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# **Infant educators' use of Mental-State talk in Australia and China: A Cross-cultural Comparative Study**

## **Abstract**

This study compares the mental-state talk of infant educators in Australia and China in order to determine the nuanced differences in the ways that they use this talk with the infants in their room. Participants are 44 native English-speaking Australian educators from centres in [removed], Australia and 30 native Chinese-speaking infant educators recruited from centres in and around [removed], China. Twenty-minute samples of each educators' naturally occurring play interactions with infants during play were coded to determine the frequency of their desire, emotion, perception, cognition and modulation of assertion talk. Each mental-state term was also coded according to the referent of that mental-state. We examined the extent to which Australian and Chinese educators' use mental-state talk and how the referents of such talk differed by mental-state talk type and culture. Australian educators used significantly more mental-state talk than their Chinese counterparts. Different patterns of referent use across cultural cohorts and mental-state talk types were identified. Findings have implications for the socialization of very young children into culturally specific ways of talking and thinking about the mind.

Keywords: Mental-state language; childcare; educator-infant interactions; cross-cultural comparison

## **Introduction**

Caregiver's use of mental-state talk when interacting with young children has been shown to predict children's subsequent use of mental-state terms as well as their social-

emotional, language and cognitive development (e.g., Ruffman, Slade, and Crowe 2002; Taumoepeau and Ruffman 2006; Symonds, Fossum, and Collins 2006; Hughes and Dunn 1998; Barnes and Dickenson 2018). When caregivers use words such as ‘want’, ‘feel’, ‘see’, ‘know’ and ‘think’ to describe desires, emotions, perceptions, cognitions and points of view, they explicit otherwise opaque mental states and processes, thus enabling children to acquire and use mental-state words and develop an understanding of their own and others’ minds. A caregiver’s use of mental-state talk when interacting with young children is argued to reflect their image of the child as a mental agent – one who possesses and acts on the basis of their own and others’ desires, emotions, perceptions and cognitions (Author/s 2015; Meins et al. 2003). For example, an educator who says to an infant “Do you think we should go inside now?” as opposed to “It’s time to go inside” is using the mental-state term “think” to frame the statement from the infants’ point of view. This propensity to acknowledge the young child’s perspective during interactions has been associated with levels of positivity, sensitivity and stimulation in both home and early childhood education and care (ECEC) contexts (Author/s 2012; Frampton, Michal, and Jenkins 2009; King and La Paro 2015; Helmerhorst, Colonnese, and Fukkink 2019; Laranjo, Bernier, and Meins 2008; Meins et al. 2001; Bernier and Dozier 2003). Because of its links to sensitive and stimulating interactions, an increasing body of multidisciplinary work therefore that mental-state talk is an important relational support for young children’s wellbeing and learning (Author/s 2015; Barnes and Dickenson 2018; Grazzani, Ornaghi, and Brockmeier 2016).

Much of the existing research about mental-state talk has been undertaken in home and family contexts (e.g., Ruffman, Slade, and Crowe 2002; Taumoepeau and Ruffman 2006; Symonds, Fossum, and Collins 2006; Hughes and Dunn 1998; Meins et

al. 2003). Across the world, young children are increasingly attending ECEC centres, so children's ECEC experiences contribute significantly to their learning and development (e.g., National Institute of Child Health and Human Development Early Child Care Research Network 2002; Li et al. 2013; Yazejian et al. 2017). Mental-state talk studies that have taken place in ECEC centres have observed that educators use mental-state talk more frequently than mothers in home contexts (Farkas et al. 2017; Author/s 2012; Frampton, Michal, and Jenkins 2009). Because ECEC settings provide infants and young children with rich experiences with mental-state talk, they should be recognised as a valuable context for fostering young children's talk about, and understanding of the mind.

