With globalization, biculturalism is increasing. Broadly speaking, unlike monocultural people who grow up in a relatively coherent culture, bicultural people are those who have extensive exposure to two cultures. Both cultures may have certain impacts on their life; hence, bicultural people may adjust their attitudes, values, language, and behaviors to these cultures (Grosjean, 2001). In addition to immigrants, people who grow up in those countries and areas where various traditional cultures are combined are bicultural (e.g., Hong, Morris, Chiu, & Benet-Martinez, 2000; Novin, Banerjee, & Riege, 2012; Qu, Gao, Yip, Li, & Zelazo, 2012; Wang, Shao, & Li, 2010). One challenge that bicultural people may encounter in their daily social interaction is how to adjust their behaviors according to different cultural contexts and norms, especially when the social norms of two cultures contradict each other. During communication, individuals actively seek common social representations among themselves. When communicating with people from different cultural backgrounds, bicultural individuals need to engage appropriate representations and switch between different cultural frames (e.g., Benet-Martinez, Lee, & Leu, 2006; Hong et al., 2000; Luna, Ringberg, & Peracchio, 2008; Verkuyten & Pouliasi, 2002).

The ability to accurately represent one’s own and other people’s mental states such as beliefs, desires, and intentions to oneself and others, and
to use these attributions to anticipate the behavior of oneself and others is called theory of mind (ToM; Zelazo, Qu, & Müller, 2005). ToM involves the representation of self and other people, including having the knowledge and awareness of self-other differences and similarities. Functionally, ToM allows individuals to translate external behaviors to internal mental states, and use these mental states to explain ongoing behaviors and guide subsequent responses. ToM is a core human capacity required for the comprehension of the social environment and the display of socially adequate behavior. Among monocultural people, individuals with superior ToM tend to be mentally healthier and socially more capable, whereas individuals with inferior ToM tend to show social cognition deficits, experience difficulties during social interaction, and even become victims of bullying (e.g., Shakoor et al., 2012). This seems to be true for bicultural people as well. For instance, bicultural adolescents who fail to adapt either their heritage or dominant cultures tend to have difficulties in regulating and expressing their anger (Novin et al., 2012).

To fully understand how bicultural people represent self, others, and different socio-cultural norms depending on the context, it is necessary first to examine how bicultural people gradually develop ToM, especially during preschool years. Although ToM continues to develop across life span, early childhood is the essential stage of the development of ToM. Compared to infants and toddlers, the biological, cognitive, and socio-emotional functions of preschoolers are much more mature, ToM develops much more rapidly, and the impacts of culture on the development of ToM seem to be more significant (e.g., Wellman et al., 2011; Zelazo et al., 2005). Furthermore, children’s ToM during this stage predicts their later ToM and social functions (e.g., Shakoor et al., 2012; Zelazo et al., 2005). Hence, it is important to study the development of ToM in preschoolers in particular. However, compared to research on monocultural children, relatively few studies have been conducted on the development of ToM in bicultural preschoolers (Bialystok & Senman, 2004; Doan & Wang, 2010; Goetz, 2003; Liu, Wellman, Tardif, & Sabbagh, 2008; Vinden, 2001; Wang, Hutt, Kulkofsky, McDermott, & Wei, 2006). Therefore, the current study aimed to expand this area of research by examining ToM among English-speaking Chinese preschoolers in Singapore.

The Development of Theory of Mind in Monocultural Children

Wellman and colleagues (e.g., Wellman & Liu, 2004) designed a series of tasks to examine the development of ToM, including tasks such as diverse desires, diverse beliefs, knowledge access, and false belief. These tasks are constructed with similar linguistic and procedural demands, formats, and scoring methods. This scale enables researchers to use multiple milestones to illustrate how preschoolers understand mental states. The diverse desires task examines whether children understand that others can have different desires from themselves (Repacholi & Gopnik, 1997; Wellman & Woolley, 1990). The diverse beliefs task examines the understanding that others can have different beliefs about the same event, object, or person than they themselves have (Wellman & Bartsch, 1989). For instance, a 3-year-old may believe that ice cream makes for a perfect dinner and assume that her parents also share the same belief. However, a 4-year-old understands that her parents may have a completely different opinion about this. The knowledge access task tests the understanding that people may not have knowledge about certain events (Pillow, 1989; Pratt & Bryant, 1990). For example, a child who fails this task may think that his mother knows that he misbehaved on the playground, even though his mother was at work at the time. Additionally, the false belief task examines the understanding that people’s beliefs can be wrong (Perner, Leekam, & Wimmer, 1987). Children gradually understand that their previous beliefs can be inaccurate, for instance, when opening a cookie jar, they found that it was filled with plastic bags instead of cookies as they
had expected. Children’s understanding of diverse desires, diverse beliefs, knowledge access, and false belief is essential for their appreciation of self-other differences and social interaction among individuals. Previous cross-sectional and longitudinal studies conducted in North America and Australia have shown that among these tasks, the diverse desires task is the easiest, followed with diverse beliefs and knowledge access, and the false belief task is the most difficult (e.g., Wellman, Fang, & Peterson, 2011). By five years of age, the majority of children who grow up in the West are able to pass the false belief task (see meta-analysis in Wellman, Cross, & Watson, 2001).

