Emergence of Mental State Words and Language Development

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Abstract：This study examined young children's use of mental state words and their relationship with the development of language and mentalising ability. Drawing from maternal reports on children's mental state word production, the breadth and development of different types of mental state words were examined and compared with data reported in a study with English-speaking children. The results suggest that Japanese children did not differ from their English counterparts in terms of variety of mental state words and their relation to the children's theory-of-mind development.

Keywords：mental state terms, theory-of-mind development, mentalising, Japanese language

Introduction

This study addresses the acquisition of mental state words in Japanese preschoolers in relation to language development and emerging mentalising ability. The role of mental state talks in developing socio-cognitive understanding of minds has been widely documented (Brown, Donelan-McCall, & Dunn, 1996; Carpendale, & Lewis, 2004; de Rosnay, & Hughes, 2006; Dunn,Brown, Slomkowski, Tesla, & Youngblade, 1991). These studies revealed that mental state talks held with family members such as the mother and siblings facilitate early understanding of other's emotions and feelings, and subsequently lead to a mastery of understanding beliefs, which refers to the acquisition of Theory of Mind. Such mentalising ability is crucial in the social world because it allows one to interpret and to predict other's behaviours.

As one of the indices for children's socio-cognitive understanding, an ability to use mental state words emerges in the middle of the second year of children's lives. Research findings from natural observations of a child's language production suggest that by 18 months children begin to use desire terms such as "*want*" to talk about their own and other's desires (Wellman, 1995), and before the child's third birthday they are able to make references to "*believing*' and ' *knowing*" (Bartsch and Wellman, 1995). Further, maternal reports of child language in their use of emotion terms correlated with their performance of the emotion recognition task (Bretherton and Beeghly, 1982), suggesting that their involvement in mental state talks is related to their socio-cognitive understanding.

Despite a growing consensus on the relationship between a child's involvement in mental state talks in a family setting and their development of social minds, the universality of such developmental relationships has yet to be addressed. A few studies (Knüppel,Steensgaard, & Jensen de López, 2007; Tardif, & Wellman, 2000) have addressed diversity in the development of mental state talks across languages; however, diversity was found in the breadth (beginning and end points) of development but not in their developmental courses. For example, Tardif and Wellman found that Chinese-speaking children started to use desire terms much earlier than English-speaking children but rarely used belief terms such as "*think*". Nevertheless, the order of appearance of these mental state terms was similar to their western counterparts. Therefore, the developmental pattern for the production of mental state terms seems to be uniform. Thus it is possible that such a similarity in the developmental pattern of mental state language is in line with the meta-analysis for the development of false-belief understanding conducted by Wellman and collaborators. Wellman, Cross, & Watson, 2001).

Cross-linguistic or cross-cultural variability in the rate of theory-of-mind (ToM) development has received little attention in the literature to date, though there have been striking findings that children in some cultures showed a time lag in passing classical ToM tasks (Greenfield, Keller, Fulugni, & Maynard, 2003; Lillard, 1998, 1999; Naito, & Koyama, 2006; Watamaki, & Ogura, 2004). Furthermore,

cross-cultural variability, if any, in the relationship between the development of mental state terms and theory-of mind has not been addressed despite an existing difference in the rate of development for certain mental state terms.

Japanese children's theory-of-mind development was reported to have shown a measurable difference in the child's age for passing the classic ToM tasks (Naito, & Koyama, 2006). However, this difference has not yet been explained; this difference may be related to the children's development of mental state language. For this reason, the present study aims to examine Japanese children's mental state terms before their acquisition of false-belief understanding and to compare these with comparable studies that examined the child mental state talks in relation to theory-of- mind understanding (Taumoepeau, & Ruffman, 2006, 2008).

Method

The children and their parents were recruited from personal contacts and local adverts for a longitudinal project on the development of the understanding of social minds. The present study was carried out as a part of the project that collected data for mental state language and theory-of-mind understanding at three time-points at approximately 6-month intervals from the child's age of 33 months.

