A Japanese-German-English Trilingual Child's Word Acquisition Patterns, Focusing on Category Differences in Comprehension and Production

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Abstract

The current study focused on trilingual (German, Japanese, and English) word acquisition by a single child to investigate relationships or patterns among the different categories of words produced and comprehended in the three languages at each time interval, and to observe word acquisition in the three languages and changes in word category patterns over the period of 14 months. The findings of the current study show that in trilingual acquisition, the three languages develop quite differently, with different dominance, but interactively. Typologically close languages show greater interaction, but even languages without typological similarities can interact, suggesting the shared knowledge of three languages in a trilingual child.

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Problem

Most bilingual studies including Japanese tend to focus on Japanese-English bilinguals, as many studies on this topic have been performed by English educators. However, there are great many other foreign languages spoken in combination with Japanese at home, as there are increasing numbers of foreigners living and raising children in Japan, as well as children of Japanese families living overseas. The linguistic environment becomes more complicated when each parent's language is different from the society's language, such as a Chinese-speaking mother and English-speaking father living in Japan. While such cases tend to be treated as very special, the use of more than two languages at home is not very rare in this increasingly mobile world. Many parents of multilingual homes are concerned about their children's language development, but not much data about how multiple languages develop in children is available, especially when Japanese is one of the languages, and much less is available in the case of trilingual acquisition.

As in research of second language acquisition, in multilingual developmental research, much interest has been on interlanguage transfers. They are interesting, as they demonstrate the interaction of knowledge of the languages and by clarifying locus and mechanism of such transfers, we may gain insight into cognitive processes in a language-acquiring child. Results of cognate processing by older bilinguals suggest that the concepts or meanings of words that are similar between the two languages are shared in the minds of bilinguals. Thus, form similarity probably has a role in word acquisition in multilingual children too.

Bilingual/multilingual children acquire translation equivalents across languages. Some of them may be cognates, but others may be very different in form. We do not know which type is easier for children to acquire, but the knowledge of words in one of the languages seems to facilitate acquisition of equivalents in the other languages. Lanver (1999) formally proposed this idea concerning bilingual word acquisition and invented the term "bilingual lexical bootstrapping." This idea can be expanded to trilingual acquisition too.

As far as simultaneous multilingual acquisition of words is concerned, one can hypothesize that words of languages with closer similarities may develop more closely to each other, while words of languages that differ greatly in concepts should develop more independently.

It is usually the case that one of the languages is used much more often in some situations than the other. A bilingual or multilingual child can only hear words in one of the languages at a given moment without translation subtitles. Therefore, translation equivalents are not acquired all the time, and there is usually an imbalance of types of vocabularies that the child has in each of the languages. Thus, I hypothesize that some word categories are more developed in one of the languages than the rest, and that there is always a difference in dominance of the languages.

However, if the situations where words in one language and their equivalents in another are used similar, the equivalents may be acquired more easily and possibly jointly. This raises the possibility of similarity effect of situations on types of word acquisition across the languages.

The current study focused on trilingual (German, Japanese, and English) word acquisition by a single child to investigate relationships or patterns among the different categories of words produced and comprehended in the three languages at each time interval, and to observe word acquisition in the three languages and changes in the word category patterns over a period of 14 months.

Methods

A boy born in a multilingual family who was exposed to three languages, German, Japanese and English, from birth was followed in order to observe his vocabulary development. He was the only child of the family, and his mother was a native speaker of Japanese and father was a native speaker of German. Both parents used English as primary main language with each other.

MacArthur-Bates Communicative Development Inventory was used for the three languages; German, (Szagun, Stumper, & Schramm, 2009), Japanese (Ogura & Watamaki, 2004; Watamaki & Ogura,2004) and English (Fenson, Marchman, Thal, Dale, Reznick, & Bates, 1992). Data were collected when the boy was 26 months old until he was40 months. The parents agreed to participate in the study and were asked to fill in vocabulary checklists in the three languages. Data were collected 9 times (26, 28,29, 31, 34, 36, 37, 39, 40 mos.) The child's words were checked by each of the native speakers; Japanese by mother, German by father. English was checked by the mother. Both parents were very fluent in English. Linguistic environment: data were collected on the amounts of each language used with the child, as well as between the parents. Also, the places where the child spent time in a typical week were ascertained, as well as the main language used in those places.

Parents were also asked to make notes on any special changes in the child's life and linguistic environment.