Consistent with the findings obtained in the West, five year old children who grow up in Eastern countries such as China, Iran, India, Thailand, and Korea are able to pass classic false belief tasks (Callaghan et al., 2005; Oh & Lewis, 2008; Sabbagh, Xu, Carlson, Moses, & Lee, 2006). Nevertheless, the developmental sequences in which ToM concepts are acquired in children who grow up in Eastern countries differ from that of Western countries. North American and Australian children have an earlier understanding of diverse beliefs than knowledge access (Peterson, Wellman, & Liu, 2005; Wellman & Liu, 2004), whereas mainland Chinese and Iranian children have an earlier understanding of knowledge access than diverse beliefs (Shahaeian, Peterson, Slaughter, & Wellman, 2011; Wellman, Fang, Liu, Zhu, & Liu, 2006; Wellman et al., 2011).

Wellman and colleagues used the traditional bi-dimensional cultural approach to explain this differing pattern (e.g., Wellman et al., 2011). According to them, the majority of the middle class in Western societies tends to adopt individualistic views emphasizing the uniqueness of each individual. People are encouraged to develop their own ideas and express their own opinions. By contrast, most Chinese and Iranian people tend to engage in collectivist and interdependent cultural practices. Personal opinions and uniqueness are de-emphasized in order to avoid conflicts and maintain harmony among individuals.

Furthermore, North Americans are motivated to acquire and maintain in-group status, whereas East Asians are motivated to maintain reciprocal relationships (e.g., Oyserman, Coon, & Kemmelmeier, 2002; Takemura, Yuki, & Ohitsuubo, 2010). These differences can even be seen in young children’s daily life. For instance, Farver and Shin (1997) found that during play, Anglo-American children tended to describe their own actions and refuse their company’s suggestions, while Korean-American children more often asked their company’s opinion and appeared to be more cooperative.

Different parental practices used in Western and Eastern societies may influence the development of ToM. In terms of styles and contents, daily conversation varies a great deal between Chinese parents and parents of European origin. For instance, European parents often discuss their own and other people’s emotions and mental states explicitly, whereas Chinese parents tend to emphasize the roles of external factors such as environment and social relationships in their attribution (e.g., Doan & Wang, 2010). Hence, among Westerners, it is the family conversation on mental states that can facilitate children’s understanding of ToM, whereas among Chinese, it is the family conversation on other people’s behaviors that can improve children’s development of ToM (Cutting & Dunn, 1999; Lu, Su, & Wang, 2008). How to teach children not to lie is another example. Although similar to American mothers, Chinese mothers consistently taught their 4-year-old children not to lie, they also taught and model to their children that deception is necessary to maintain relationships, avoid losing face in front of people outside the family, and avoid making other people feel awkward in public (Wang & Bernas, 2012). In this case, North American parental practices may promote the early understanding of diverse beliefs whereas Chinese parental practices may promote the early understanding of knowledge access.
The Development of Theory of Mind in Bicultural Children

