency between the 2 languages, more so than Lucy, furthering the evidence seen in Fig. 4.1. Although Lucy attained 3% more correct answers than Charlotte in English, showing her overall higher level in English, there was a 6% drop in her accuracy in Spanish. Charlotte's accuracy, on the other hand, was not significantly reduced, only dropping in Spanish by 2%.

These scores seem particularly low, especially in English. This is because the rate of error increases with difficulty, as the test gets more complex, and is therefore proportional to the amount of answers given. Both children progressed to set 8 in English and only set 4 in Spanish (See Appendix 2), hence they achieved a higher number of correct answers in English, but as a result, a higher amount of errors too. This meant that the overall percentages of accuracy did not differ greatly and therefore the errors do not really tell us much.

4.3: Total vocabulary for both children

Fig. 4.3: Graph to show the twins' Standardised Scores in English, Spanish and total vocabulary, in relation to their expected score:



Considering vocabulary separately across the 2 languages may not provide a full representation of the twins' knowledge. As a result, it is important to acknowledge at the extent of their vocabulary across both languages. Their total vocabulary was calculated by adding the amount of answers they got correct in Spanish but not in English, to their English Raw Score. This new Raw Score was then translated into Standardised Scores, using the norm-table specified by the BPVS. Fig. 4.3 shows an increase of 2 marks in Lucy's total vocabulary from English, extending her score to 1 mark over the median score of 100. Charlotte's total vocabulary increased by 4 marks, advancing her score to the point of the median score, 100. Lucy's total standardised vocabulary score was still higher than Charlotte's as seen for her English score in Fig. 4.1.

Fig. 4.4: Pie Chart to show the distribution of English and Spanish in Lucy's total vocabulary:

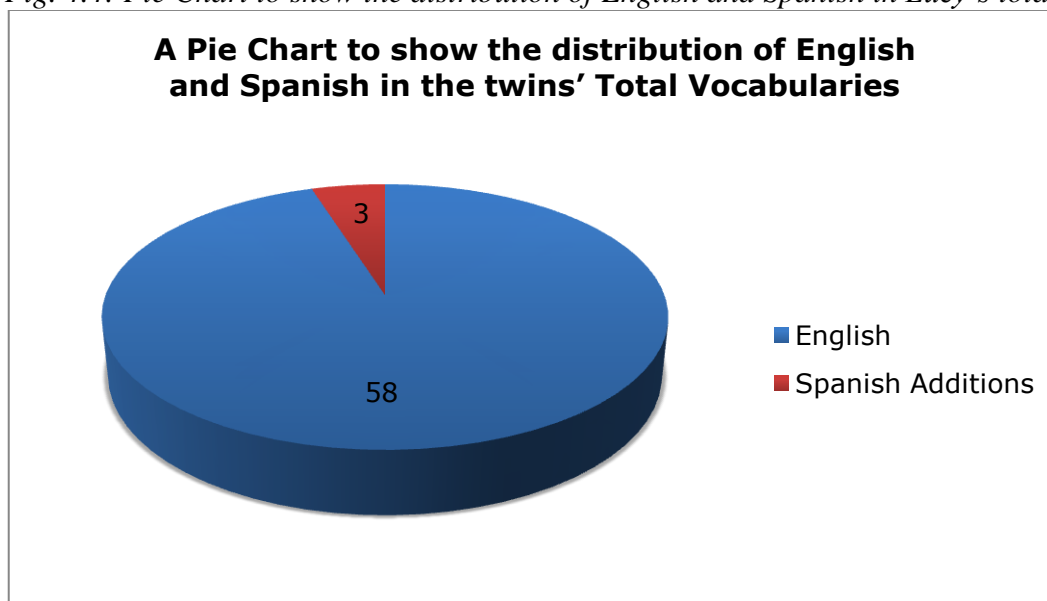


Fig. 4.4 used Lucy's Raw Scores to show the distribution of English and Spanish in Lucy's total vocabulary. It shows 95% of her total vocabulary was comprised of English words, with the additional 5% made up with Spanish words, which were unknown in English.

Fig. 4.5: Pie Chart to show the distribution of English and Spanish in Charlotte's total vocabulary:

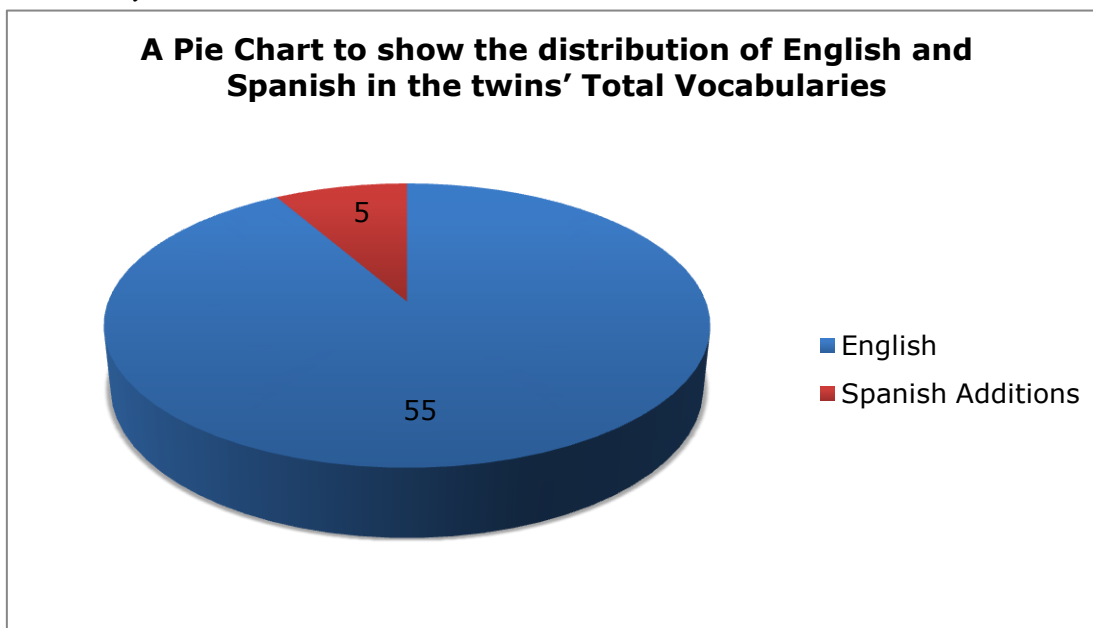


Fig. 4.5 shows the distribution of English and Spanish in Charlotte's total vocabulary. The graph shows that 8% of her total vocabulary was made up of Spanish words; therefore 92% were English. This demonstrates that Charlotte's total vocabulary had 3% more Spanish words in that are unknown in English than Lucy's.

4.4: Vocabulary test scores in relation to the age equivalents specified in the BPVS

Fig. 4.6: Table to show the twins' estimated English and Spanish age equivalents and calculated total vocabulary age equivalents:

Participant	English age equivalent (estimated)	Spanish age equivalent (estimated)	Total vocabulary age equivalent
Lucy	2;7	N/A	2;11
Charlotte	2;4	N/A	2;8

The BPVS provides an age norm-referencing table, allowing for Raw Scores of participants to be translated into an age equivalent. The twins are at the entry level to be assessed with the BPVS, and both children scored below the age equivalent of 2;8 for which they would have had to achieve a Raw Score of 59. However, chronologically they are below this limit anyway, so according to the test results, both have a language age of <2;8.

I converted their Raw Scores to a lower age equivalent as seen in Fig. 4.6 by extending the pattern presented in the BPVS norm table (See Appendix 5 for extended pattern). This resulted in a score in English of 2;7 for Lucy, and 2;4 for Charlotte, as is shown in Fig. 4.6. This highlights a delay of 3 months for Charlotte, but the age appropriate score for Lucy. For

Spanish, because their scores were below those evaluated by the Standardised test, there was not an age equivalent. However, it is important not to underestimate their Spanish vocabulary, which has added to their combined scores. Their total vocabulary scores were above their chronological age, with Lucy scoring 2;11 which shows an advancement of 4 months. Additionally, Charlotte scored 2;8 for her total vocabulary which is 1 month above her chronological age.

4.5: Content Analysis for Questionnaire

This section highlights the most important responses obtained from the questionnaire that was given to the twins' Mother, Lauren. For the full questionnaire see Appendix 3.

Input

Question 7 highlighted that the twins have been exposed to Spanish since birth. Question 4 investigated whether anybody else communicates with the children in Spanish, revealing that: 'If the girls talk to me (Lauren) in Spanish, I will try and reply in Spanish if I can or reiterate what they have just said.' Nonetheless, Lauren also stated that they rarely chose to communicate with her in Spanish. This establishes the twins' Grandmother as their main Spanish interlocutor. Question 2 highlighted that the twins associate their Grandmother's house, as well as her, with their Spanish learning. Question 6 also showed that they do not have any other input from a Spanish community; however they do receive additional input from reading and the television.

Language Mixing

Question 2 states that 'they respond in both English and Spanish while at their grandmothers'. Question 8 establishes that the twins have been heard mixing their 2 languages. Lauren provided the following 2 examples:

'Can I get on La Cama?' (Can I get on the bed?)

'Where is La Gata?' (Where is the cat?)

These show the exchanging of the English noun for the Spanish, which is a common error in young bilingual children (Meisel, 2008b). Also, they use the English syntax, further showing English as their dominant language.

Receptive / productive knowledge

Question 5 asked whether their understanding of English was more advanced than their Spanish, to which Lauren answered that it was. This is fairly obvious from reduced Spanish input they have compared to English; nevertheless, Question 9 states that they do have an understanding of Spanish. Question 10 highlights that they also have a productive vocabulary in Spanish, with Lauren declaring that they are able to construct up to 3 word utterances.

Individual abilities

Question 11 stated that Charlotte showed a greater ability to learn Spanish than Lucy, which is reflected in the Standardised Scores seen above. Question 12 further explained that Charlotte showed a higher level of interest in Spanish than Lucy did, which may explain her greater proficiency level.