Results

Changes in language environment and developing vocabularies

Table1 shows the summary of the child's language inputs and linguistic environments during the period of study. Fig.1 compares numbers of words produced and comprehended in the three languages at each age interval. Table 2 shows linguistic age, and Table 3 shows grammatical age of the child at each interval. The areas shaded with grey in Tables 2 and 3 indicate that the child's linguistic/grammatical age fell below the expected level of the monolingual standard of each language.

The parents were determined to bring him up trilingually and were aware that Japanese would easily be the weakest language once he entered school in the U.S. Thus, the mother, who was in fact quite fluent in German too, focused on using Japanese with him throughout the study period. Probably due to the parents' efforts, the child was most dominant in Japanese, both in terms of vocabulary and grammar, in comparison to other two languages, and his Japanese level was on par with his monolingual counterparts, something which was not achieved in the other two languages.

While Japanese was quite solid and not affected much by the changes in linguistic environments, the two weaker languages proved to be more susceptible to such changes. Neither vocabulary nor grammatical ages for the three languages reached the child's real age, except for the Japanese vocabulary age from 29 months onwards, and Japanese grammatical age (particle) at 36, 29 and 40 months, and German sentence complexity at 26 months. Japanese was the strongest language throughout, and the order by strength was almost always Japanese > English > German, except for at 26 and 28 months. At 29 months, the boy was immersed in Japanese, as he stayed with his grandparents in Japan. From that point on, his Japanese production became clearly superior and stayed that way. As is often the case with bilingual and monolingual children, the child's confidence with the language was boosted by the significant increase in inputs during his stay at the grandparents', resulting in increase in production. Similar effects were seen in his English production at 31 months when his hours at English daycare were increased, and in his German production at 34 months when he entered German preschool, combined with his stay in Germany at 31 moths. Interestingly, at 34 months, the great increase in his German production coincided with a decrease in his English production, while no such change was seen in his

Japanese production. This is probably because Japanese had already reached the equivalent level with Japanese monolinguals and was strong enough to remain unaffected by the sudden change in German input, while English was still relatively weak and susceptible to the change. It is not very rare to find one or more points in bi/multilingual child's language development where he/she suddenly becomes less capable of one of the languages than previously. Probably, when levels of the two languages are not very high and compatible, and there are close similarities of words and situations of language use, a huge change in input such as by visiting another country, causes a temporarily inverse effect on the other language.

