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MATERNAL SPEECH AND BEHAVIOR DURING MOTHER-INFANT PLAY: COMPARISON BETWEEN THE UNITED STATES AND JAPAN

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Abstract

The present study investigated cultural characteristics of maternal speech and behaviors during mother-infant play. Forty-four 13-month-old infants and their mothers were recruited in the United States and Japan and observed at their homes. The results showed that American mothers emphasized labeling objects, talking about infants' activities and states, and encouraged infants, by giving, showing, and pointing an object more than their Japanese counterparts; whereas, Japanese mothers emphasized social routines and empathy, by showing the model and gesturing. Mothers' behaviors were less than speech in frequency; however, most speech entailed behaviors so that infants can easily understand what mothers say. Findings suggest that American culture emphasizes language and self development and Japanese culture emphasizes social and emotional development. The studies of maternal speech and behaviors have been done from the view point of language development and further research is needed to investigate the relationship between maternal speech and behaviors and child language and social development.

Key Words: maternal speech and behavior, mother-infant play, language, social routine, development, cultural comparison.

Introduction

In the beginning of the second year, infants begin to produce single-word utterances and mothers become aware of infant language comprehension and production. In the pre-linguistic period, maternal speech is characterized as unclear, short, simple, baby-centered utterances, frequent repetitions, and exaggerated expressions so that infants can understand words (Newport, Gleitman & Gleitman, 1977; Snow, 1977; Keye, 1980; Morikawa, Shand & Kosawa, 1988). However, few relations between speech characteristics in pre-linguistic period and language production have been studied. Many studies have reported that maternal speech, especially maternal verbal responsiveness to infants

influences infant language acquisition and predicts later language functioning, including vocabulary comprehension (Baumwell, Tamis-LeMonda, & Bornstein, 1997; Bornstein & Tamis-LeMonda, 1997; Bornstein, Tamis-LeMonda, & Haynes, 1999; Bornstein, Tamis-LeMonda, Tal, Ludemann, Toda, Rahn, Pecheux, Azuma, & Vardi, 1992; Tamis-LeMonda, Bornstein, Kahana-Kalman, Baumwell, & Cyphers, 1998; Bretherton & Bates, 1984; McLaughlin, White, McDevitt, & Raskin, 1983; Moerk, 1980; Toda, Azuma, & Bornstein, 1993). Bornstein et al., found that maternal speech to infants increased from 5 months to 13 months (1992), and maternal verbal responsiveness was stable from 13 to 20 months and predicted child vocabulary development (1999). It is suggested that maternal verbal responsiveness to infants with speech characteristics in pre-linguistic period may be one of the important factors for infant language development (Bloom, 1993).

Studies mentioned above have focused on maternal speech, but it is not clear whether mothers' behaviors are also related to infant language acquisition. Tamis-LeMonda, Bornstein, Cyphers, Toda, & Ogino (1992) observed mothers' behaviors in a mother-infant play situation and analysed them by using the same categories as infant play. The result shows that mother's play influenced infant play at 13 months of age. In contrast to the fact that American infants produced words more than Japanese infants, Japanese infants played at higher level than American infants did. Another study also found that maternal responsiveness predicted 18-month-old's play (Spencer & Meadow-Orlans, 1996). These studies show that maternal behaviors are associated with infant play development, but they are not reported whether mothers' behaviors contribute to infant language development. Toda et al., found that mother's nurturing responsiveness predicted infant language production (1993), but in this study, nurturing behaviors include both verbal and behavioral responsiveness. In daily life, when mothers play with infants, they interact with infants in a variety of behaviors such as giving, receiving, pointing a toy, or showing a model and so forth. On the other hand, infants look at such mothers' behaviors and at the same time they hear what she talks to them. Through mother-infant interaction, infants acquire the basic communicative skills such as turn-taking; consequently, infants become to understand and produce a word. However, previous studies have overlooked these mothers' behaviors which occur in mother-infant interaction every day and the association between maternal speech and behaviors.