Reason for bilingualism and concerns

Question 3 and Question 13 discussed the twins' parents' reasons for bilingualism. Lauren stated that she felt that: 'with learning a second language at such an early age they will hopefully find it easier to pick up other languages throughout their education and life.'

However, she also voiced her concerns that it ‘may mean that their first language ‘English’ may be less advanced than it should be for their age’.

4.6: Summary

These results indicate higher Standardised Scores for both children in English than Spanish, but neither child quite reaches the median Standardised Score, which signifies the middle of the nationally representative sample. However, the estimated age equivalent in English is 2;7 for Lucy, and 2;4 for Charlotte, indicating Lucy to be at the expected age level, but a delay of 3 months for Charlotte. Furthermore, there appears to be no relationship between their first and second vocabulary levels.

Both children’s total vocabulary reached the median score, in Charlotte’s case exactly, and for Lucy achieving a score of 101. This increases their age equivalents to 2;11 for Lucy and 2;8 for Charlotte, showing advancements beyond their chronological age.

Chapter V – Discussion

5.1: Vocabulary level of both twins in their first and second language

Language proficiency asymmetry

From the BPVS results presented in Fig. 4.1, both children have a higher proficiency level in English than Spanish. Lauren states that they obtain 10-15 hours of Spanish exposure per week, solely from their Grandmother (see Appendix 3, Question 1). As a result, if they were awake for an average of 12 hours per day, they would therefore spend the other 72 hours of the week speaking English. This approximate calculation demonstrates the highly uneven exposure to both languages that the twins receive. This is therefore likely to be the main differentiating factor between their overall varying language proficiencies, as suggested by Hoff (2006).

Additionally, the twins lacked the necessary Spanish speaking language community that would give them the Spanish exposure and motivation needed to really develop their second language (de Houwer, 2007). The twins communicate with each other and everyone else in English, therefore there is no necessity to practice a more balanced level of Spanish and English.

Vocabulary

The study shows that both twins had delayed vocabulary levels, scoring below the median Standardised Score of 100, as demonstrated in Fig. 4.1. There is research to support this study’s findings from twin studies. Bornstein (2002) found that twins scored lower on the PPVT, this study concurred, with both twins scoring lower than the median Standardised Score. However, neither result shows severe delays, with Lucy achieving a Standardised Score of 99 and Charlotte scoring 96. This delay is evidenced by Macnamara (1988: cited by Bialystok, 2001), who stated that bilinguals have ‘vocabulary deficits’ when considering 1 language in isolation. Nevertheless, it seems excessive to consider a score of 1 or 4 marks below the median score as a ‘deficit’. The twins’ Mother however, also acknowledges the threat of bilingualism on their linguistic development (see Appendix 3, Question 13).

Tomosello et al., (1986) stated that the delays experienced in twins were because of postnatal and perinatal factors. Both children are within the 2500 grams birth weight limit stated to usually result in language delays (Stromswold, 2005), their slightly delayed vocabulary test results are therefore concordant with his research. Charlotte’s ‘individual traumas’ (Kovas et al., 2005: 7) such as lower weight, cranial bleed at birth, and her longer, more traumatic birth, appear to have directly affected her individual vocabulary delay. Whereas Lucy’s more minimal vocabulary delays could be explained because she is on the borderline of Stromswold’s boundary weight.

Perinatally, the ‘shared environmental influence’ may also contribute to their delays (Plomin and Dale, 2001: 38). However, their English does not appear significantly behind, as is evidenced in Fig. 4.1. This may be due to the strategies their parents undertook in order to prevent a lack of individual attention for either child. I witnessed their parents’ awareness of their children’s capacity as twins, each weekend consciously spending time with one twin individually. This gave the twins the independent linguistic input that is often omitted in twins.

Lauren’s medical background ensured her awareness of the difficulties the twins face because of their twinship and bilingualism (see Appendix 3, Question 13). As a result, Lauren and Jim undertook counteracting measures to reduce this language delay. The twins live in a rich linguistic environment, she has communicated with the twins since infancy and constantly reads to them. Hoff and Naigles (2002) indicated that children exposed to plenty of natural speech generally have a quicker vocabulary expansion rate. Their Mother is a graduate with a rich language herself; this is also of benefit to the children (Hoff, 2009). This naturally rich dialogue of life has helped to bring the twins, especially Lucy, back to the ‘normal’ level of vocabulary development.

Receptive and Productive Vocabulary

Although the BPVS does not measure productive vocabulary, Question 10 (Appendix 3) shows that the twins have acquired some productive Spanish knowledge. However, it is impossible to test the extent of this vocabulary. My observations show that they do have a basic productive vocabulary in Spanish, and sometimes respond to their Grandmother’s utterances in Spanish, as is evidenced in Question 2 (Appendix 3); nevertheless, I witnessed their response in English significantly more. This highlights the development of their Spanish receptive vocabulary, as is evidenced in the BPVS, and emphasises their unequal productive vocabulary. This concurs with Schmitt and McCarthy’s (1997) argument that receptive vocabularies are acquired before productive.