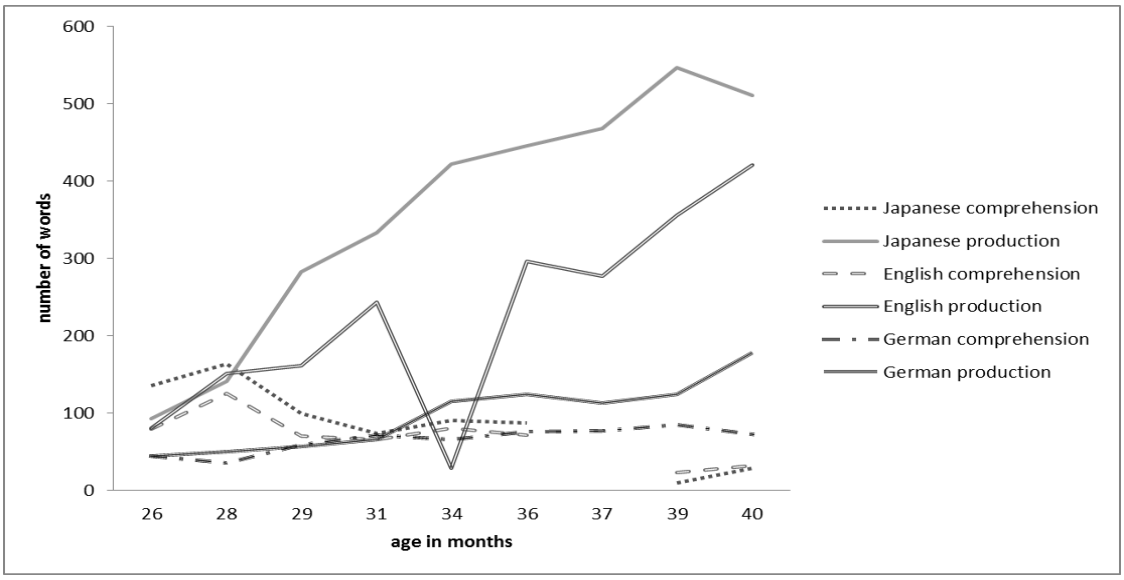

Fig.1 Vocabulary development of the three languages

Table 1. Summary of the child's language environments

		26mos.	28mos.	29mos.	31mos.	34mos.	36mos.	37mos.	39mos.	40mos.
Mother →Child	English	20	15	0	8	5	5	0	5	5
	Japanese	60	80	100	90	90	90	90	70	80
	German	20	5	0	2	5	5	10	25	15
Father →Child	English	40	50	30	20	30	20	25	20	20
	Japanese	20	20	20	30	20	10	25	15	10
	German	40	30	50	40	50	70	50	65	70
Mother → Father	English	60	50	0	50	40	40	40	40	50
	Japanese	20	30	0	40	40	50	50	50	30
	German	20	20	0	10	20	10	10	10	20
Father → Mother	English	50	40	50	40	40	30	40	50	40
	Japanese	30	40	40	50	40	50	50	40	40
	German	20	20	10	10	20	20	10	10	20
Place Child stayed 1		Home	Home	Grandparents' in Japan	Home	Home	Home	Grandparents' in Japan	Home	Home
(Language(s) used)		J・E	J・E	J・E	J・E	J・E	J・E	J・E	J・G	J・G
Hours/day		11	16	11	4	16	4	24	15	16
Place Child stayed 2			preschool		play group	preschool	preschool		preschool	preschool
(Language(s) used)			E		J	G・E	G		E・G	E・G
Hours/day			8		2	8	8		6	8
Place Child stayed 3					daycare				daycare	
(Language(s) used)					E				E	
Hours/day/day					6				3	
Notable changes in Child's life & lingustic environment		none	none	went back to Japan for 2 wks.	increased Day care in English. Went to Germany for 1 wk.	started preschool in German	wentback to Japan for 3 wks.	travel to Japan	fewer kids at German preschool due to holiday	more chance to speak in German at preschool

Table 2 Vocabulary ages for the three languages

Chronological Age	26mos.	28mos.	29mos.	31mos.	34mos.	36mos.	37mos.	39mos.	40mos.
Japanese	24	25	30	32	34	over 36	over 36	over 36	over 36
English	16-22	16-22	16-22	23-24	16-22	23-24	23-24	16-22	23-24
German	21-22	21-22	22-23	22-23	24-25	24-25	24-25	24-25	25-26

Table 3 Grammatical ages for the three languages

Chronological Age	26mos.	28mos.	29mos.	31mos.	34mos.	36mos.	37mos.	39mos.	40mos.
Japanese particles	23-24	16-22	25	25	31	36	35	over 36	36
Japanese auxilaries	16-30	16-30	16-30	16-30	16-30	16-30	16-30	16-30	16-30
English word forms	16-22	16-22	16-22	23-24	16-22	23-24	23-24	16-22	23-24
English word endings	16-30	16-30	16-30	16-30	16-30	16-30	16-30	16-30	16-30
German gramatical complexity	18-24	18-24	27	18-24	27	25	18-24	28-29	25
German sentense complexity	27	18-24	18-24	25	28-29	27-28	26-27	27-28	27-28

Table 4 Correlations among word categories and total number of words across the three languages

	Infant words	Animals	Vehicles	Toys	Food	Clothes	Body parts	Furniture	Small house-hold items	Outdoor items	Outdoor places & items	People	Gree-tings	Actions	Time	Descrip-tion	Pronoun s	Ques-tions	Location	Numbers	Connect -ives	Total words
Jpn × Eng		.73*		.91**	.86**	.81*			.85*	.92*	.83**	.91*		.77*		.81**	.88**		.69*	.73*		.88**
Eng × Gr		-.69*	.70*	.69*	.78*		.71*	.80*	.81**	.86**	.83**											.87**
Gr × Jpn				.70*	.72*	.72*			.67*	.76*	.77*		.73*		.90*							.87**

To determine whether the developing words of the three languages were related, correlations were sought for both total number of words in vocabularies and for each word category (set).

Only significant ($p<.05$) correlations with greater than medium strength are reported here. The total numbers of words produced and some types of words correlate strongly, but others do not.

Five categories were found to be correlated across the three languages; Toys, Food, Small household items, Outdoor items, Outdoor places & items. These words had to do with activities done at home, and all three languages were used at home, thus correlated.

Some categories were found to be correlated only between Japanese and English. Six categories were found to be so: People, Actions, Descriptions, Pronouns, Locations, and Numbers. These may be more related to the activities done by the mother who spoke both Japanese and English.