Participants

Forty-five mother-child dyads agreed to participate in the project. The mean age of the children (26 girls, 19 boys) at Time 1 was 33 months (SD = 3 months) and mother's age was 33.6 years (SD = 4.2 years). They spoke Japanese as their mother tongue and came from two-parent families.

Materials and procedure

Child language

Children's language development was assessed using the subscale of K-ABC. The language assessment was always administered at the end of the task, as the length of the task varied depending on the child's language ability. Child mental state words were assessed using a checklist for a variety of mental state terms related to cognitions, emotions

and desires. This checklist was composed from a Japanese version of the McArthur Communication Development Inventory (Watamaki, & Ogura, 2004) plus some additional mental state terms that emerged from a study by Taumoepeau and Ruffman (2006, 2008). In order to maintain the validity of the Japanese mental state terms, additional words were chosen from the Japanese children's book for emotional expressions "kimochi no hon" (Morita, 2003). Mothers were asked to check which words her child had ever used at home.

Theory-of-mind tasks

Three tasks that assess the ToM understanding precursor to the standard false-belief understanding were administered. These included the divergent-belief task (Wellman, & Bartsch, 1988); the desire-emotion task (Wellman, & Liu, 2004); and the emotion-situation task (Ruffman, Slade, & Crowe, 2002). These tasks were administered individually at the university lab in one session. The order of administering these tasks was counterbalanced. Only the ToM understanding, which was assessed at time 1, was used for the present study.

Results

Children's mental state terms were analysed to discover the proportion of children who were reported to use each term in the list and the results are shown in Table 1. All of the Japanese words in the checklist are presented with English translations that were back translated to check their meanings. The listed mental state words were categorised into three groups: emotion terms, cognitive terms and mental state terms, drawing from the categories that were used by Taumoepeau and Ruffman (2006, 2008). Their version of MCDI also included additional categories of physical state terms, sense terms, and modulation of assertion. The studies by Taumoepeau and Ruffman included 32 emotion terms, 7 cognitive terms, 15 mental state terms, 7 physical state terms, 19 modulation of assertion and 4 sense terms whereas the present study included 33 emotion terms, 9 cognitive terms, 15 mental state terms and 8 physical state terms for the comparative categories.

Table 1. Proportion of the children who used the terms on the list

Category			Proportion	Rank
Emotion terms				
fearful	こわい	*kowai*	0.98	1
happy	たのしい（楽しい）	*tanoshii*	0.89	2
interested	おもしろい	*omoshiroi*	0.89	3
fear	こわがる	*kowagaru*	0.89	4
be angry	おこる	*okoru*	0.87	5
cool	すごい	*sugoi*	0.85	6
good	いい	*ii*	0.85	7
be fine	だいじょうぶ	*daijobu*	0.85	8
disgust	きらい（嫌い）	*kirai*	0.83	9
happy	うれしい	*ureshii*	0.81	10
be surprised	おどろく，びっくりする	*odoroku,bikkuri*	0.79	11
lively	元気	*genki*	0.77	12
bad	悪い	*warui*	0.68	13
poor/sorry	かわいそう	*kawaiso*	0.68	14
shy/ashamed	はずかしい	*hazukashii*	0.66	15
funny	おかしい	*okashii*	0.57	16
lonely missed	さびしい	*sabishii*	0.57	17
sad	悲しい	*kanashii*	0.53	18
unhappy	楽しくない	*tanosikunai*	0.51	19
be pleased	よろこぶ	*yorokobu*	0.47	20
be serious	ほんとうに〜	*hontoni*	0.45	21
happy	しあわせ	*shiawase*	0.40	22
get bored	つまらない	*tsumaranai*	0.36	23
cannot bear	がまんできない	*gamandekinai*	0.34	24
worry about	心配する	*shinpai suru*	0.34	25
be excited	わくわくする	*wakuwaku suru*	0.30	26
feel good	気分がいい	*kibun ga ii*	0.26	27
angry	腹がたつ	*hara ga tatsu*	0.21	28
nervous	きんちょうする	*kincho suru*	0.17	29
angry	いかる	*ikaru*	0.09	30
be irritated	いらいらする	*iraira suru*	0.06	31
hateful	にくい	*nikui*	0.02	32
worry about	はらはらする	*harahara suru*	0.02	33