Vocabulary Size

By the age of 30 months, Bates et al., reported a median vocabulary size of 573 words (1995). The BPVS does not give a measurement for the actual vocabulary size of the twins, only standardised levels. However, we can estimate that Lucy’s vocabulary is above the amount given by Bates et al., as her age equivalent is 31 months. Charlotte’s vocabulary size, on the other hand, is likely to be lower than 573 words as her equivalent age was 2;4 (Fig. 4.6).

Umbel et al., (1992) stated that bilinguals have smaller vocabularies than monolinguals; my study showed this was true for Charlotte but not Lucy. However, more testing would need to be administered, as I have no quantitative data from which to assess their vocabulary size accurately.

Spanish input from other mediums

Question 6 (see Appendix 3) demonstrates that the only Spanish input the twins receive other than from their Grandmother is from reading and the television. My observations show the main input to be from the children’s television series ‘Dora the Explorer’, which communicates in both English and Spanish. Linebarger (2005) found that watching this programme aided vocabulary development in Spanish as a second language. This was useful as a means of consolidating and reinforcing vocabulary knowledge, especially with regards to basic concepts, such as numbers (Fisch, 2004).

Meisel (2008b) suggested that for children, a language interlocutor could be a toy. Both children appeared to use their Dora the Explorer dolls as interlocutors, sitting them on their knee and using them as a ‘speech puppet’, to point to their answers. Charlotte uses the doll significantly more than Lucy however, and it therefore seems more of an important

language interlocutor to her. This means that she has 2 interlocutors – her Grandmother being the other. As the interlocutor is pivotal to the development of language (Saunders, 1988), her Spanish learning is likely to be facilitated more than Lucy's. This may partially explain her Spanish advancement over her sister.

5.2: Relationship between the vocabulary levels of their first and second language

There appears to be no relationship between each language for the twins, concurring with Marchman et al., (2010). However a negative relationship could be suggested, between Lucy and Charlotte, with both scoring higher in the opposite language. Fig. 4.2 highlights the percentage of correct answers for each child in Spanish and indicates that Charlotte's vocabulary is more consistent across both languages than Lucy who performs a lot more accurately in English than Spanish.

Reasons for lack of relationship

One of the main reasons for this difference in ability their individual personalities. Using my insider knowledge (Wei, 2008), Charlotte demands more attention than Lucy and needs more interaction with people. Lucy is much more content to engage in independent play. This slight advancement in Charlotte's Spanish over Lucy's could be to do with the 'performance phenomenon' as described by Meisel (2008b: 340). Charlotte manipulates her knowledge of Spanish in order to receive the positive reinforcement and praise from her Grandmother by speaking Spanish when her sister does not.

Lucy's independent nature may mean that she is not as physically close to her Grandmother, and thus gets slightly less Spanish input than Charlotte. However, it is this independent nature that aids Lucy's higher attainment in English. Additionally, the questionnaire highlights Lauren's acknowledgement that Charlotte has a greater ability and interest in Spanish than her sister (see Appendix 3, Question 11 and 12). Dornyei and Ushioda (2009) state that level of interest is a major factor in learning a language, as is proven by Charlotte's Spanish attainment in comparison to Lucy's ambivalence.

Code Switching

An issue that was revealed from my questionnaire was the use of language mixing (see Appendix 3, Question 8). Lauren gave examples of the twins supplementing utterances in English with Spanish. She stated this happened rarely and took the form of nouns, as was further evidenced in my observations. For instance, 'Can I get on La Cama?' (Can I get on the bed?) (Appendix 3, Question 8). This concurs with Meisel (2008b) who indicates that bilinguals under 3;0 will insert nouns from 1 language into the other. It is considerably more common, however, for the twins to supplement their Spanish with English, predominantly choosing to communicate in English over Spanish.

It is understandable that they language mix, because the rest of their extended family are English, therefore they will hear their Grandmother speaking both languages when in their company. Also, as she is a Spanish teacher she is adept at stating something in Spanish, slipping back into English to explain it, then continuing in Spanish. For this reason, the twins are constantly hearing the 2 languages simultaneously. This is a contributor factor that helps to cause confusion between languages.

They associate Spanish with their Grandmother and her house; therefore speak noticeably more Spanish when they are in this context. When the twins asked about my cats they verbalise it in English, but when talking about their Grandmother's cat they referred to her as 'abuela's gata' ('Grandma's cat'). This illustrates their understanding of the parameters of different language uses in their life, even though they still use the English possessive syntax.

5.3: Total vocabulary for both children

The total vocabulary is the total of both languages minus the translational equivalents (Poulin-Dubois et al., 2010). The study showed that the twins' total vocabularies equal, and in Lucy's case, exceed the median Standardised Score, making them chronologically advanced for their age. Charlotte scored exactly the median Standardised Score of 100 and Lucy scored 101 (Fig. 4.3). This concurs with the results found by Pearson et al., (1993), agreeing that a bilingual's combined vocabulary is larger than a monolingual's. Fig. 4.4 shows that Lucy's total vocabulary is comprised of 5% Spanish additions in comparison to the 8% seen in Charlotte's (Fig. 4.5). This again shows Charlotte to have a higher level of Spanish proficiency, but not high enough to surpass Lucy overall.