It is important, however, to acknowledge that most existing research on mental-state talk in both home and ECEC contexts has taken place in English-speaking countries and contexts. Yet cultural differences exist in the ways that caregivers talk to, and interact with young children (Bornstein and Cheah 2006). It is apparent that interaction styles reflect cultural conventions about self and other identity and about learning. While generalisations should be avoided, in independent-oriented cultures such as many English-speaking and European countries, caregiver-child interaction styles are often found to promote autonomy, agency and self-directed exploration and learning (Kagitcibasi 2007; Markus and Kitayama 1991). Other cultures promote interdependence, where values of social-connectedness and collective moral obligations are prioritised (Luo, Tamis LeMonda, and Song 2013). In these cultures, there may be less emphasis on individual perspectives and mental agency and more on conformity, group socialisation and information transmission (Kagitcibasi 2007; Markus and Kitayama 1991). This being the case, children's linguistic experience with mental-state talk may

differ across cultures, and this raises questions about whether research undertaken in English-speaking contexts can necessarily be generalised universally.

The present study addresses the gaps in the current research base by conducting the first cross-cultural comparison of the mental-state talk of early childhood educators<sup>1</sup>. We compare the naturally occurring talk of native English-speaking infant educators from [removed for review], Australia and native Mandarin-speaking infant educators from [removed for review], China in order to identify similarities and differences in the ways that they use mental-state talk with these very young children. These two cultural contexts are examples of the independent – interdependent orientations outlined above, and thus provide a valuable opportunity to examine how cultural orientations may shape educators' language use. Findings will contribute to understandings of the ways that the cultural context, through the language practices of early educators, fosters young children's self-identity and learning in culturally specific ways.

### *Prevalence and characteristics of mental-state talk in ECEC settings*

A small, but increasing body of work has investigated the prevalence of mental-state talk in ECEC settings. Some studies have used a composite measure of all mental-state terms, and have reported that mental-state terms comprise four percent of all words used, and exists in around 11% of educators' utterances (Helmerhorst, Colonna, and Fukkink 2019; Barnes and Dickenson 2018). Other studies have described the relative frequency of specific categories of mental-state terms. When interacting with pre-schoolers in structured play or reading contexts, Colonna and colleagues (2017) and

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<sup>1</sup> In this research, we adopt the term 'educator' to refer to any early childhood practitioner who works directly with children in ECEC settings, regardless of their qualification level.

Misailidi and colleagues (2013) reported that educators most frequently used cognition terms, with desires, preferences and emotions referred to less frequently.

However, in data generated from naturalistic observations of normal classroom practice, King and La Paro (2015) found that educators of preschool-aged children used significantly more perception terms than desire and cognition terms, with emotions used least often. In contrast, observations of infant educators has shown that desire and emotion talk are more prevalent than talk about cognitions (Farkas et al. 2017; Author/s 2012). Young children begin to understand and use desire and emotion terms during infancy and toddlerhood, whereas cognitive terms tend to enter their vocabulary during their fourth and fifth year of life. The difference in relative frequency of educators' use of desire and emotion and cognitive terms in infancy and during the preschool years suggests that educators may adjust their mental-state talk to reflect the developmental levels of the children with whom they interact.

While educators' use of mental-state talk is widely argued to support young children's developmental outcomes, some ECEC studies have proposed that children's development may be further supported by the referent of, or the 'person doing', the mental state. For example, educators can ascribe a mental state directly to a child when they say '*Do you want the ball?*', or '*You know where it is*'. Alternatively, they can ascribe it to themselves '*I think it's time to go inside*', or to another person '*Tilly feels sad now*'. In an ECEC context, Barnes and Dickenson (2018) reported that, during instructional and book reading activities, educators most frequently ascribed mental-state terms to the child compared to themselves or others. They suggest that educators may adhere to the view that young children better understand talk about themselves than others. When more specific categories of mental-state terms were examined, King and La Paro (2015) found that when educators used perception, desire and cognitive terms,

they were more likely to refer to the child's mental-state than to their own, other adult's or inanimate characters such as a doll or soft toy. In contrast, educators tended to refer to their own emotions rather than the child's or other people's. The researchers propose that these educators are thus de-emphasising preschool-aged children's emotional states while placing an emphasis on their cognitions, desires and perceptions.