Relatively few studies on bicultural children have been conducted in the area of ToM and the results tend to be mixed. Compared to monocultural children, bicultural children have been reported to show an advanced, equal, and delayed development of ToM. For example, by only analyzing the data of bicultural children whose verbal scores were above 64, the lowest score that the monocultural children in her study received on the Peabody Picture Vocabulary Test (PPVT), Goetz (2003) found that Chinese American 3- and 4-year-olds outperformed European-American and mainland Chinese children on ToM tasks. Similarly, Bialystok and Senman (2004) used language proficiency as a covariant in their analysis and found that compared to Canadian monolingual children, bilingual 4- and 5-year-olds developed ToM faster. However, when language proficiency is not taken into consideration, bicultural children appear to perform ToM equally well as monocultural children do. Indeed, Bialystok and Senman (2004) did not find any significant differences between bicultural and monocultural children without controlling language ability. Additionally, when age was taken into consideration, Vinden (2001) found that on appearance-reality and content false belief tasks, only 5-year-old, not 3- and 4-year-old, Korean American children outperformed Anglo-American counterparts. Nevertheless, there are also studies showing that bicultural children developed ToM slower compared to monocultural children. For instance, Wang and colleagues (Doan & Wang, 2010; Wang et al., 2006) found that Chinese American preschoolers were less accurate in emotion judgment and production compared to their European American counterparts. Liu and colleagues (2008) also found in their meta-analysis that Hong Kong children began to pass false belief tasks around 64 months rather than 60 months, later than their Canadian, American, and Chinese counterparts.

These contradictory findings are possibly due to several factors including bicultural status, age, and language ability. Bicultural status can influence bicultural individuals’ representation of self and other people. Based on Berry’s bi-dimensional acculturation framework (1997), bicultural people can be categorized into four types according to their maintenance of their traditional culture and participation in both cultures. There are two relatively balanced types: integrated and marginalized type. Integrated type people are those who actively adopt both cultural values. They may have the representations of both Westerners and Easterners, and are able to switch to different mental frames depending on the context (Hong et al., 2000; Ng, Han, Mao, & Lai, 2010). Unlike integrated types, marginalized type people are those who passively avoid their heritage and the mainstream cultures. As a result, they may fail to construct representation systems according to either culture (e.g., Novin et al., 2012). The two relatively unbalanced types are assimilated and separated types. Assimilated type people are those who mainly adhere to the dominant culture over their heritage culture whereas separated type people are those who mainly adhere to their heritage culture instead of the dominant culture. Research suggests that these unbalanced bicultural types may follow the norms and behaviors of the dominant culture similarly as those monocultural people do. For example, Garrett-Peters and Fox (2007) presented preschoolers with a disappointing gift and tried to analyze how they would regulate their negative emotion. They have found that Chinese American children who adopted more Western values, the assimilated type, behaved more like their European American counterparts. Likely, Moroccan-Dutch adolescents who identified themselves mainly with Moroccan culture, the separated type, tended to manage their anger in the same manner as Morocco counterparts (Novin et al., 2012). Hence, it is necessary to control bicultural status when studying bicultural children.

Children’s age is another essential factor determining the development of ToM. Like monocultural children, 3- and 4-year-old bicultural preschoolers generally fail false belief
tasks (Bialystok & Senman, 2004; Goetz, 2003; Liu et al., 2008; Qu, 2011; Vinden, 2001). However, it is unclear whether bicultural children develop differently compared to monocultural children. Vinden (2001) found that 5-year-old Korean American children outperform their Anglo-American counterparts. However, other researchers showed that by age five, most bicultural Canadian and Hong Kong children still failed appearance-and-reality tasks and false belief tasks (Bialystok & Senman, 2004; Liu et al., 2008).

Additionally, children’s language ability can influence the development of ToM. Children learn about their own and other people’s mental states through their conversation with parents, caregivers, and siblings (e.g., Cutting & Dunn, 1999; Lu et al., 2008). Furthermore, language is a tool for children to mentally represent themselves, other people, and the rules and regulations that they are supposed to follow (e.g., Wang et al., 2010). Thus, as summarized by Grosjean (2001), “culture is acquired, socially transmitted, and communicated in large part by language” (p. 157). What language children speak can serve as an index of cultural orientation and how they represent themselves and the social world (Kang, 2006).

Children who are advanced in language develop ToM faster than those who are linguistically less advanced (Milligan, Astington, & Dack, 2007). Compared to monolingual children, bicultural children have fewer vocabularies (e.g., Washbrook, Waldfogel, Bradbury, Corak, & Ghangro, 2012). Thus, when language ability is not controlled in data analysis, bicultural children appear to perform worse than monocultural children on ToM tasks (Liu et al., 2008; Wang et al., 2006). When language ability is taken into consideration, bicultural children perform better than monocultural children (Bialystok & Senman, 2004; Goetz, 2003). Nevertheless, it is unclear whether language proficiency correlates with the development of ToM in bilingual children. Only Bialystok and Senman (2004) reported that bilingual children’s PPVT scores were correlated with their understanding that the appearance of an object can be different from what it really is. However, they did not report whether the correlation was still significant when children’s age was taken into consideration.

