

バイリンガルになる：乳児の二言語理解の発達

The Bilingual-To-Be: Comprehension Development in Infancy

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ABSTRACT

本研究では、マッカーサーコミュニケーション発達質問紙で集めたデータを元に、日英バイリンガル乳児の9ヶ月から1歳4ヶ月までの二言語理解の発達に焦点をあてたものである。その結果、生まれてから触れられていた両言語の理解の発達は差が見られることがわかった。言語理解と「言語入力」(language input)との間に、明白な相関関係があることが判明した。また、1歳3ヶ月から、理解できる語彙獲得は加速したが、それは一番理解していた言語に限られたことが観察された。次に、Quay (2001)と比較し、ほぼ同じ環境で育てられたバイリンガル乳児の言語理解の発達については共通点があることが示された。さらに、この研究では、同じ意味を持つ英語と日本語の語彙、すなわち「訳語」(translation equivalent)が前言語段階で理解できたことが明らかになった。英語の理解できる語彙が日本語より多いにもかかわらず、研究対象児は初めての発話と初めて発話した訳語の数ヶ月前に訳語の理解が出来た。訳語の理解により、バイリンガル乳児は前言語段階で二言語発達に必要な過程の第一歩を踏み出したことと二言語語彙習得の受容力があることを示唆している。

Data were collected using the MacArthur-Bates Communicative Development Inventory (CDI), a parental checklist, to investigate the comprehension of English and Japanese in a bilingual infant, Issa, from age 0;9 to age 1;4. Results show uneven development of comprehension between the two languages the subject was exposed to from birth. Comprehension in each language was found to be positively linked to language input. The rate of comprehension accelerated at age 1;3 but only for the language which was most understood. Comparison with Quay (2001) shows that bilingual infants raised in similar linguistic conditions may share

similarities in comprehension development. In addition, an analysis of translation equivalents (TE), or words from both languages with the same meaning, understood by the subject reveals that TEs emerge in the pre-linguistic stage. Despite having a much larger receptive vocabulary in English compared to Japanese, Issa showed an understanding of bilingual synonyms months before he uttered his first words and produced his first TEs. The ability to understand TEs suggests that, at the pre-linguistic stage, the bilingual-to-be has already embarked on a process necessary for bilingual development and has the capacity for dual lexical acquisition.

Introduction

Human infants develop an early understanding of the language spoken to them long before they utter their first words. In a study of eight infants from age 0;9 (age is read as year;month.day), Benedict (1979) found that comprehension developed rapidly in a short span of time with an average of 50 words understood before 10 are produced. The progress infants make in understanding words in their native language in the second half of their first year is astounding and even more so in infants who are acquiring more than one language from birth. Comprehension is the very first step in language acquisition and, in most cases, a prerequisite for production. Just as there are productive vocabulary spurts, there are also comprehension spurts (Reznick & Goldfield, 1992). The significance of early comprehension development for the bilingual-to-be warrants detailed investigation in the field.

However, as pointed out by De Houwer, Bornstein and De Coster (2006), research in early bilingualism tends to focus on expressive language behavior. The difficulty in measuring comprehension is probably one reason for the lack of research in this area. Although test-based experimental research is possible, there was no systematic tool for measuring comprehension development longitudinally in naturalistic settings. An early naturalistic case study by Leopold (1939) of his German-English bilingual daughter, Hildegard was based on diary records. Although his study focuses on phonological and lexical development, it also includes a description of

Hildegard's early understanding of words. Leopold relates how she understood her name at age 0;7 by turning towards the speaker and reacted to questions such as 'where is the baby?' by turning towards a picture of herself at age 0;8. However, his accounts are selective and are only available up to age 1;2.

Research in bilingual comprehension has been made more accessible in recent years due to the development of the infant version of the MacArthur-Bates Communicative Development Inventory (CDI), a parental checklist. The tool was first used to compare early comprehension and production in bilingual children with their monolingual counterparts. As part of their group-based study, Pearson, Fernández and Oller (1993) used the English and Mexican-Spanish versions of the CDI with Spanish-English bilingual children and monolingual children between the ages of 0;8 to 1;4. On average, the total vocabulary and total conceptual vocabulary (total vocabulary after excluding words with the same lexical concept in both languages) comprehended by the bilingual infants were slightly higher than that of their monolingual peers. The bilingual infants who were identified as English-dominant also outperformed their monolingual counterparts even when looking at comprehension of English alone. Further investigation revealed that the bilingual infants also had comparable productive vocabularies to their monolingual peers.

Peréz-Pereira (2008) reported similar results in his study of Galician-Spanish bilinguals and Galician-speaking monolinguals. Parents of 127 Galician-Spanish bilingual children and 104 Galician-

speaking monolingual children between ages 0;8 to 1;3 completed the Galician version of the infant CDI. Bilingual subjects registered slightly higher scores in both comprehension and production, indicating that their lexical development was no different from that of their monolingual peers.