Cognitive terms

see/understand	わかる	*wakaru*	0.72	1
difficult	むずかしい	*muzukashii*	0.64	2
easy	やさしい	*yasashii*	0.62	3
remember	おもいだす、おぼえている	*omoidasu/oboeteiru*	0.55	4
forget	忘れる	*wasureru*	0.51	5
guess	思う	*omou*	0.47	6
think that	〜だと思う	*dato omou*	0.36	7
dream	夢をみる	*yume wo miru*	0.17	8
hard	つらい	*tsurai*	0.17	9

Mental state terms

like	好き	*suki*	0.96	1
want	欲しい	*hosii*	0.94	2
know/see	知る	*shiru*	0.85	3
know/remember	知っている	*shitteiru*	0.85	4
prefer	〜のほうがいい	*〜 no ho ga ii*	0.72	5
wish	〜したらいいな	*〜 shitara ii na*	0.55	6
think	考える	*kangaeru*	0.38	7
be sure	きっと〜	*kitto 〜*	0.28	8
relief	あんしん（安心）	*anshin*	0.28	9
curious	不思議におもう	*fushigi ni omou*	0.28	10
care for	気にする	*kini suru*	0.23	11
satisfied	満足する	*manzoku suru*	0.15	12
suppose	〜のつもり	*〜 no tsumori*	0.15	13
believe/be sure of	信じる	*shinjiru*	0.06	14
regret	こうかい（後悔）する	*koukai suru*	0.04	15

Syntax

	ね（例：きれいね）	*ne*	0.89	1
want to	〜たい（例：食べたい）	*〜 tai*	0.87	2
going to	〜よう（例：食べよう）	*〜 you*	0.83	3
don't want to	〜たくない（例：食べたくない）	*〜 taku nai*	0.81	4
going to	〜う（例：飲もう）	*(nomo) u*	0.79	5
wonder	かな（例：行こうかな）	*kana*	0.74	6
wanted to	〜たかった（例：食べたかった）	*〜 takatta*	0.74	7
if	たら（例：食べたら）	*tara*	0.70	8
	よ（例：あついよ）	*yo*	0.62	9
maybe	〜でしょう（例：食べるでしょう）	*〜 desho*	0.36	10

Non-mental state terms

read	読む	*yomu*	0.91	1
say	いう	*iu*	0.89	2
hear	聞こえる	*kikoeru*	0.81	3
listen to	きく（聞く）	*kiku*	0.74	4
become	～なる	～ *naru*	0.62	5

Physical state

hurt	いたい（痛い）	*itai*	1.00	1
see/look	みる（見る）	*miru*	0.96	2
sleepy	ねむい（眠い）	*nemui*	0.91	3
cry	なく（泣く）	*naku*	0.91	4
laugh	わらう（笑う）	*warau*	0.87	5
tired	疲れた	tsukareta	0.79	6
sick	気持ち悪い	*kimochi warui*	0.47	7
painful/difficult	苦しい	*kurushii*	0.26	8

For most categories on the list, the terms that the majority of children were reported to use outnumbered those that were not used by the children. In order to make a comparison between the Taumoepeau and Ruffman (T & R, thereafter) and the present study, the percentage of children who were reported to use at least one of each type of mental state term were calculated and charted along with English-speaking data drawn from T & R in Figure 1. The proportion of Japanese children who were reported to use at least one of each type of mental state term did not differ from their English counterparts (chi-square tests *df* = 1, all *ps* < .1).
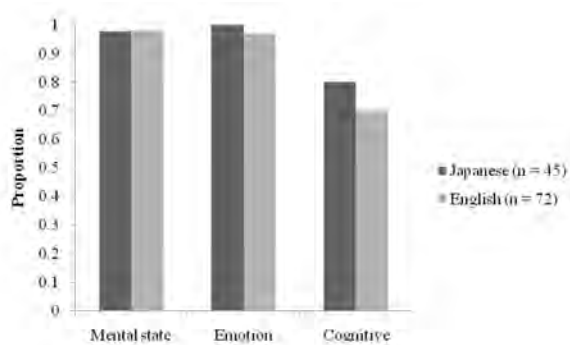