The Current Study

In summary, culture influences the development of ToM. The developmental sequence of ToM differs between children who are raised in Eastern and Western cultures. It is unclear how two conflicting and unbalanced cultures may influence the early development of ToM. We hypothesized that the dominant culture that children identify with would have more influence on the early development of ToM than the secondary culture that they adopt. As a first study to examine this hypothesis, we chose the bicultural children whose dominant culture was the same as the mainstream culture of the society, which contradicted to their heritage culture, the secondary culture. According to Berry’s framework (1997), these children are the assimilated bicultural type. In particular, we recruited English-speaking Chinese Singaporean children who were mainly exposed to English at home and daycare centers, and mainly spoke English instead of Chinese in their daily life. Like Hong Kong, Singapore is a former British colony that also has a strong Chinese tradition. Singaporeans respect and maintain both British and Chinese heritages and customs, and promote both Western education and Confucian philosophy. However, English-speaking Chinese Singaporeans tend to adopt the Western culture rather than the Eastern culture.

We hypothesized that among these assimilated type, bicultural preschoolers the development of ToM would follow the dominant (in this case, Western) pattern, with an earlier development of diverse beliefs than knowledge access, instead of following their traditional (in this case, Chinese) pattern. To examine this hypothesis, we used tasks of diverse desires, diverse beliefs, knowledge access, and content false belief. All tests were conducted in English. In terms of developmental timeline, we
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hypothesized that our results would be similar to Liu and colleagues’ (2008) findings on Hong Kong children who developed false belief relatively slowly. Additionally, we hypothesized that the development of ToM would correlate with language ability even in bicultural children; hence, we measured English vocabulary. The method and procedure were approved by the ethics committee of the Division of Psychology, Nanyang Technological University.

Study 1

Method

Participants

One hundred and twenty (M age = 54.2 months, SD = 9.7, Range = 36-71 months; 65 girls and 55 boys) English-speaking Chinese Singaporean 3- to 5-year-olds were recruited from daycare centers in Singapore. Approval from the daycare center supervisor and informed consent from parents were secured. Most (87%) of children had one to three siblings, mainly from middle class, with parents having professional occupations and 12 to 16 years of education. On average, mothers were 30.4 and fathers were 32.3 years of age when they had the children.

Measures

Four of Wellman and Liu’s (2004) ToM tasks (i.e., diverse desires, diverse beliefs, knowledge access, and content false belief) were used. We followed the procedure and the scoring method used in Wellman and Liu’s (2004) study strictly, and only modified the superficial task characteristics to suit the local context. In the diverse desires task, children were told that John liked a different snack than they did and then were asked which snack John would choose. In the diverse beliefs task, children were told that Linda had thought her cat was hidden in a different place than they thought the cat was hidden and then were asked where Linda would look for her cat. In the knowledge access task, children were shown what was hidden inside a box and then were asked whether Mary would know what was inside the box given that she had never seen inside the box before. In the false belief task, children were shown a cookie box but were further shown that a car was inside the box instead of cookies. Then children were asked what Peter would think was inside the box given that Peter had never seen inside the box. In each story, two questions were asked: a target question about the protagonist’s mental state or behavior (e.g., in the diverse belief task, “Where will Linda look for her cat?”) and a contrasting or control question about the reality of another person’s state (e.g., in the diverse belief task, “Where do you think the cat is?”). For each task, participants were awarded one point if they answered both questions correctly. Additionally, the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-IV; Dunn & Dunn, 2006) was used to measure the receptive verbal ability.

Procedure

The participants were tested individually in a quiet classroom in their daycare center by a trained experimenter. Each child was tested in a single session that lasted approximately 50 minutes. All tasks were administered in English. The task order was first the ToM tasks and then the PPVT. The order in which the ToM tasks were presented was counterbalanced among children.

Results

Like what was found in Wellman and Liu’s study (2004), our preliminary analysis did not show any significant effects of gender or test order in ToM tasks performances within each age group, so data were combined. Task performance is summarized in Table 1.