Research in bilingual comprehension has also focused on words with the same meaning in two languages, i.e. translation equivalents (TEs), which were previously researched extensively in early bilingual production. Studies have shown that TEs are produced even in the earliest stages of speech (Quay, 1995; Johnson & Lancaster, 1998; Lanvers, 1999; Pearson, Fernández & Oller, 1995; Wilson, 1998). Indeed, in Quay (1995), it was reported that a Spanish-English bilingual child, Manuela, produced her first TE pair of *bye* and *tatai* at age 0;11. The use of TEs is a distinctive linguistic feat that differentiates the bilingual child from children who are acquiring a single language. The production of such bilingual synonyms also contradicts the Principle of Contrast (Clark, 1993), a theory in the field of language acquisition, which proposes that in building their vocabularies, young children will assume that different words convey different meanings. The use of words from two languages to refer to the same meaning by bilingual children suggests that two separate lexical systems are developing from the very start. Clark (2003) herself subsequently acknowledges that the Principle of Contrast does not apply across languages.

Although we now know that early production

of TEs signify the development of two lexicons within the bilingual child, the comprehension of TEs in the pre-linguistic stage suggests that there is a prerequisite for bilingual development to take place. De Houwer et al. (2006) studied the comprehension of translation equivalents in 31 French-Dutch bilingual infants at age 1;1. All of the subjects understood TEs although there was considerable variability in the number and proportion of TEs from child to child with a range from 3 to 221 pairs. Notably, the more words the subjects comprehended, the more TEs they understood. As the study was based on comprehension data at age 1;1, we have no earlier information on when the first comprehension TEs emerged.

However, Leopold's (1939) diary-based study tells us that Hildegard showed her first understanding of equivalents at age 0;9. He describes how she put her hands together upon hearing the English term *patticake* and its German equivalent, *backe backe Kuchen*, to play the game. This occurred in the same month that she uttered her first word, indicating that comprehension TEs emerged along with production. Five more words and their equivalents were understood by age 0;11 as shown in Table 1.

Another area of concern is the relationship between language input, comprehension and production. Quay (2001) examines early comprehension and production in a trilingual child, Freddy, who was exposed to English and German from birth and to Japanese when he began daycare at age 0;11. Freddy's CDI data from 1;0 to 1;4 reveal that he understood more

Table 1. Hildegard's comprehension TEs (extracted from Leopold: 1939)

Age	English	German
0;9	patticake	backe backe Kuchen
0;9	peek-a-boo	guck, guck (Kuckuk)
0;10	no, no	nein, nein
0;11	come here	komm her
0;11	squirrel	Vogel
0;11	by-by	winke winke

words in English which he had higher exposure to than German, implying that the early development of bilingual comprehension is positively linked to the amount of exposure in each language. Although Pearson, Fernández, Lewedeg and Oller (1997) have established that production strongly correlates with the amount of input received in the particular language, input factors also appear to play a role in bilingual comprehension. However, contrasting results were obtained in the second year as Freddy produced more Japanese than English or German, indicating that, when a change of environment occurs, early production may not be influenced by comprehension or amount of input from birth.

Research question

To shed more light on the development of comprehension in bilingual infants, the present study reports on the results obtained from the longitudinal data of an English-Japanese infant, Issa, from age 0;9 to 1;4 collected through CDIs. The main questions addressed are:

1. How does comprehension develop in each language that the bilingual infant is exposed to from birth?
2. What does the comprehension of translation equivalents imply for early bilingual development?

Methodology

The child and his linguistic environment

Issa is the first born and only child of the mother-researcher, a Malaysian, and a Japanese father. He was born in Kawasaki City in Kanagawa, Japan and only left the country for a three-week holiday in Malaysia at age 0;7 during the period of this study. Since birth, he has been exposed to English from his mother and Japanese from his father. Issa's mother is multilingual and speaks native Hakka (a Chinese dialect), near-native English and Malay and fluent

Japanese. However, she has chosen to speak English to Issa as it is her strongest language. Issa's father addresses the child in Japanese. The parents speak Japanese to each other.

Issa's mother was the full-time caregiver and the person he spent most of his time with during the period of this study. As Issa co-slept and was nursed until his second birthday, he shares a strong bond with his mother. In the evenings and weekends, Issa enjoyed baths and some form of play with his father. Issa also interacted with his Japanese-speaking grandparents who lived nearby and visited them two to three times a week. He was also exposed to Japanese from other mothers and children when attending community playgroups. Although input in both languages was regular and consistent, Japanese input was intermittent and took place only during certain times of the day and week. It is estimated that at age 0;10, out of an average of 11 hours Issa was awake in a day, he was exposed to two to three hours of Japanese along with ongoing exposure to English.