### ***Cultural differences in mental state talk***

An emerging body of international research suggests cultural differences exist in parents' use of mental-state talk with young children. In a New Zealand study of mental-state talk used by mothers as they described pictures to their 15- to 26-month-old infants, Taumoepeau (2015) reported that mothers of Pacific Island heritage tended to use a lower proportion of mental-state terms than English-speaking mothers. The cultural differences were heightened by the strength of the Pacific Island cultural identity reported by the mother. On the basis of the differences in frequency of mental-state talk between these two cultural groups, the author suggests that mental-state talk may be less privileged in non-English-speaking cultures than in English-speaking ones.

This finding is supported by studies involving Chinese speaking parents.

Analysing transcripts from Chinese (n = 60) and European American (n = 71) mothers' narration of a wordless picture book to their three-year-old children, Doan and Wang (2010) reported that Chinese mothers used significantly fewer mental-state words than their US counterparts. While both cohorts used cognitive terms most frequently and emotional terms least frequently, European American mothers used significantly more of these terms than their Chinese counterparts. They also more frequently drew attention to their own and others perspectives by modulating the certainty of their utterances using modal verbs and adjuncts such as 'might' and 'maybe'.



The frequency of particular types of mental-state talk appears to vary according to the age of the child being spoken to. Dai, McMahon and Lim (2020) compared the mental-state talk used by 50 Australian and 50 mainland Chinese parents as they played with their 18-month-old infants. Similar to findings in infant ECEC settings (Farkas et al. 2017), both cohorts used desire terms most frequently, followed by cognitive and then emotion terms. However, Australian mothers used significantly more mental-state talk than their Chinese counterparts, with the difference attributed to a greater frequency of desire, as opposed to cognitive and emotion terms. These findings are reflected in an interesting study by Cheng and colleagues (2020) in which bilingual mothers played with their 18-month-old infants twice – once interacting in English and once in Mandarin. Results again demonstrated that, in both languages, mothers used significantly more desire than cognitive terms. However, mothers used desire terms more frequently and cognitive terms less frequently when they spoke Mandarin compared with when they spoke English.

No known studies to date have analysed cultural differences in the referent of parents' mental-state talk. A suggestion that cultural differences may exist comes from a related study by Fujita and Hughes (2020) which analysed five-minute samples of Japanese (n = 117) and UK (n = 119) mothers when they were describing (as opposed to talking to) their three- to six-year old children. These researchers reported that the UK mothers used significantly more references to mental states than Japanese mothers and explicitly referred to the child's perspective more frequently than their Japanese counterparts, who used more references to their own or others' perspectives.

### ***The present study***

While an emerging body of research supports the argument that educators' mental-state talk comprises an important element of their classroom discourse, the literature cited

above identified important gaps. First, despite findings from family based studies reinforcing the importance of experience with mental-state talk in infancy, there are few studies that explore this discourse type in the ECEC setting. Second, no infant ECEC studies to date have examined the referent of mental-state terms, and third, ECEC studies are yet to consider cross-cultural differences in educator's use of mental-state terms. Therefore, the present study aims to address these gaps by answering the two research questions:

- (1) To what extent does the frequency of mental-state talk used by infant educators differ by type and by cultural-linguistic context (Australian English-speaking and Chinese Mandarin-speaking)?
- (2) To what extent does the frequency of referents of mental-state talk used by infant educators differ by type and by cultural-linguistic context?

## **Method**

### ***Participants***

Participants for this study comprised of 44 native English-speaking educators who worked in ECEC centres in and around the [removed for review] area, Australia, and 30 native Mandarin-speaking educators who worked in [removed for review], Mainland China. All educators worked in rooms catering for infants aged birth to two years. The Australian cohort was derived from the participants of an Australian study on the language environment of infant ECEC rooms. Qualifications reflected those required in the Australian context, with 10 holding a specialised early childhood Bachelor degree, 20 holding a vocational diploma and 14 holding a vocational certificate in ECEC. Australian educator experience with infants ranged from 1 to 20 years, with a mean of approximately 10 years. The Chinese cohort was recruited specifically for this study.