To understand what kinds of maternal speech and behaviors infants select in mother-infant interaction, many researchers have investigated developmental process in language acquisition by comparing with different countries. In previous studies, some researchers reported the differences of maternal speech in pre-linguistic period in the United States and Japan (Bornstein, Tamis-LeMonda, Ludemann, Rahn, Tal, Toda, Pecheux, Azuma, & Vardi, 1992; Fernald & Morikawa, 1993, Toda, Fogel & Kawai, 1990). The most remarkable differences were the mother's communicative styles in a play situation. In the United States, mothers emphasized language in a way that mothers labeled and asked about objects. As a result, American infants may produce words more than Japanese infants do at 13 months like Tamis-LeMonda et al., found (1993). On the other hand, Japanese mothers emphasized social routines such as greeting or expressing empathy (Fernald & Morikawa, 1993). Fernald & Morikawa also found that mother's

communicative styles were similar between two countries even though infants got older. Toda et al.,(1990) showed that American mothers talked to 3-month-old infants like speaking to adult and Japanese mothers talked to infants using nonsense sound, onomatopoeia, calling the infant name and baby talk. These studies clearly show that even though mothers in both countries respond to infants, the contents they talked to infants or their communicative styles are different between two societies ; consequently the associations between infant language development and maternal speech and behaviors may differ in the United States and Japan. However, it is not clear in what ways infants select maternal speech and behavior for the acquisition of linguistic knowledge and communicative skill (Blount, 1972), because few studies have investigated the relation between maternal speech and behaviors.

The present study focuses on only maternal speech and behaviors, and investigates

1) maternal speech and behavioral characteristics during mother-infant play, 2) the cultural characteristics of maternal speech and behaviors in the United States and Japan, and 3) the association between maternal speech and behaviors. When mothers talk to their infants, what behaviors do mothers show to infants? Do such behaviors differ in two societies? In maternal speech, we expect that American mothers will emphasize labeling objects by showing them. Whereas Japanese mothers will emphasize social routines by talking and showing a model about social manners or empathy as previous studies found. However, mothers' behaviors such as showing or giving a toy to infants may not differ between two countries.

Methods

Subjects: Forty-four 13-month-old infants and their mothers were recruited in the United States and Japan. Infants were full term and no complications at birth (male=10, female=12 in the US, male=11, female=11 in Japan). Mothers' average age was 31 years old in the United States and 29 years old in Japan at 5 months. The data in the present study were part of longitudinal study.

Procedures: The procedures were identical in both countries. The mother-infant play was observed for 15 minutes in their homes and videotaped. The mothers were asked to play with their infants using toys which were provided by an experimenter. Toys were appropriate for 13 months: a ball, a train, a doll and blanket, a teapot with cover, two spoons, two teacups and saucers, and two books.

Data reduction and coding: The present study analysed only three modes in maternal speech: labeling, social routines, and speech topics (Table 1). As seen in table 1, labeling is divided into two categories: adult form and onomatopoeia, social routines were 5 categories, and speech topics were 6 categories. Mother behaviors were 8 categories: giving, receiving, modeling, showing, gesturing, pointing, co-playing and other. Maternal speech and behaviors were coded by stopping the videotape whenever mothers stop their speech or change their behaviors. For example, if mothers say "spoon" showing a spoon, "labeling (adult form)" in speech and "showing" in behavior are counted. If mothers did not talk or behave more than two seconds, the next maternal speech or behavior was counted as a new utterance or behavior.

Table 1 Description of maternal speech and behaviors

1. Maternal Speech	English	Japanese
1) Label : Labeling the objects		
a. Adult form	Train	Kisha
b. Onomatopoeic form	Choo-choo	Poppo
2) Social Routines : Talking about social routines		
a. Greeting	Hello	Konnichiwa
b. Social routines	Thank you or please	Arigato or dozo
c. Empathy or feelings	Make nice or hug the doll	Kawai kawai shite
d. Encouragement	Good or that's right	Jozu jozu
Praise infant behavior		
e. Other : Including correction of infant's positive or negative words		
3) Speech Topic: Occur in either syntactic style		
a. Objects	A ball is yellow	Boru kiiro ne
Talking about objects		
b. Infant activities	Throw the ball	Boru nagete
Talking about infant action		
c. Infant state	What do you think?	Doo omou?
Talking about infant state		
d. Mothers	I can throw the ball	Boru nageruwayo
Talking about herself	to you	
e. Suggestion/Invitation	How about this toy?	Kono omocha wa do?
Suggesting something to infants		
f. Other		
2. Mothers' Behaviors		
1) Giving/Offering	Give or offer an object to infant	
2) Receiving	Receive an object from infant	
3) Modeling	Modeling behavior using toys	
4) Showing	Show an object to infant	
5) Pointing	Point an object	
6) Gesturing	Gesture something	
7) Co-playing	work together or support infant play	
8) Other	Do something with an object or prepare the next activity.	