The twins' total vocabularies contradict many twin studies which state that twins are more likely to have language delays (Day, 1932). This appears to be an advantage of their bilingualism, perhaps suggesting that their combined situation complements, as opposed to harms, some of the problems related to each independent variable.

Specific Spanish examples used by the twins

The words that Lucy got correct in Spanish but incorrect in English were 'dressing', 'calendar' and 'ring', and for Charlotte were 'fence', 'tunnel', 'dressing', 'ring' and 'spanner'. Having examined these words, I can explain most of them situationally using my insider's knowledge.

Firstly, both children got 'dressing' and 'ring' correct in Spanish. This is interesting as they have their own dressing up box at their Grandmother's house containing jewellery, including rings. Additionally, they have a play tunnel that I have witnessed their Grandmother playing with; therefore she would have labelled it in Spanish. This offers an explanation for Charlotte's knowledge of these words. Furthermore, a fence at her house has recently been painted; I experienced their Grandmother warning them not to touch the 'cerca' (fence). Finally, they made a calendar for their Grandmother, thus will have communicated with her accordingly. These examples highlight the importance of different lifetime experiences in early vocabulary outcomes, as stated by Marchman et al., (2010).

5.4: Vocabulary test scores in relation to the age equivalents specified in the BPVS

The study found that in English, Charlotte was 4 months behind her chronological age, whereas Lucy was at the correct age (Fig. 4.6). Charlotte's score concurs with Dale et al., (2000) who found that twins' vocabulary levels are usually delayed by 3-4 months. The reason for the severity of her delay over Lucy's is due to the previously discussed perinatal factors. Lucy's score was at 2;7, however, thus providing a contrast to the findings of Dale et al., (2000). This may be due to the more typical circumstances of her birth, meaning that the effect of twinship is not as pronounced.

Although Charlotte is delayed when considering her age equivalent in English, her total vocabulary is 2;8, which is above her chronological age. Lucy's total vocabulary is further advanced at 2;11 (See Fig. 4.6). This is a positive and useful indicator of their future language success as they perform above their age equivalent when both languages are combined. Even with considering their total vocabularies, the relationship between the 2 children is still maintained: Lucy remains 3 months ahead of Charlotte, regardless of Charlotte performing higher in Spanish. This indicates that the difference is due to Charlotte's individual traumas and personality, as their other circumstances are identical.

5.5: Advantages of bilingualism

Although this investigation has presented some of the disadvantages of bilingualism, there are a number of advantages that many consider to outweigh the negative aspects. Aside from developing cultural awareness, social skills and economic gain as a result of globalisation, bilingualism has been suggested to have a positive cognitive affect (Baker and Jones, 1998). It has been argued that it enhances intelligence levels, especially non-verbally

(Bialystok, 2001). Peal and Lambert concluded that bilinguals had a greater mental flexibility than monolinguals, allowing them to think in a more abstract way (1962). These are only a small sample of the advantages evidenced in bilinguals, but show the diverse benefits associated with learning a second language.

5.6: Limitations of the test

One limitation of the test is the small sample size. Factors such as the moods of the twins on the day of testing and concentration levels could potentially affect the entire study.

Clark (1995) estimates the rate of word acquisition to be 10 word per day from age 2;0 to 6;0, therefore the difference over the month of 2;7 is over 300 words. More conservatively, Pinker (1995) suggested that children learn 1 word every 2 waking hours. Consequently, in an average 12-hour day a child would learn 6 new words, equating to 186 words per month. Even with this lower estimate, because they were tested at the beginning of the month, their scores will be significantly smaller than at the end. It would be of interest to also test them at the end of the month and assess the extent of this difference.

The BPVS usually is administered from the age of 3;0. However, it has a confidence band of 6 months which allowed me to use this test on the twins as they were 2;7. This meant that they were at the minimum age to be operating the test, consequently limiting the data's usability. This is especially relevant as the twins experienced delays; as a result, all of their scores except for their total vocabulary fell below the age equivalents specified by the BPVS. Resultantly, I was obliged to estimate their age equivalents, which may have compromised the accuracy.

Chapter VI- Conclusion

6.1: Conclusion

This Undergraduate dissertation investigated the receptive vocabulary levels of 2 DZ twin girls age 2;7 in their first and second language, English and Spanish. From the test results, both children performed significantly better in English than Spanish, showing this to be their dominant language. This is due to imbalanced exposure, only experiencing Spanish for 10-15 hours per week. Additionally, Lucy and Charlotte lacked the community element and motivation needed to excel in Spanish as they communicated with everyone in English, including their Grandmother sometimes, as their higher receptive vocabulary meant that they often replied to her Spanish utterances in English. Their productive vocabulary should increase with age and exposure (Schmitt and McCarthy, 1997).