Qualification again reflected the requirements of the local context, 12 holding a specialised early childhood Bachelor degree, 15 possessing a vocational diploma, and three holding a non-early-childhood Bachelor degree. Chinese educators were less experienced than the Australian cohort, with experience working in infant rooms ranging from one month to 19 years with an average of approximately two years.

### ***Data generation***

Each educator was video-recorded as they conducted their normal activities and interactions with the infants in their room. Ethical approval for the study was gained from the [university's name] Human Ethics Research Committee. Prior to data collection, fully informed written consent was obtained from the focus educators, all other educators, and the parents of the infants in the room. Information letters explained that the researchers were interested in the naturally-occurring interactions that took place between educators and infants, and encouraged educators to interact as they normally would if the videographer was not in the room. The videographer who obtained the footage had early childhood qualifications and observed the infants' cues in a sensitive and responsive manner. She spent time at each research site prior to recording in order to become familiar with educators and infants. She ceased recording if an infant became upset, she removed herself temporarily if an infant was disturbed by their presence, seeking advice from room educators about the best way and time to recommence the recording. The participants were informed that they had the right to opt out of participation at any time, and educators were informed that they could request to cease the filming should they or any infant become upset or uncomfortable.

The data for the Australian cohort was extracted from three hours of video footage of normally occurring activities including play, mealtimes, and personal care. For this study, we extracted 20 minutes of play footage on the basis that the context of

play has been observed to be rich in opportunities for mental-state talk (Author 2012). We used the following criteria to select the extracts: first, the focus educator needed to be present during the entire 20 minute play activity from beginning to the end. Second, the focus educator needed to be actively interacting with the children. The first 20 minutes in the footage that met these criteria was selected for analysis. The Chinese data was extracted from 1.5 hours of footage that captured the morning activities including free play and structured play in the infant rooms. The same criteria were used to select 20 minutes of free play footage for analysis.

### *Coding of the data*

All educator talk directed at one or more infant in their room was transcribed in the native language. The transcriptions were then separated into *messages*, which is a semantic unit that is approximately equivalent to a clause (Hasan 1996). Each message was coded as follows:

#### *Mental-state talk*

Each message was coded as *mental-state* if it contained a mental-state term, or *non-mental-state* if it did not. Previous mental-state coding schemes (Ruffman, Slade, and Crowe 2002; Author/s 2012; Bretherton and Beeghly-Smith 1982) were used to categorise each mental-state term. *Desires* were references to motivations and preferences (e.g., want, like, love and hope). *Emotions* were references to emotional feeling states and processes (e.g., happy, sad, cranky, angry, frustrated, excited, and surprised). *Perceptions* were explicit references to perceptual states and processes (e.g., see, hear, taste, and smell). *Cognitions* were references to knowledge and epistemological states and processes (e.g., know, think, understand, remember, wonder, and pretend). *Modulations of assertion* were references that, through the use of a modal

verb or adjunct, explicitly express a point of view (e.g., might, probably, maybe, should, and possibly).

Most mental-state messages only contained one mental-state term, but in rare instances, a message was coded in two categories (e.g., *I think you want the ball*). Table 1 provides examples from the data of Australian and Chinese educators' messages that contained each category of mental-state terms.

### **INSERT TABLE 1 HERE**

#### *Mental-state referent*

Each coded mental-state term was then further coded according to the mental-state referent. *Child* was coded when the referent was the child (e.g., *Do you remember when ...*); *Educator* when the educator ascribed the term to herself (e.g., *I think it's in here*); *Joint* when the educator referred jointly to herself and one or more child (e.g., *We might play outside*); and *Other* when the educator referred to someone who she was not directly speaking to (e.g., *Tommy wants a turn now*) or to an inanimate object (e.g., *Teddy's feeling sad*).

#### *Inter-coder reliability*

We calculated Cohen's Kappa inter-coder reliability for Australian and Chinese cohorts separately (Table 2). We randomly selected 11 educators for Australian cohort (27.5%) and seven for Chinese cohort (23.3%). Our results are all above .70, which according to Cohen, represents substantial agreement (McHugh 2012).