To determine whether the understanding of ToM concepts occurred sequentially, we followed the nonparametric analysis used in Wellman and Liu (2004). First, the Friedman
Test was used and a significant rank-order was revealed, $\chi^2(3, 120) = 165.889, p < .001$. Follow-up Wilcoxon Signed Rank tests were conducted to evaluate pairwise comparisons between participants’ understanding of ToM concepts. It revealed that the understanding of diverse desires developed significantly earlier than that of diverse desires, $z(1, 120) = 2.117, p < .05$, knowledge-access, $z(1, 120) = 7.298, p < .001$, and false belief, $z(1, 120) = 9.434, p < .001$; the understanding of diverse desires developed significantly earlier than that of knowledge access, $z(1, 120) = 6.147, p < .001$, and false belief, $z(1, 120) = 8.132, p < .001$; and the understanding of knowledge access developed significantly earlier than that of false belief, $z(1, 120) = 4.718, p < .001$.

Kruskal-Wallis tests were conducted to evaluate differences among the three age groups on ToM task performance. Corrected for tied ranks, the tests showed significant age improvement on diverse desires, $\chi^2(2, 120) = 13.471, p < .01$, diverse beliefs, $\chi^2(2, 120) = 20.631, p < .001$, knowledge access, $\chi^2(2, 120) = 22.219, p < .001$, but not false belief, $\chi^2(2, 120) = 1.726, p > .05$. Follow-up Mann-Whitney $U$ tests were conducted to evaluate pairwise differences among the three age groups. Results indicated significant age improvement between 3- and 4-year-olds and between 3- and 5-year-olds on diverse desires, $z(1, 78) = 2.189, p < .05$, diverse desires, $z(1, 78) = 3.53, p < .01$, diverse beliefs, $z(1, 78) = 3.209, p < .01$, knowledge access, $z(1, 75) = 6.147, p < .001$, and false belief, $z(1, 75) = 5.516, p < .001$, were above chance level, the performance on knowledge access was at the chance level $z(1, 78) = 4.718, p < .001$, and the performance on false belief was below the chance level $z(1, 78) = 3.53, p < .01$, diverse belief, $z(1, 78) = 3.209, p < .01$, knowledge access, $z(1, 75) = 6.147, p < .001$, and false belief, $z(1, 75) = 5.516, p < .001$, were above chance level, the performance on knowledge access was at the chance level $z(1, 78) = 4.718, p < .001$, and the performance on false belief was below the chance level $z(1, 78) = 3.53, p < .01$.

A ToM composite score was derived for each participant by adding the scores for all ToM tasks. A one-way Analysis of Variance (ANOVA) showed a significant age difference
Post-hoc Tukey analysis ($\alpha = .05$) showed that 3-year-olds ($M = 1.61, SD = 0.74$) performed significantly worse than 4- ($M = 2.42, SD = 0.75$) and 5-year-olds ($M = 2.79, SD = 0.81$) but there was no significant performance difference between 4- and 5-year-olds.

Another one-way ANOVA with the PPVT scores as the dependent variable and age group as independent variables did not show significant age improvement ($F(2, 117) = 2.707, p > .05$), and Pearson correlation did not show any significant correlation between age and the PPVT scores ($r(1, 120) = .101, p > .05$).

Pearson correlation revealed a significant correlation between the ToM composite score and vocabulary ($r(1, 120) = .183, p < .05$). However, this correlation was not significant any more when age was partialled out ($r(1, 117) = .154, p > .05$).

**Discussion**

Study 1 showed that the sequence of ToM development in English-speaking Chinese Singaporean preschoolers is as follows: diverse desires, diverse beliefs, knowledge-access, and false belief. Hence, the developmental sequence of ToM in these children followed the Western, the dominant, cultural pattern instead of the Eastern, the original, cultural pattern. It is possible that English-speaking Chinese Singaporean, being of assimilated type, may primarily adopt the Western culture and mentally represent themselves and other people in the Western fashion though they are biologically Chinese and have some exposure to traditional Chinese culture.