Comprehension and production data

The 2007 English version and the 2004 Japanese version of the infant CDI checklist were used to collect data on Issa's comprehension and production in both languages. Developed for infants from ages 0;8 to 1;4, the infant inventories are divided into two sections: early words and actions and gestures. The early word section consists of four parts. The first part of the questionnaire consists of a few general questions used to determine if the child has begun to respond to language. The second part of the questionnaire contains 28 items and assesses the child's understanding of phrases and routines. The third part of the form asks if the child has begun imitation and labeling. The final part of the early words section, the vocabulary list, makes up the bulk of the questionnaire. Both the English and Japanese versions of the infant CDI have 396 lexical items spread over 19 categories such as toys, food, and

animal sounds. In addition, the Japanese version has 52 items in 3 new categories - onomatopoeia, particles and interjections. Caregivers are required to check items which the child comprehends, or comprehends and produces. Although all parts of the infant CDI checklists were completed, the analyses here will focus on items in the vocabulary section of the forms.

The infant CDI checklist was completed monthly at ages 0;9 and 0;10. Completion of the forms then became a bimonthly exercise from ages 0;11 to 1;4.15 as comprehension developed rapidly towards the end of the first year. The infant form was discontinued from age 1;4 as it was difficult to accurately measure comprehension beyond this age. Both the English and Japanese CDIs were completed by the mother who consulted the father when filling up the Japanese version. A word was considered as comprehended if an affirmative act of understanding (e.g. looking in the right direction, reaching for object and pointing) was performed. Some of the acts of comprehension were regularly elicited as a game with the child. For instance, at age 0;10, when asked consecutively by his mother ‘where is Daddy?’ and ‘wanna watch Baby Einstein?’, Issa would shift his gaze in response from the doorway where his father usually appeared after work and the television set where he watched his favorite television program.

Comprehension data from the CDI is supplemented by data kept in a diary from age 1;2 that recorded

new words that were comprehended or produced. The toddler version of the CDI was also completed monthly from age 1;4 to age 2;6. Monthly recordings lasting 20 to 25 minutes in length in each language context were also made from age 1;2 to age 2;3. Along with providing additional data for Issa’s comprehension development, the diary records, toddler CDI forms and video recordings are also sources of data for a larger longitudinal study of the subject’s early bilingual development.

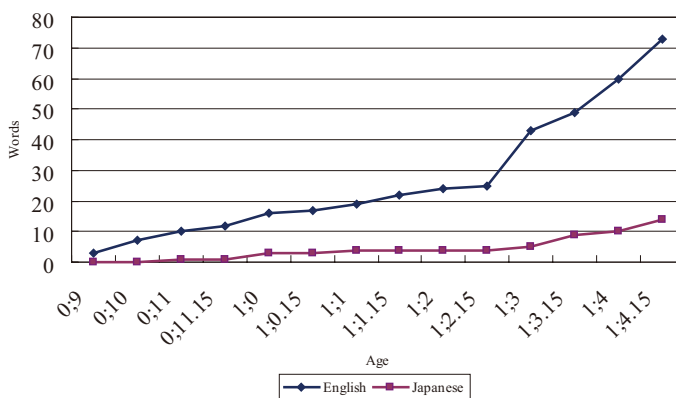
Results and discussion

Bilingual comprehension

Issa’s development in comprehension is summarized in Figure 1. The results were compiled after removing cognates from the English and Japanese CDI data, i.e. bye-bye, banana and the subject’s name. The results show that comprehension development was slow and gradual in the earlier stages. A ‘comprehension spurt’ occurred for English words at age 1;3 with 18 new words understood compared to only one new comprehended word a fortnight ago. In contrast, the rate of comprehension for Japanese words remained relatively low and stable; never exceeding four items in each month or half-month when it was assessed.

There is a greater understanding of English words in contrast to Japanese words with 75 (84%) of 89

Figure 1. Comprehension of English and Japanese words from age 0;9 to 1;4



words comprehended at 1;4.15 being English. At each month or half-month when comprehension was measured, there were more new words understood in English than in Japanese. The uneven development of comprehension between the two languages is attributed to Issa's linguistic environment. He spent all of his time with his English-speaking mother who performed most of the care-giving duties as well as play and book-reading activities, continuously providing him with a larger range of vocabulary. In comparison, Japanese input was provided intermittently and in fewer contexts. This indicates that the number of words understood in each language is positively linked to the amount of exposure to it. The relationship between input and comprehension was also previously found in Quay (2001).