Result

1. Maternal speech and behaviors

The total number of utterances in maternal speech was 195.5 (SD 66.0) in the United States and 136.6 (SD 50.2) in Japan, and an ANOVA showed the significant difference in country ($F(1,43) = 11.06, p < .002$). The total number of behaviors was 130.3 (SD 46.3) in the United States and 101.7 (SD 41.2) in Japan, and an ANOVA showed the significant difference in country ($F(1,43) = 5.08, p < .03$). Consequently, ANOVAs for speech and behavioral categories were conducted controlling the total number of utterances or behaviors to examine the culture differences. Figure 1 shows the total frequencies of speech in each mode. ANOVAs were conducted for labeling, social routines and speech topic respectively to compare the United States with Japan. There were significant differences in labeling, social routines and speech topic. American mothers labeled the name of an object ($F(1,43) = 9.59, p < .01$), talked about objects or infants ($F(1,43) =$

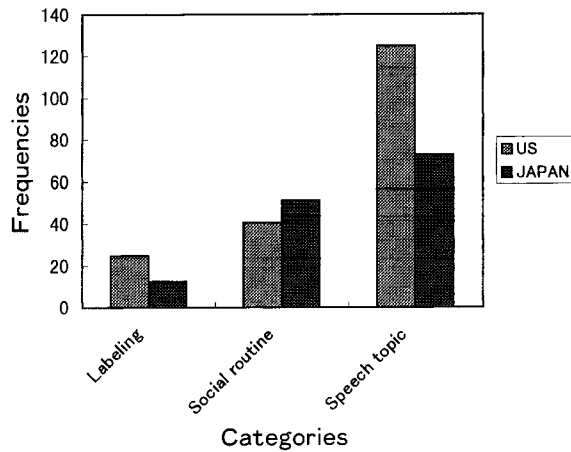


Figure 1 Mean frequencies of maternal speech

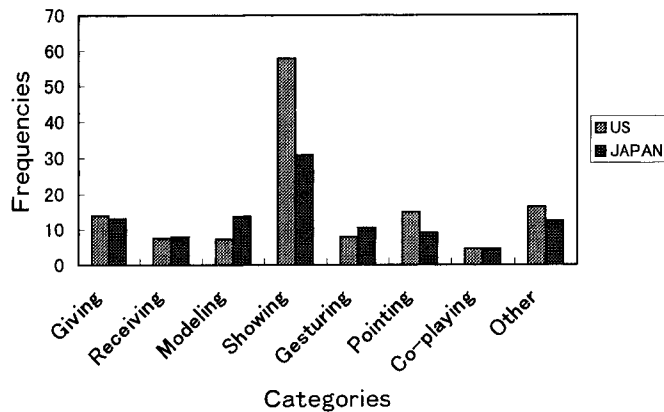


Figure 2 Mean frequencies of mothers' behaviors during speech

155.63, $p < .001$) more than Japanese mothers did, whereas Japanese mothers talked about social routines ($F(1,43) = 18.21$, $p < .001$) more than American mothers did. Figure 2 shows the total frequencies of mothers' behaviors when mothers talk to infants. There were significant differences in modeling, showing, pointing. American mothers showed ($F(1,43) = 14.01$, $p < .001$) and pointed a toy to infants ($F(1,43) = 5.83$, $p < .05$) more than Japanese mothers did, whereas Japanese mothers showed a model more than American mothers did ($F(1,43) = 4.86$, $p < .05$). However, when the total frequencies of behaviors were controlled, giving and gesturing became significantly different between two countries. American mothers gave a toy more than Japanese mothers did ($F(1,43) = 23.13$, $p < .001$), whereas Japanese mothers gestured more than American mothers did ($F(1,43) = 14.17$, $p < .001$). These results show the cultural characteristics in maternal speech and behaviors.