In addition, although we found significant age improvement on the ToM composite scores, we did not find any age improvement on the false belief scores among 3-, 4-, and 5-year-olds. Previous work on monocultural children has shown that most children younger than 5-year-olds would fail the false belief tasks (e.g., Wellman et al., 2001), so it is not surprising that 4-year-olds performed similarly as 3-year-olds. However, our results highlighted that English-speaking Chinese Singaporean preschoolers who were older than 5 years of age still had difficulty with the false belief task. In fact, in terms of false belief, they performed the same as 4-year-olds. It is possible that these children develop the understanding of false belief slowly, which is consistent with the general findings for Hong Kong children (Liu et al., 2008). Alternatively, it is possible that these English-speaking Chinese Singaporean children developed verbal ability slowly as there was no age improvement on their PPVT scores. Indeed, previous work has generally suggested that bilingual children tend to have lower vocabularies when compared to monolingual children (e.g., Bialystok & Senman, 2004). In this case, they may not have sufficient verbal ability to fully understand the false belief tasks. Furthermore, some researchers suggest that children may understand false belief but may fail the false belief tasks due to demands placed on verbal skills or understanding of conversational conventions during the administration of the task (Lewis & Osborne, 1990). It is hence possible that the verbal demands embedded in the false belief task may impede these 5-year-olds’ performance though they may have the relevant conceptual understanding.

Additionally, consistent with our hypothesis, the results revealed that ToM development was highly correlated with their PPVT scores. However, this correlation disappeared when age was partialled out. This is different from previous findings in monocultural children (e.g., Astington & Jenkins, 1999). Hence, the interaction between ToM and language ability deserves further examination.

Previous work on deaf children and children with normal hearing used pictures with thought bubbles to decrease the requirement of verbal ability as contents are illustrated and presented clearly (Liu et al., 2008; Peterson et al., 2005). Following the same rationale and aiming to replicate the findings of Study 1, in Study 2, we designed pictures illustrating these ToM tasks. Additionally, we specifically studied 5-year-olds. This is because the findings in Study 1 on 3- and
Development of Theory of Mind in Preschoolers Who Grow up in Two Conflicting and Unbalanced Cultures

4-year-olds were consistent with the reports on monocultural counterparts. However, the 5-year-olds in our study seemed to develop false belief slowly possibly due to their verbal ability. Furthermore, as reviewed above, the results reported in the past on bicultural 5-year-olds are contradictory to each other. Some studies reported superior whereas other studies showed inferior performance of bicultural 5-year-olds compared to their monocultural counterparts (Bialystok & Senman, 2004; Liu et al., 2008; Vinden, 2001). Hence, theoretically, it is important to further examine 5-year-old bicultural children with a set of picture version ToM tasks to decrease the verbal demands.

Study 2

Method

Participants

Thirty 5-year-old (M age = 66.9, SD = 3.13, Range = 60-71 months; 16 girls and 14 boys) English-speaking Chinese Singaporean children from similar backgrounds as Study 1 participated in the study with the permission of their parents.

Measures

In addition to the PPVT used in Study 1, ToM tasks - Picture Choice Version were used. This illustrated version ToM task was adapted from the method used by Liu, Sabbagh, Gehring, and Wellman (2009). A story about two children was presented using PowerPoint slides. Throughout the story, participants were asked about the character’s diverse beliefs, knowledge access, and false belief, which were the target questions. Participants were instructed to answer the questions by pointing to response options encapsulated in thought bubbles on the slides. The scoring method was the same as Study 1.

Procedure

The procedure was roughly the same as Study 1. However, given that no significant task order effect was revealed in previous studies, in Study 2, we presented the ToM task in a fixed order, diverse desires, diverse beliefs, knowledge access, and then false belief.

Results

Preliminary analysis of participants’ performance on each ToM task did not show any significant gender differences in tasks performances, so data were combined. The performance for all tasks is presented in Table 2. The Friedman Test showed a significant rank-order, \( \chi^2(3, 30) = 28.708, p < .001 \). Follow-up Wilcoxon Signed Rank tests revealed that the performance on diverse desires was the same to that of diverse desires, \( z(1, 30) = .692, p > .05 \),

Table 2 Mean and Standard Deviation of Vocabulary and Performance on Theory of Mind Tasks in Study 2