Similarly, there were some categories which were correlated only between English and German. Three such types were found: Vehicles, Body parts, Animals (negative). These categories were likely related because the words were similar between the two languages, and names of vehicles had more to do with toy play with the father. There is not a reasonable explanation for the negative correlation for animal names, but it might be that the animal names were too similar between the two languages, and the knowledge of one may have hindered production of words in the other. There were also two categories correlated only between German and Japanese: Greetings and Time. Greetings not only included routine greeting expressions, but also casual interaction words such as *shiii* (Japanese) and *psst leise* (German) ("shush" in English). These kinds of words are not really taught or learned in formal language learning; therefore, it is very likely that the parents used words in their own languages in such situations and English words were not used. Expressions about time such as *now*, *yet*, and so forth are learnt in foreign languages, and both parents should know them but simply did not talk about time in their foreign language.

Interestingly, some categories showed no correlation. Three such types were found; Infant words, questions, connecting words. These words were quite different in form across the three languages, and language specificity played a greater role.
The analyses of correlations among categories suggest interrelations of words with

similar concepts and meanings among the languages and that they depend on situations where words were learnt, as well as on their linguistic similarities.

Interrelations among word categories comprehended and produced

The correlations found above are of the aggregate of the nine intervals. They were meaningful in examining the overall interaction of the three languages; however, varying knowledge in the course of development and interaction of the three languages of the child are lost in such analyses. Given the changing linguistic environments of the child, it may be more interesting and insightful to pin them down at each age interval. To do so, correspondence analyses were conducted for all the categories produced and comprehended in the three languages for each interval separately (from Fig.2 to Fig.10).

At each age interval, different distributions of word categories showing different relationships were found. Types of words (word categories) produced and comprehended in each language were considered and compared here.

Table 5 Keys used in quadrants

Category names in quadrant	Meanings
sound	sound (baby words)
animal	animals
vehicle	vehicle
toys	toys
food	food
clothes	clothes
body	body parts
room	room and furniture
items	small household items
outside	items outside home
places	places
people	people
games	games and routines
action	action (verbs)
time	time
descpt	description (adjectives)
pron	pronouns
questn	questions
prepos	words indicating temporal & spatial locations
number	numbers and quantity
connec	connectives
Jcom	Japanese comprehension
Jpro	Japanese production
Gcom	German comprehension
Gpro	German production
Ecom	English production
Epro	English production