2. Labeling

Mean frequencies of labeling and behaviors show in table 2. ANOVAs were carried

Table 2 Mean frequencies of maternal speech and behavior : Labeling

Categories	US Mean (SD)	Japan Mean (SD)	Signif.
Labeling			
1) Adult form	22.4 (16.6)	8.9 (6.8)	**
2) Onomatopoeic form	2.5 (3.5)	3.6 (3.6)	*
Behavior			
1) Giving/Offering	1.2 (1.7)	1.0 (1.4)	**
2) Receiving	0.5 (0.9)	0.3 (0.7)	
3) Modeling	1.3 (4.5)	1.1 (2.7)	
4) Showing	11.3 (9.3)	4.0 (3.6)	***
5) Pointing	5.2 (5.5)	1.6 (2.0)	
6) Gesturing	0.3 (0.6)	0.3 (0.9)	
7) Co-playing	0.05 (1.1)	0.05 (1.0)	
8) Other	1.0 (1.1)	0.5 (1.0)	

* $p < .05$ ** $p < .01$ *** $p < .001$

out controlling the total number of speech and behaviors. There was significant difference in labelling. American mothers labeled objects with adult form more than Japanese mothers did ($F(1,43) = 7.29$, $p < .01$), whereas Japanese mothers talked to infants with onomatopoeic form more than American mothers did ($F(1,43) = 5.08$, $p < .05$). In behaviors there were significant differences in giving and showing. When American mothers talked to infants, they were likely to give ($F(1,43) = 8.11$, $p < .01$) or show a toy ($F(1,43) = 11.98$, $p < .001$) to infants. These findings suggest that American mothers emphasize the word in a way that they try to get attention from infants and teach a word by giving or showing a toy to accord with the name of an object so that infants can understand more easily.

The correlation analyses between labeling and behaviors were carried out in each country respectively. In the United States, "labeling" was positively correlated with co-playing ($r = .50$, $p < .05$), pointing ($r = .66$, $p < .001$), receiving ($r = .45$, $p < .05$), and showing ($r = .92$, $p < .001$). It means that American mothers tended to label an object when they co-played with infants, received a toy from the infant, showed or pointed a toy. On the other hand, in Japan "labeling" was positively correlated with giving ($r = .57$, $p < .05$), modeling ($r = .57$, $p < .01$), showing ($r = .67$, $p < .001$), and gesturing ($r = .53$, $p < .05$). Japanese mothers tended to label an object when they gave or showed a toy, showed a model or gestured. These results suggest that even though mothers label an object, how to get attention from infants or how to teach a word was different in two societies.

3. Social routines

A table 3 shows mean frequencies of social speech and behaviors in each country. ANOVAs were carried out controlling the total number of speech and behaviors. There were significant differences in encouragement, social routines, and empathy. American mothers encouraged infants more than Japanese mothers did ($F(1,43) = 15.26$, $p < .001$), whereas Japanese mothers talked about social routines ($F(1,43) = 4.97$, $p < .05$) and empathy ($F(1,43) = 4.89$, $p < .05$) more than American mothers did. In behaviors there

Table 3 Mean frequencies of maternal speech and behavior : Social routines

Categories	US Mean (SD)	Japan Mean (SD)	Signif.
Social routines			
1) Greeting	13.5 (9.9)	14.6 (13.8)	
2) Social routines	7.0 (6.9)	22.5 (16.9)	*
3) Empathy or feelings	4.9 (5.0)	18.4 (16.2)	*
4) Encouragement	14.5 (7.5)	3.4 (2.8)	***
5) Other	1.3 (2.8)	1.4 (3.5)	
Behavior			
1) Giving	3.5 (3.6)	7.0 (5.3)	**
2) Receiving	4.5 (4.3)	5.2 (5.2)	
3) Modeling	2.9 (3.6)	9.1 (9.4)	*
4) Showing	6.3 (5.0)	6.1 (7.0)	
5) Pointing	0.5 (0.9)	1.3 (2.8)	
6) Gesture	3.0 (2.8)	7.3 (1.5)	**
7) Co-play	1.7 (2.1)	1.5 (1.9)	*
8) Other	2.0 (1.8)	2.7 (3.5)	*