<table>
<thead>
<tr>
<th>Task</th>
<th>Performance Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>85.4 (12.3)</td>
</tr>
<tr>
<td>Diverse desire</td>
<td>0.87 (0.35)</td>
</tr>
<tr>
<td>Diverse beliefs</td>
<td>0.77 (0.43)</td>
</tr>
<tr>
<td>Knowledge access</td>
<td>0.37 (0.49)</td>
</tr>
<tr>
<td>False belief</td>
<td>0.27 (0.45)</td>
</tr>
<tr>
<td>Composite score</td>
<td>2.23 (0.86)</td>
</tr>
</tbody>
</table>
significantly better than that of knowledge-access, $z(1, 30) = 3.702, p < .001$, and false belief, $z(1, 30) = 3.808, p < .001$; the performance on diverse desires was significantly better than that of knowledge access, $z(1, 30) = 3.000, p < .01$, and false belief, $z(1, 30) = 3.273, p < .01$; and the performance on knowledge access was the same as that of false belief, $z(1, 30) = .775, p > .05$. Separate one-sample Wilcoxon Signed Rank tests showed that the performances on diverse desires, $z(1, 30) = 3.922, p < .001$, and on diverse belief, $z(1, 30) = 2.921, p < .01$, were above chance level, the performances on knowledge access were at chance level, $z(1, 30) = 1.461, p > .05$, and the performance on false belief were below chance level $z(1, 30) = 2.556, p < .05$.

A ToM composite score was derived by adding together the scores for all picture versions of ToM tasks. Pearson correlation indicated that participants' verbal ability was positively and significantly correlated with the ToM composite score, $r(1, 30) = .44, p < .05$, and this remained significant when results were controlled for age, $r(1, 30) = .42, p < .05$.

**Discussion**

In Study 2, we decreased the linguistic demands of ToM tasks by using pictures to illustrate stories and asking children to choose their answers from pictures. Although the format of Study 2 was different from that of Study 1, the results of two studies were consistent. In Study 2, we found that 5-year-olds had a better understanding of diverse beliefs than that of knowledge access, though they still had difficulties with false belief. These findings suggest that although linguistic demands embedded in the false belief tasks may impair their performance, 5-year-old English-speaking Chinese Singaporean have not fully developed false belief.

Additionally, our results showed that preschoolers’ receptive verbal ability was significantly and positively correlated with ToM, even after age was controlled. This is consistent with our hypothesis and previous work on monocultural children (Milligan et al., 2007), though it was different from the pattern reported in Study 1. It is possible that in our Study 1, because the linguistic demands embedded in the description of ToM tasks may hinder children's ToM-related performance, the correlation between language and ToM was not significant.

**General Discussion**

**Developmental Sequence of Theory of Mind.** Consistent with our hypothesis, the current studies with both verbal and picture illustrated ToM tasks have shown that English-speaking Chinese Singaporean preschoolers developed the understanding of diverse beliefs earlier than the understanding of knowledge access, a pattern resembling that of preschoolers who grow up in Western cultures, and different from that of preschoolers who are raised in Eastern cultures. This indicates that the development of ToM in these assimilated type bicultural preschoolers followed the dominant cultural pattern instead of their original cultural pattern, which extends the proposal that culture shapes the early development of ToM (e.g., Wellman et al., 2006). This result is similar to previous Garrett-Peters and Fox’s (2007) and Novin and colleagues’ (2012) findings on assimilated type bicultural children and adolescents. It is possible that these English-speaking Chinese Singaporean families may adopt more Western values than Eastern values, rather than adopting both cultures equally. Hence, the dominant culture has more impact on the development of ToM than the secondary culture.

**Developmental Timeline of Theory of Mind.** Consistent with previous work on monocultural children (e.g., Zelazo et al., 2005), we have found that ToM develops rapidly during preschool years, in that 5-year-olds and 4-year-old performed much better than 3-year-olds. However, there was no age improvement between 4- and 5-year-olds. Additionally, most 5-year-olds in our sample still failed to pass false
belief tasks, though this pattern is consistent with the meta-analysis on Hong Kong children who did not pass false belief tasks until 64 months of age (Liu et al., 2008). This is possibly because these children did not have sufficient exposure of the norms, values, and attitudes of the dominant culture, though they are exposed to both traditional Confusion and modern Western cultures. It has been widely reported that family conversations about people’s internal mental states and the external behaviors predict children’s understanding of false belief (e.g., Cutting & Dunn, 1999; Lu et al., 2008). Bicultural parents may talk to their children about both cultures; however, the amount of conversations about either culture may not be enough. Nevertheless, it is also possible that these children may experience conflict between two socio-cultural norms and thus have difficulties in developing a coherent ToM. Hence, it is necessary for future studies to examine how English-speaking Chinese Singaporean parents discuss mental states and behaviors with children and how cultural conflicts may influence their development of ToM.