The study shows slightly delayed English vocabulary levels for both twins; Charlotte is slightly further delayed than Lucy, thus suggesting that the younger twin may face more severe language development issues. Charlotte had a more traumatic birth, as is common for the younger twin, and this seems to have affected her score. Lucy gained a Standardised Score in English of 99 and Charlotte scored 96. This equates to the desired age equivalent for Lucy, at 2;7, but a 3 months delay for Charlotte.

Charlotte's age equivalent concurs with Dale et al., (2000), who indicated that twin factors would result in a delay of 3-4 months for vocabulary development, however Lucy's level opposes this theory. This, and the fact that Lucy remained 3 months ahead of Charlotte even when considering their total vocabulary, indicates that the younger twin is affected by these specified delays more than the older twin. This indicates twins' individual traumas as potential reasons for their differentiation, as twins' shared environment increase levels of similarity. It must also be proposed that these delays are not only as a result of the twinship but also from the twins' bilingualism.

Conversely, in Spanish, Charlotte's vocabulary level was higher than Lucy's, showing a negative correlation between their languages as Lucy scored higher in English. Both children's total vocabularies were much higher and exceeded their age equivalents. This

suggests that bilingual children's combined vocabularies show bilingualism in a positive manner. This contradicts the statements that bilingualism negatively affects vocabulary acquisition, although it does appear to create delays when languages are considered separately.

An increased awareness of the issues twins face postnatally, such as 'shared environmental influence' and counteracting measures similar to those that Lauren and Jim employ, may see a decrease in the severity of delays experienced by twins. Lucy for instance, seems to have been positively affected by her parents' intervention. Charlotte's score is still slightly further behind, although the conditions of her birth meant that she has had a longer way to go; therefore she is progressing well. If there is a greater knowledge of the effects of bilingualism and twinship, more can be done to encourage parents to take counteracting measures to help their children's development. Bilingualism should not be seen negatively, indeed it may create some slight delays in vocabulary at first, but this appears to equal out by school age (Yan and Nicoladis, 2009), and there is much evidence for the immense value of bilingualism in other areas.

This study has demonstrated that as a product of Lucy and Charlotte's bilingualism and twinship, they are slightly behind when assessing separate languages. Nevertheless, if more were done to assess bilingual children's 2 languages in conjunction, it would be obvious that they generally equal, and in this study exceed, the expected scores for their age. More research needs to be completed into how this can be embraced by schools to ensure that these children are not seen as developmentally behind with their vocabulary.

6.2: Recommendations for further study

This study has clarified the aims initially set, yet raised additional issues for future investigation. Firstly, it would be useful to examine a larger sample size because generalisability in case studies is impossible. However, finding participants would be difficult because of the independent variables corresponding in this study. It would also be useful to compare the girls' results against male twins to see whether the pattern is the same. Similarly, it would be interesting to assess Monozygotic twins.

There was a tendency to refer to Lucy and Charlotte as 'the twins', this instantly homogenised them, creating the assumption that they behave similarly. I did attempt to view them separately, however, in future studies both twins would be observed individually, thus reducing the risk of over-generalisation. Additionally, although I did make longitudinal observations, I would administer the BPVS on the twins at different ages throughout their childhood, thus following their vocabulary development to see whether their delays were rectified with age as suggested by Kovas et al., (2005).

Research could investigate their productive vocabularies too, providing the parents with the MacArthur CDI: Toddler Checklist as a means of assessment. Nevertheless, we can assume that in Spanish their productive vocabularies would be significantly lower and smaller than their receptive vocabularies.

Future research could also investigate other aspects of the twins' language development, such as phonology and syntax. I would then combine this data to obtain a much wider view of their overall language development. Also, it would be interesting to investigate the different word classes used. This would offer an insight into the specific word learning patterns of the twins. I could have attempted this with the BPVS; however there was not enough information to enable accurate results.

Issues of code switching were raised from the questionnaire and require further study, as I was only able to make basic comments. A more detailed study would be required, with transcripts of their language in a variety of different naturalistic settings.

A more widespread questionnaire for the twins' Mother would have proved useful, allowing more detailed opinions to be obtained and additional insight to be gained. I would also provide the twins' Father with a questionnaire, as this study is more focused on the twins' interaction with their Mother. Furthermore, it would have been helpful to interview or provide

a questionnaire for the twins' Grandmother to obtain more accurate depiction of the level of Spanish communication she gives the twins.

I hope that in the future I will have the opportunity to take this study further. A supplementary investigation into the relationship between male and female bilingual twins would be of particular interest to me, and would significantly contribute to the body of literature already in place for this specialised subject area.