* $p < .05$ ** $p < .01$ *** $p < .001$

were significant differences in giving, modeling, gesturing, co-playing and other. American mothers co-played more than Japanese mothers did ($F(1,43) = 5.11$, $p < .05$), whereas Japanese mothers gave a toy ($F(1,43) = 7.84$, $p < .01$), showed a model ($F(1,43) = 6.90$, $p < .05$), and gestured ($F(1,43) = 7.38$, $p < .01$) more than American mothers did. In mother-infant play, Japanese mothers preferred the use of a doll when they express the empathy or feelings.

The correlation analyses between speech and behaviors were carried out in each country respectively. In the United States "social routines" were positively correlated with receiving ($r = .83$, $p < .001$). American mothers were likely to talk about social routines such as "thank you" when they received a toy from infants. In Japan, "greeting" was positively correlated with gesturing ($r = .49$, $p < .05$) and showing a model ($r = .52$, $p < .05$). "Social routines" were positively correlated with giving ($r = .48$, $p < .05$), receiving ($r = .77$, $p < .001$), showing a model ($r = .57$, $p < .01$), gesturing ($r = .68$, $p < .001$), and pointing ($r = .53$, $p < .05$). "Encouragement" was positively correlated with co-playing ($r = .61$, $p < .01$). When Japanese mothers talked about greeting, they were likely to show a model or gesture, and also Japanese mothers were likely to talk about social routines when they gave and received a toy from infants, pointed a toy, showed a model or gestured. "Empathy" was positively correlated with giving ($r = .50$, $p < .05$), gesturing ($r = .51$, $p < .05$). When Japanese mothers talked about empathy, they were likely to give a toy or gesture. Also when Japanese mothers co-played with infants, they were likely to encourage infants. These findings that Japanese mothers talked about social routines or empathy by giving, receiving, showing a model, pointing, or gesturing more than American mothers suggest that Japanese mothers teach social manners and empathy using toys, especially a doll, in contrast to American mothers who teach the name of objects.

Table 4 Mean frequencies of maternal speech and behavior : Speech topics

Categories	US Mean (SD)	Japan Mean (SD)	Signif.
Speech topic			
1) Objects	52.2 (23.4)	40.2 (21.6)	***
2) Infant activities	61.0 (28.8)	24.1 (14.6)	***
3) Infant states	7.8 (5.3)	3.5 (3.0)	**
4) Mother themselves	0.9 (1.1)	0.5 (1.2)	
5) Suggestion/Invitation	3.9 (4.3)	4.1 (4.7)	**
6) Others	4.2 (3.5)	0.5 (2.1)	
Behavior			
1) Giving/Offering	9.2 (6.1)	5.2 (4.0)	**
2) Receiving	2.6 (2.7)	2.4 (2.6)	
3) Modeling	3.1 (3.3)	3.5 (3.5)	*
4) Showing	40.2 (20.5)	20.6 (16.1)	***
5) Pointing	9.2 (6.7)	6.5 (5.2)	***
6) Gesturing	4.6 (5.3)	2.8 (3.6)	**
7) Co-playing	2.8 (3.5)	2.9 (6.5)	
8) Other	13.4 (9.1)	9.2 (6.1)	***

* $p < .05$ ** $p < .01$ *** $p < .001$

4. Speech topics

A table 4 shows mean frequencies in maternal speech topics and behaviors. ANOVAs were carried out controlling the total number of speech and behaviors. There were significant differences in object, activity, states, and suggestion/invitation. American mothers talked about objects ($F(1,43) = 63.90$, $p < .001$), infants' activities ($F(1,43) = 72.64$, $p < .001$) and infants' states ($F(1,43) = 7.83$, $p < .01$) more than Japanese mothers did. It is clear that American mothers talked about infants (activity and states) more than Japanese mothers ($F(1,43) = 69.38$, $p < .001$, 68.8 in the US, 27.6 in Japan). Whereas Japanese mothers talked about suggestion/invitation ($F(1,43) = 8.99$, $p < .01$) more than American mothers did. In behaviors, there were significant differences in giving, modeling, showing, pointing, gesturing and others. They were likely to give ($F(1,43) = 8.59$, $p < .01$), show ($F(1,43) = 52.19$, $p < .001$), point a toy ($F(1,43) = 14.35$, $p < .001$) and gesture ($F(1,43) = 9.77$, $p < .01$) more than Japanese mothers did, whereas Japanese mothers showed a model more than American mothers did ($F(1,43) = 4.87$, $p < .05$).