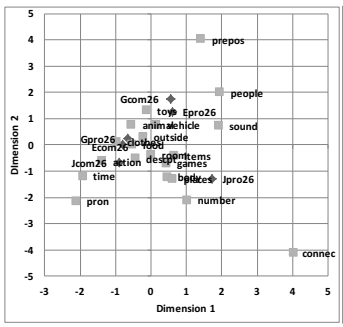

fig. 2 26 months

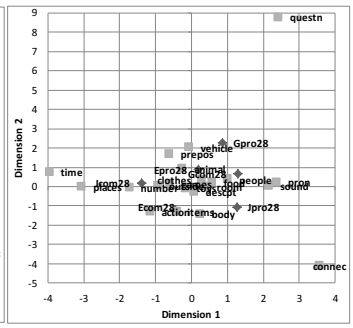

fig.3 28 months

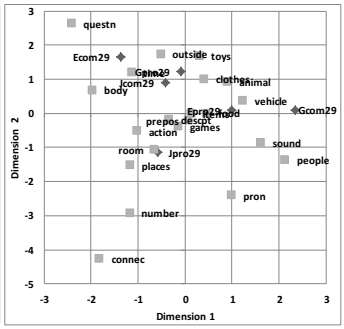

fig.4 29 months

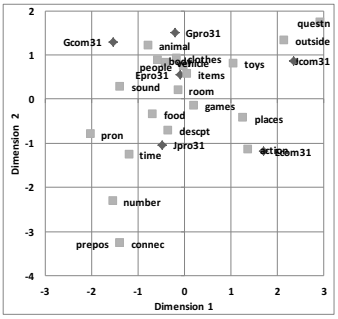

fig. 5 31 months

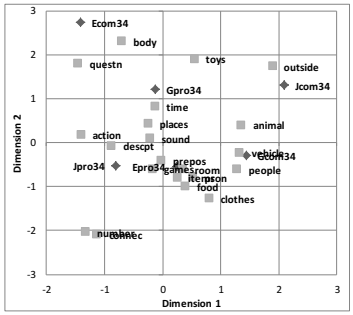

fig. 6 34 months

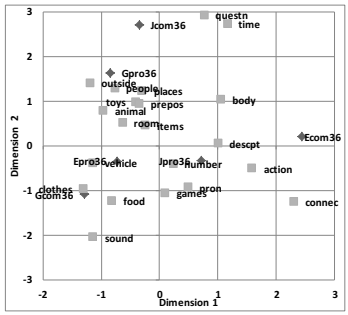

fig.7 36 months

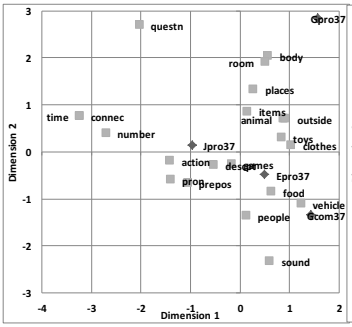

fig.8 37 months

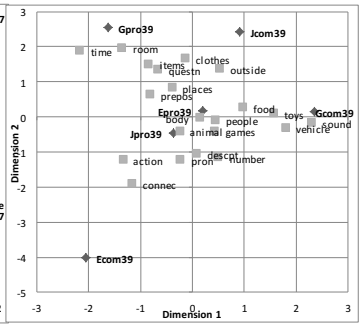

fig.9 39 months

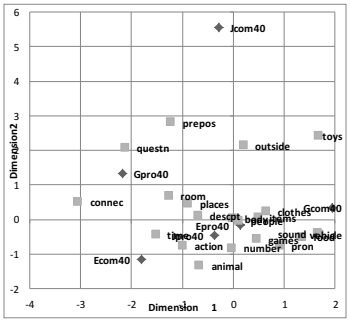

fig.10 40 months

In general, Japanese production is almost always plotted alone in a separate quadrant from the other two languages, suggesting the kinds of words that the child learned first in Japanese were not really related to the kinds of words he produced or knew in the other two at each stage. In the same quadrant as Japanese production, there tended to be more advanced word types, such as number, connectives, times, and actions (verbs), suggesting the child acquired such abstract concepts when acquiring Japanese words.

English production and German comprehension often belong to the same quadrant, sharing similar characteristics at each age. For instance, at 31 and 36 months, the categories such as vehicles and clothes were shared. This suggests that such words were learned and produced first in English, and their knowledge was transferred to German, thus demonstrated as German production. This is probably due to the linguistic similarities and the situational similarities of acquisition, as German and English words were heard more outside the home as the child attended German school

and received English day care, and the situations in which the words were used may have been more similar than those in which Japanese words were used, which was mostly at home and which was much more advanced.

From 39 months on, this tendency of Japanese production to be independent of the others changed. English comprehension entered the same quadrant at 39 and at 40 months, where the abstract word categories such as action, connectives, and time also exist. This suggests that from around this point, the abstract concepts learned and produced in Japanese transferred and demonstrated themselves in English comprehension.

Discussion

The current study was conducted to observe word acquisition of three languages and relationships among the word categories in three languages in a trilingual child.

As far as the numbers of words in production and comprehension are concerned, the three languages developed quite differently. Japanese, to which the child was exposed the most since birth, was the strongest and stable, while the other two lagged behind and were affected by changes in inputs.

In terms of types of words learned, they were related in different ways, suggesting some knowledge of words were shared in acquisition, especially among English and German, while Japanese tended to be independent as expected from language similarities. But, this may be because Japanese was always the strongest and most stable language throughout, and the level of concepts in Japanese was too high for words known in the other two languages to be used to express. Acquiring concepts in one language should help acquisition of equivalent words in other languages, but the gap between the level of Japanese and the levels of the other two was too big for that to occur. Nonetheless, this can happen when the gap is small enough. As the English ability strengthened, the concepts acquired in Japanese began to be shared with English. This may also suggest that even among languages of smaller form similarities, concepts and knowledge can be shared. The form similarities may be the easiest and most obvious for the child to match the equivalents, but it is likely that the situational similarities may also provide a cue. Probably, when both situational and form similarities are low, it can be quite hard for the child to internalize the matching equivalent words, even concepts and meanings of the words that have already been acquired in one of the languages.

All in all, the findings of the current study show that in trilingual acquisition, the three languages develop quite differently but interactively, with different dominance. Typologically close languages show greater interaction, but even languages without typological similarities can interact, suggesting the shared knowledge of three languages in a trilingual child.

Only language types and categories were considered in this study, but similarities should be examined in more detail to further reveal the cognitive processes of multilingual word acquisition in a child.

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