Figure 1. Percentage of the 33-month-old children who were reported to use at least one of each type of mental state term

The number of words used by the children were summarised in Table 2. The mean number of words used by the Japanese and English children were compared for each type of mental state words. Independent t-tests revealed that there were significant differences for the emotion and cognitive terms (*t* = 3.30, *p* < .01, *t* = 4.95, *p* <. 001) but not

for the mental state terms (*t* = 1.67, ns.). This suggests that Japanese children were reported to use many more emotion terms and cognitive terms than their English counterparts.

Japanese children's mental state word use and ToM understanding were examined next, controlling for language production as measured by the K-ABC. Among the theory-of-mind tasks measured at time 1, the emotion-desire task score correlated significantly with the children's emotion terms (*r* = .31, *p* = .05), mental state terms (*r* = .27, *p* = .09) and the total mental state words (*r* = .30, *p* < .06). However, other theory-of-mind tasks did not show significant correlations with any types of mental state words.

Discussion

The present study examined Japanese children's mental state words in relation to their English counterparts and if the mental state words were a precursor to ToM understanding. The proportion of children who were reported to use each mental state word shows a large variability even though on average around 50% of the terms on the lists were used by the majority of children. As for the emotion words, it is notable that those that were used by a large proportion of the children were related to basic emotions. Amongst the mental state terms, the words expressing desires, such as "*want*" and "*like*", were very common. By 33 months, children seemed to use a large range of mental state words. As Wellman states, children's ability to use the cognitive term "*know*" before the third birthday was evident in the Japanese sample. However,

Japanese children did not use the term "*believe* [shinjiru]" at this age. This result may have been related to the different breadth of the word's use in each language. The English term, "*believe*", can also be interpreted in Japanese as "*omou*", and this term *omou* entails a wide range of meanings such as "*believe*", "*think*", "*suppose*" and so forth. The present data suggests that Japanese children at 33 months appeared to use the term "*omou*", which also has the equivalent meaning to the English term "*believe*".

The current Japanese data were also compared quantitatively to the English data. Although the analysis was based on the assumption that the numbers of mental state words listed in both languages were roughly the same, there needs to be some caution in drawing a firm conclusion. Nevertheless, the results indicated that Japanese children were reported to use as many mental state words as the English children. The t-tests revealed that Japanese children were reported to use many more different types of cognitive and mental state terms compared with English children. This result does not seem to support a possible explanation for the later development of the ToM in Japanese children. Moreover, the Japanese children's mental state word use was related to the development of emotion understanding. This result is also in line with previous findings from the studies with other linguistic and cultural populations.

However, the current analyses were based on the variety of mental state words and did not concern the frequency of mental state word use. In order to provide a clearer picture for the development of mental state words and their relation to the ToM understanding, analyses need to include the frequency of the mental state words used by the children and also by the mother who may play a scaffolding role in the development of early social understanding through conversing with their children (Carpendale, & Lewis, 2004).

Acknowledgement

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Table 2. Means, with standard deviations in parenthesis, for the mental state words used by the children

	Mental state	Emotion	Cognitive
Japanese	6.70	17.87	4.15
	(3.38)	(7.66)	(2.93)
English	4.68	9.49	1.49
	(1.96)	(5.98)	(1.34)

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心的状態をあらわす語の獲得と心の理解

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要　旨

　本研究は幼児の心的状態をあらわす語の獲得と言語発達および心の理解の関係について検討した。幼児の心的状態をあらわす語の産出について養育者の報告によるデータをもとに、その種類と獲得順序について分析を行った。これらのデータを欧米の先行研究結果と比較したところ、日本の幼児の心的状態をあらわす語の産出が同年齢の欧米の幼児と大きく違わないことが示された。また、心の理解の指標として、複数の萌芽的な心の理論課題を用い、これらへの反応と心的状態をあらわす語の産出との関連性を検討した結果、一部の心の理論課題との関連性が認められた。

キーワード：心的状態語、心の理論、発達、日本語