The correlation analyses between speech topics and behaviors were carried out in each country respectively. In the United States, "object" was positively correlated with giving ($r = .66$, $p < .001$), showing ($r = .82$, $p < .001$) and pointing ($r = .70$, $p < .001$). When American mothers talked to infants about objects, they were likely to give, show or point a toy. "Activity" was positively correlated with giving ($r = .52$, $p < .05$), showing ($r = .71$, $p < .001$) and gesturing ($r = .63$, $p < .01$). When American mothers talked about infant activities, they were likely to give, show a toy or gesture. "Suggestion/invitation" was positively correlated with gesturing ($r = .66$, $p < .001$). When American mothers suggest something, they were likely to gesture. These findings suggest that American mothers talk about objects or infants by giving, showing, pointing toys or gesturing more than Japanese mothers do. In Japan, "object" was positively correlated

with giving ($r=.47$, $p<.05$), receiving ($r=.53$, $p<.01$), showing ($r=.67$, $p<.001$) and pointing ($r=.69$, $p<.001$). When Japanese mothers talked about objects, they were likely to give, receive and point an object. "Activity" was positively correlated with giving ($r=.72$, $p<.001$), modeling ($r=.55$, $p<.01$), and co-playing ($r=.77$, $p<.001$). When Japanese mothers talked about infant activities, they were likely to give a toy, show a model, or co-play with infants. "Mother" was positively correlated with showing ($r=.53$, $p<.05$). When Japanese mothers talked about themselves, they were likely to show a toy. These results suggest that behaviors were different by what topics mothers talk about and these differences may express their cultural characteristics.

Discussion

The present study investigated the characteristics of maternal speech and behaviors at 13 months of age. The results clearly showed the cultural characteristics of maternal speech and behaviors, and confirmed findings in previous studies. American mothers talked about objects, especially labeled the name of an object by showing and pointing a toy. It seems that American mothers teach that each object has a name because infants begin to produce a word at around this age. Also American mothers significantly encouraged infants and talked about infants more than Japanese mothers did. These findings suggest that American mothers may emphasize self from infancy to adapt to the society. In contrast to American mothers, Japanese mothers significantly talked about social routines and empathy more than American mothers did. It seems that the mother's characteristic speech reflects cultural characteristics that American culture emphasizes language and self development and Japanese culture emphasizes social and emotional development, and these culture specificities may transfer to the next generation. Further research is needed to explain these hypotheses.

In behaviors, when mothers talk to 13-month-old infants, they usually show a variety of behaviors such as giving, modeling, showing, pointing, gesturing and co-playing so that infants pay attention to both maternal speech and behaviors. Among these behaviors, mothers use "showing" behavior most for 13-month-old infants in both countries. When American mothers talked to infants, they were likely to show or point a toy more than Japanese mothers did, whereas Japanese mothers were likely to show a model or gesture more than American mothers did. It is clear that most of the maternal speech to 13-month-old infants entails behaviors, and the characteristic behaviors are related to what mothers talk to infants. It suggests that when American mothers talk about objects and infants they select showing and pointing behaviors as an effect way for infants to learn and when Japanese mothers talk about social routines and empathy, they select modeling or gesturing as an effect way. Also the present findings suggest that maternal speech and behaviors may foster the ground of both language acquisition and socialization but what mothers emphasize depends on social value in each country. The next research may investigate associations between mothers' behaviors and infant language development or socialization and which behaviors infants select as the most effective way for language acquisition or socialization, by observing infant language and behaviors. To understand the process of language development corresponding to relationships between infant behavior and maternal speech and behavior, we need a

longitudinal study.

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