### **INSERT TABLE 2 HERE**

### ***Data analysis***

As the number of the total messages varied widely among educators (range = 164 – 570,  $M = 684.20$ ,  $SD = 74.42$ ), we first calculated proportions of different types of mental-state talk in terms of the total messages. We also calculated proportions of the mental-state referent for different types of mental-state talk.

For the first research question, we performed a 5 x 2 MANOVA using the mental-state talk type (desire, emotion, perception, cognition, and modulation of assertion) as a within-subject independent variable and culture (Australia and China) as a between-subject independent variable. To answer the second research question, we conducted six separate 4 x 2 MANOVAs for the overall use of mental-state talk and for each type of mental-state talk using the mental-state referent type as a within-subject independent variable (i.e., Child, Educator, Joint, and Other) and culture as a between-subject independent variable (i.e., Australia and China). The data analyses were performed in IBM SPSS 25.

### **Results**

#### ***Comparison of the proportions of mental-state talk by type x culture***

Table 3 presents the descriptive statistics of the proportions of mental-state talk. The results of MANOVA show that there was a significant within-subject effect of mental-state talk type ( $F(4, 288) = 62.64$ ,  $p < .01$ , partial  $\eta^2 = .47$ ). Post-hoc pairwise comparison reveals that irrespective of the culture, educators used desires most and emotions least. There was no significant difference between perceptions and cognitions, both of which were more than modulations of assertion.

**INSERT TABLE 3 HERE**

There was a significant between-subject effect for culture ( $F(1, 72) = 39.36, p < .01$ , partial  $\eta^2 = .35$ ); and a significant interaction effect between mental-state talk type x culture ( $F(4, 288) = 3.93, p < .01$ , partial  $\eta^2 = .05$ ). Overall, Australian educators ( $M = 15.73\%$ ) used significantly more mental-state talk than Chinese educators ( $M = 7.44\%$ ). Post-hoc analyses showed that, except for emotions ( $F(1, 72) = .24, p = .63$ , partial  $\eta^2 = .00$ ), Australian educators used significantly more of each type of mental-state talk than Chinese educators: desires ( $F(1, 72) = 4.83, p < .05$ , partial  $\eta^2 = .06$ ); perceptions ( $F(1, 72) = 39.97, p < .01$ , partial  $\eta^2 = .36$ ); cognitions ( $F(1, 72) = 15.64, p < .01$ , partial  $\eta^2 = .18$ ); and modulations of assertion: ( $F(1, 72) = 30.81, p < .01$ , partial  $\eta^2 = .30$ ). To examine the interaction effect (Figure 1), we further conducted separate repeated ANOVAs for Australian and Chinese educators. We found that Chinese educators used desires most frequently, and modulations of assertion least frequently. The proportion of emotions used by Chinese educators did not differ from their use of perceptions and modulations of assertion. English educators also used desires the most, followed equally by perceptions and cognitions. However, emotion talk was used the least.

## **INSERT FIGURE 1 HERE**

### ***Comparison of proportions of mental-state talk referents by type x culture***

Table 4 presents descriptive statistics of the proportions of the mental-state talk referents. For overall mental-state talk, the within-subject effect of the referent type was significant ( $F(3, 216) = 385.59, p < .01$ , partial  $\eta^2 = .84$ ). The within-subject comparison shows that the Child referent was used most frequently, followed by the Educator, with Joint and Other referents used least frequently.

**INSERT TABLE 4 HERE**

While the between-subject effect of culture was not significant ( $F(1, 72) = 0.23$ ,  $p = .64$ , partial  $\eta^2 = .00$ ), there was a significant interaction effect between referent type x culture ( $F(3, 216) = 22.69$ ,  $p < .01$ , partial  $\eta^2 = .24$ ) (Figure 2). The post-hoc univariate analyses show that Chinese educators used the Child referent significantly more than Australian educators ( $F(1, 72) = 33.37$ ,  $p < .01$ , partial  $\eta^2 = .32$ ) and used the Educator ( $F(1, 72) = 9.18$ ,  $p < .01$ , partial  $\eta^2 = .11$ ), the Other ( $F(1, 72) = 24.76$ ,  $p < .01$ , partial  $\eta^2 = .26$ ), and the Joint ( $F(1, 72) = 24.76$ ,  $p < .01$ , partial  $\eta^2 = .26$ ) significantly less often.