Nevertheless, we need to acknowledge that this pattern is contrary to Goetz’s (2003), Bialystok and Senman’s (2004), and Vinden’s (2001) findings. This is possibly due to the differences in bicultural status and language ability of the samples. As reviewed earlier, balanced and unbalanced bicultural children may adopt cultural values and norms differently, and their development of mental representation may be different as well. Additionally, language ability influences the development of ToM and children with low language ability may be delayed in the development of ToM. The children in our study were assimilated type and had relatively low vocabulary, thus the development of ToM may be delayed.

Language and the Development of Theory of Mind. Consistent with our hypothesis, we have found that like monocultural children, the assimilated type bicultural preschoolers with superior language ability were more advanced in the development of ToM compared to those with less advanced language ability. Language is the mental tool for children to represent themselves, other people, and socio-cultural norms. Children with advanced language ability are more able to communicate with other people and seek explanation and feedback on mental states and behaviors (e.g., Cutting & Dunn, 1999; Lu et al., 2008). However, like our Study 1, previous studies on bicultural children failed to find a significant correlation between language and ToM. This is possibly because the linguistic demands embedded in the ToM tasks may impede the performance of bicultural children. Additionally, it is also possible that like our current studies, past studies only measured receptive vocabulary without measuring pragmatic, semantics, syntax, and memory for complements, and these linguistic aspects are all linked to the development of ToM (Milligan et al., 2007). Hence, future work should use comprehensive language measurements.

Implication and Limitations. Similar to monocultural people, during social interaction, bicultural people seek common grounds with other people to establish relationships. During this process, they need to rely on ToM to represent self, others, and the world, to interpret and anticipate other people’s behaviors and intentions, and to regulate their own behaviors accordingly. However, unlike monocultural people, bicultural people need to have a representation set for each cultural norm. It is still unclear how two conflicting and unbalanced cultures may influence the development of ToM in bicultural preschoolers. Our current study contributes to the literature by revealing that the development of ToM in these bicultural children would follow the pattern of the dominant culture. It is possible that when assimilated type bicultural children grow older, they still continue to use the dominant culture representation system and behave like monocultural people of the dominant culture during social interaction (e.g., Novin et al., 2012). Nevertheless, it is also possible that assimilated type bicultural children later may develop into integrated type if they
have more exposure to their original culture. Hence, longitudinal studies are needed to examine these possibilities.

Additionally, compared to research in the past, our work is unique in terms of methodology. Studies in the past mainly used false belief tasks to test bicultural children (e.g., Goetz, 2003; Vinden, 2001). Children were told false belief stories and were asked to respond verbally. As a contrast, our study used a serial of four ToM task, including diverse desires, diverse beliefs, knowledge access, as well as false belief tasks. Furthermore, we used not only verbal but also picture illustration versions of ToM tasks. Hence, our study was more comprehensive. However, the tasks used in our studies may not be pure measurements of ToM. For instance, in addition to ToM, the tasks in Study 1 also required verbal ability, working memory, and executive function whereas the tasks in Study 2 required the abilities to understand picture representation and to form logical reasoning. Hence, relatively purer and more sensitive ToM tasks are needed.

Nevertheless, our study has limitations. We did not directly compare our results with monocultural children and we did not directly measure the cultural orientation of the families, parental practices, children’s exposure to English and Chinese or their Chinese ability. Future studies should include these measures to further explore how these factors influence the development of ToM in bicultural children. Additionally, bicultural parents may use different languages when expressing different mental states and emotional states. For example, Chen, Kennedy, and Zhou (2012) have found some Chinese American parents may easily say, “I love you” in English but seldom say this in Chinese, while they may often use Chinese rather than English when they scold their children. Thus, future studies can examine how bicultural children interpret different emotional states with different languages. Furthermore, children’s individual differences in working memory, temperament, birth order, number of siblings, family size, and daily activities may also influence the development of ToM (Cutting & Dunn, 1999; Davis & Pratt, 1995; Farver & Shin, 1997; Zelazo et al., 2005). Future research could use natural observation and experimental manipulation to investigate how these factors may interact with language and culture during the early development of ToM.

Conclusion

The current study investigated the development of ToM in preschoolers who grow up in two conflicting and unbalanced cultures. We found that the development of ToM in these preschoolers follows the pattern of the dominant culture, these 5-year-olds still fail false belief tasks, and verbal ability of the dominant language correlated with their development of ToM. These findings increase our understanding of how bicultural people develop a mental structure to represent themselves, other people, and their socio-cultural world. Our results also highlight the importance of creating developmentally and culturally appropriate curriculum and intervention programs for children from diverse cultural backgrounds.

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