Bibliography

- Baker, C., Prys Jones, S. (1998). *Encyclopedia of Bilingualism and Bilingual Education*. Vol. 1997. (pp. 3-61). Clevedon: Multilingual Matters.
- Barron-Hauwaert, S. (2010). *Bilingual Siblings: Language Use in Families*. (pp. 141-147) Bristol: Multilingual Matters.
- Bates, E., Dale, P., & Thal, D. (1995). Individual differences and their implications for theories of language development. In: P. Fletcher & B. MacWhinney (Eds.), *Handbook of child language*. (pp. 96-151) Oxford: Blackwell.
- Benedict, H. (1979). Early lexical development: Comprehension and production. *Journal of Child Language*, 6, 183-200.
- Ben-Zeev, S. (1977). The influence of bilingualism on cognitive strategy and cognitive development. *Child Development*, 48, 1009-18.
- Bialystok, E. (2001). *Bilingualism in Development: Language, literacy and cognition*. (pp. 3-203). Cambridge: Cambridge University Press.
- Bialystok, E., Luk, G., Peets, K. F., & Yang, S. (2010). Receptive vocabulary differences in monolingual and bilingual children. *Bilingualism: Language and Cognition*, 13, 525-531.
- Bornstein, M. (Ed.), (2002). *Handbook of Parenting*. 2nd ed. Vol. 5. (pp. 242) New Jersey: Lawrence Erlbaum Associates, Publishers.
- Bowern, C. (2007). *Ethics in Linguistics*. (pp. 1-4). Rice University Press.
- Clark, E. (1995). *The Lexicon in Acquisition*. (pp. 13- 15) Cambridge: Cambridge University Press.
- Conway, D., Lytton, H., & Pysh, F. (1980). Twin-Singleton Language Differences. *Canadian Journal of Behavioral Science*, 12(3), 264-271.
- Crystal, D. (2nd Ed.), (2003). *English as a global language*. (pp. 17). Cambridge: Cambridge University Press.
- Dale, P., Dionne, G., Eley, T. C., & Plomin, R. (2000). Lexical and grammatical development: A behavioural genetic perspective. *Journal of Child Language*, 27, 619-642.
- Dale, P., Simonoff, E., Bishop, D., Eley, T., Oliver, B., Price, T., Purcell, S., Stevenson, J., and Plomin, R (1998). Genetic influence on language delay in two-year-old children. *Nature Neuroscience* 1(4), 325-328.
- Day, E. J. (1932). The development of language in twins. 1. A comparison of twins and single children. 2. The development of twins: their resemblances and differences. *Child Development*, 3, 179-199, 298-316.
- DeHouwer, A. (1995) *Bilingual Language Development*. In: P. Fletcher & B. MacWhinney (Eds.), *Handbook of child language*. (pp. 219-248). Oxford: Blackwell.

- Dornyei, Z., Taguchi, T. (2010). *Questionnaires in second language research: construction, administration, and processing*. (pp. 127). Nottingham: Taylor & Francis.
- Dornyei, Z., Ushioda, E. (2009). *Motivation, language identity and the L2 self*. (pp. 30-34). Nottingham: Multilingual Matters.
- Dunn, L. (1959) *Peabody Picture Vocabulary Test (PPVT)*. Circle Pines, MN: AGS Inc.
- Dunn, L., Dunn, D. (3rd Ed.), (2009). *The British Picture Vocabulary Scale Manual*. (pp. 1-49). UK: GL Assessment.
- Fenson, L., Dale, P., Reznick, S., Bates, E., Thal, D., Pethick, S. (1994). Variability in Early Communicative Development. *Monographs of the Society for Research in Child Development*. Serial No. 242, 59(5), 1-185.
- Fisch, S. (2004). *Children's learning from educational television: Sesame Street and beyond*. (pp. 45-46) Pennsylvania: Routledge.
- Genesee, F. (2003). Rethinking bilingual acquisition. In: DeWaele, M. (Ed.) *Bilingualism: Challenges and directions for future research* (pp. 158-182). Clevedon: Multilingual Matters.
- Grosjean, F. (2008). The Bilingual's Language Modes. In: Wei, L. (Ed.), (2nd Ed. reprint). *The Bilingualism Reader*. (pp. 432-448). New York: Routledge.
- Grosjean, F. (2008). Studying Bilinguals: Methodological and Conceptual Issues. In: Bhatia, T., Ritchie, W. (Eds.), (3rd Ed.). *The Handbook of Bilingualism*. (pp. 32-63) New York: Wiley-Blackwell.
- Hoff, E. (4th Ed.), (2009). *Language Development*. (pp. 89- 309) Florida: Cengage Learning.
- Hoff, E., Naigles, L. (2002). How children use input to acquire a lexicon. *Child Development*, 73, 418-433.
- Jorgensen, R., Dale, P., Bleses, D. (2010). CLEX: A cross-linguistic lexical norms database. *Child Language*, 37, 419-428.
- Kail, R., Cavanaugh, J. (2008). *Human Development: A Life-Span View*. (pp. 159-160) Indiana: Cengage Learning.
- Kovas, Y., Hayiou-Thomas, M., Oliver, B., Dale, P., Bishop, D., Plomin, R. (2005). Genetic influences in different aspects of language development: The etiology of language skills in 4.5 year-old twins. *Child Development*, 76(3), 632-651.
- Lenneberg, E. (1967). *Biological foundations of language*. (pp. 133) New York: Wiley.
- Linebarger, D., Walker, Dale (5th Ed.), (2005). Infants' and toddlers' television viewing and language outcomes. *American Behavioral Scientist Journal*, 48(48), 624-645.
- Lytton, H., Conway, D., Sauve, R. (1977). The impact of twinship on parent-child interaction. *Journal of Personality and Social Psychology*, 35(2), 97-107.