To see how Issa's comprehension development contrasts with other infants raised in similar conditions, the results of the present study are compared to the CDI-based data of Freddy, the English-German-Japanese trilingual subject in Quay (2001). Although Freddy is trilingual, he shares two common languages with Issa i.e. English and Japanese and was only exposed to his third language, German, from age 0;11. Issa and Freddy are also first born males and the only child in the family during the period of study. Like Issa, Freddy is also raised in Japan and is addressed in a different language by each parent, i.e. English by his mother and German by his father. The only difference is that Freddy started daycare at age 0;11 whereas Issa was cared for at home by his mother until age 2;3.

As Table 2 illustrates, the size of the total receptive vocabulary of both infants are similar for each month from age 1;0 to 1;4. Both also show uneven development of comprehension with a greater understanding of one language, English. This happens to be the language of their mothers and the language that they received the most exposure to in their first year. Both Issa and Freddy also exhibit an increase in comprehension of new words from age 1;3. Although a comparison with another individual case study is a limited analysis that does not benefit from mean figures obtained from large samples of bilingual and monolingual subjects in group-based studies, it nevertheless shows that Issa's comprehension development is comparable to a peer raised in similar conditions.

Comprehension of translation equivalents

Out of the total words understood at 1;4.15, seven comprehension TE pairs were identified. As shown in Table 3, the first three comprehension TE pairs emerged before age 1;0 (as the CDI was completed on Issa's first birthday, they must have been understood before or on that day). The first TEs, *peek-a-boo* and *inai-inai-ba*, were understood at 0;9 and 1;0 respectively. As the two terms referred to an action game where the parents and subject hid and exposed their faces repeatedly, Issa was probably aware that they referred to the same activity. Thus, there is assurance that some of the comprehension TEs were 'true TEs', i.e. referring to the same object or event.

Table 2. Comparison of Issa's early comprehension with Freddy

Age	Issa			Freddy			
	English	Japanese	Total	English	German	Japanese	Total
1;0	16	3	19	15	0	0	15
1;1	19	4	23	21	0	1	22
1;2	24	4	28	27	0	1	28
1;3	43	5	48	40	0	2	42
1;4	60	10	70	52	29	2	83

Table 3. Time gap between receptive translation equivalents

	English	Japanese	Time gap (months)
1	<i>Peek-a-boo</i> (0;9)	<i>Inai inai ba</i> (1;0)	3
2	<i>Eat</i> (1;0)	<i>Manma</i> (0;11)	1
3	<i>No</i> (1;0)	<i>Dame</i> (1;0)	0
4	<i>Doggie</i> (1;1.15)	<i>Wanwan</i> (1;3)	1.5
5	<i>Give</i> (1;3)	<i>Chodai</i> (1;1)	2
6	<i>Hi</i> (1;3)	<i>Konnichiwa</i> (1;4.15)	1.5
7	<i>Train</i> (1;4)	<i>Densha</i> (1;3.15)	0.5

Table 3 also shows that there was no significant time lag between the comprehension of a new word and the comprehension of its equivalent with an average mean time of 1.36 months. One pair, *no* and *dame*, was recorded in the same month; indicating that Issa faced little difficulty in ‘accepting’ different terms in reference to the same object or event. The results here concur with the observations of Leopold (1939) and the findings of De Houwer et al. (2006) that bilingual infants understand TEs at a young age. In addition, Issa’s data show that comprehension TEs emerged in the pre-linguistic stage as he uttered his first word at age 1;3 and acquired his first pair of production TEs at 1;5. Data from the present study also indicate that comprehension TEs emerge even when input is uneven between the two languages of exposure and the receptive vocabulary of one language is much larger than the other.

In the first year, the world of the bilingual infant is very small. He is still relatively immobile, sleeps frequently and spends most of his or her time indoors. As the infant is repeatedly exposed to the same semantic forms in both languages in the limited contexts that he or she encounters daily, it is reasonable to expect that before the first words are uttered, there is an understanding that two different words can have the same meaning. The bilingual-to-be does not reject bilingual synonyms as the Principle of Contrast suggests but readily accepts them and in doing so, takes the very first step

towards becoming bilingual.

Conclusion

It has been shown that comprehension development in infancy is not necessarily balanced between the two languages the bilingual infant is exposed to from birth. The number of words comprehended in each language was found to be positively linked to the amount of exposure to it. The results also reveal that the rate of comprehension of new words accelerated from age 1;3, although this occurred for the language which was most understood. Although group-based studies have established that great inter-individual variability exists in the language development of bilingual infants, the present study also suggests that bilingual infants in similar linguistic conditions may share similarities in comprehension development as the data of Issa and Freddy, the subject of Quay (2001), demonstrate. It has also been found that comprehension TEs emerged prior to first words. Despite having a much larger receptive vocabulary in English compared to Japanese, Issa showed an understanding of bilingual synonyms months before he uttered his first words and produced his first TEs. The ability to understand TEs suggests that, at the pre-linguistic stage, the bilingual-to-be has already embarked on a process necessary for bilingual development and has the capacity for dual lexical acquisition.

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