Marchman, V., Fernald, A., Hurtado, N. (2010). How vocabulary size in two languages relates to efficiency in spoken word recognition by young Spanish–English bilinguals. *Journal of Child Language*, 37(4), 817-840.

Martin, N., Boomsma, D., Machin, G. (1997). A twin-pronged attack on complex traits. *Nature Genetics*, 17, 387-392.

Meisel, J. (2008a). The Bilingual Child. In: Bhatia, T., Ritchie, W. (Eds.), (3rd Ed.). *The Handbook of Bilingualism*. (pp. 91-113) New York: Wiley-Blackwell.

Meisel, J. (2008b). Code-switching in young bilingual children: the acquisition of grammatical constraints. In: Wei, L. (Ed.), (2nd Ed. reprint). *The Bilingualism Reader*. (pp. 336-359). New York: Routledge.

Mittler, P. Genetic Aspects of Psycholinguistic Abilities. *Journal of Child Psychology and Psychiatry*, 10(3), 165-176.

Muter, V., Hulme, C., Snowling, M.J. and Stevenson, J. (2004) Phonemes, rimes, vocabulary, and grammatical skills as foundations of early reading development: evidence from a longitudinal study. *Development Psychology*, 40(5) 665-681.

Nelson, K. (1973). Structures and strategy in learning to talk. *Monographs of the Society for Research in Child Development*, 38 (1-2, Serial No. 149).

Oller, D., Eilers, R. (2002) Language and literacy in bilingual children. (pp. 119) Illinois: Multilingual Matters.

Oppenheim, A. (1998). *Questionnaire design, interviewing and attitude measurement*. (pp. 115). London: Continuum International.

Pan, B. Semantic Development: Learning the Meaning of Words. In: Berko-Gleason Peal, E., Lambert, W. (1962). The relation of bilingualism to intelligence. *Psychological Monographs*, 76(27), 1-23.

Pearson, B., Fernández, S., Oller, D. (1993). Lexical development in bilingual infants and toddlers: Comparison to monolingual norms. *Language Learning*, 43(1), 93-120.

Pinker, S. (1995). Language acquisition. In: L.R. Gleitman & M. Liverman (Eds.), (2nd Ed.). *An Invitation to Cognitive Science: Language* (pp. 135-182). Massachusetts: MIT Press.

Plomin, R., Dale, P. (2001). Genetics and Early Language Development: A UK case study in twins. In: Bishop, D., Leonard, L. (Ed.), *Speech and Language Impairments in Children: causes, characteristics*. (pp. 28-38) Oxford: Psychology Press.

Poulin-Dubois, D., Blaye, A., Coutya, J., Bialystok, E. (2010). The effects of bilingualism on toddlers' executive functioning. *Journal of Experimental Child Psychology*. 1-13.

Raban-Bisby, B., Brooks, G., Wolfendale, S. (1995). *Developing language and literacy in the English national curriculum*. (pp. 103). UK: Trentham Books.

Redlinger, W., Park, T. (1980). Language mixing in young bilinguals. *Journal of Child Language*, 7, 337-352.

- Rescorla, L., Mirak, J., Singh, L. (2000). Vocabulary growth in late talkers: lexical development from 2;0 to 3;0. *Journal of Child Language*, 27, 293-311.
- Romaine, S. (1995), (2nd Ed.). *Bilingualism*. (pp. 181 - 205) Oxford: Wiley-Blackwell.
- Saunders, G. (1988). *Bilingual children: From birth to teens*. Clevedon: Multilingual Matters.
- Schmitt, N., McCarthy, M. (1997). *Vocabulary: Description, acquisition and pedagogy*. (pp. 86). UK: Cambridge University Press.
- Stromswold, K. (2005) Genetic Specificity of Linguistic Heritability. In: Cutler, A. *Twenty-first century psycholinguistics: four cornerstones*. (pp. 121-140). Max Planck Institute for Psycholinguistics: Routledge.
- Tomasello, M., Mannle, S. & Kruger, A. (1986). Linguistic environment of 1- to 2-year-old twins. *Developmental Psychology*, 22, 169-176.
- Umbel, V., Pearson, B., Fernández, M., Oller, D. (1992) Measuring Bilingual Children's Receptive Vocabularies. *Child Development*, 63(4), (pp. 1012-1020).
- Wei, L., Moyer, M. (Eds.), (2008). *The Blackwell guide to Research Methods in Bilingualism and Multilingualism*. (pp. 5-157). Blackwell Publishing.
- Weizman, Z., Snow, C. (2001). Lexical output as related to children's vocabulary acquisition: Effects of sophisticated exposure and support for meaning. *Developmental Psychology*, 37(2), 265-279.
- Yan, S., & Nicoladis, E. (2009). Finding “le mot juste”: Differences between bilingual and monolingual children’s lexical access in comprehension and production. *Bilingualism: Language and Cognition*, 12, 323–335.