**INSERT FIGURE 2 HERE**

For desire talk, the within-subject effect ( $F(3, 216) = 273.71$ ,  $p < .01$ , partial  $\eta^2 = .79$ ), the between-subject effect ( $F(1, 72) = 19.51$ ,  $p < .01$ , partial  $\eta^2 = .21$ ), and the interaction effect ( $F(3, 216) = 10.97$ ,  $p < .01$ , partial  $\eta^2 = .13$ ) were all significant. The post-hoc pairwise comparison for the within-subject effect show that, consistent across the two cultures, educators attributed desires to the Child the most, followed by Educator and Other, which did not differ. Joint referent was used the least. As to the between-subject effect of culture, Australian and Chinese educators only differed in the Child referent: ( $F(1, 72) = 14.30$ ,  $p < .01$ , partial  $\eta^2 = .17$ ), with Chinese educators using a significantly higher proportion than their Australian counterparts.

To examine the interaction effect (Figure 3), separate repeated ANOVAs were performed for Chinese and Australian educators. While Chinese educators used Child



most frequently, the differences between Educator and Other, and between Joint and Other were not significant. Educator was found to be higher than Joint. However, for Australian educators, there was no difference between Educator and Joint. Australian educators used Other significantly more than Joint.

**INSERT FIGURE 3 HERE**

For emotion talk, the within-subject effect of the referent type ( $F(3, 216) = 9.89, p < .01, \text{partial } \eta^2 = .12$ ), and the interaction effect ( $F(3, 216) = 3.51, p < .05, \text{partial } \eta^2 = .05$ ) were significant. But the between-subject effect of culture was non-significant ( $F(1, 72) = 3.50, p = .07, \text{partial } \eta^2 = .05$ ). The post-hoc pairwise comparison for the within-subject effect shows that the educators attributed emotions most frequently to the Child, followed by Other, which was higher than Joint. There were no significant differences either between Educator and Joint referents, or between Educator and Other referents.

For the interaction effect (Figure 4), the repeated ANOVA for Australian educators showed a similar use of Child and Other referents, both of which were used more frequently than Educator and Joint. In contrast, the Chinese educators' use of Child was significantly higher than Joint and Other, which were used equally. No pairwise differences between Educator and all the other three referent types.

**INSERT FIGURE 4 HERE**

For perception talk, the effects of referent type ( $F(3, 216) = 58.86, p < .01, \text{partial } \eta^2 = .45$ ) and culture ( $F(1, 72) = 17.96, p < .01, \text{partial } \eta^2 = .20$ ) were significant,

but the interaction ( $F(3, 216) = 1.43, p = .23, \text{partial } \eta^2 = .02$ ) was not. The within-subject pairwise comparison shows that the educators ascribed perceptions to the Child the most, followed by Educator and Other. There were no significant differences between the Educator and Joint referents, or between Joint and Other referents. For the between-subject effect of the culture, Australian educators used each referent type significantly more than Chinese educators: Child ( $F(1, 72) = 5.50, p < .05, \text{partial } \eta^2 = .07$ ), Educator ( $F(1, 72) = 5.35, p < .05, \text{partial } \eta^2 = .07$ ), Joint ( $F(1, 72) = 7.79, p < .01, \text{partial } \eta^2 = .10$ ), and Other ( $F(1, 72) = 11.73, p < .01, \text{partial } \eta^2 = .14$ ).

For cognition talk, there was a significant effect of referent type ( $F(3, 216) = 47.27, p < .01, \text{partial } \eta^2 = .40$ ), and an interaction effect ( $F(3, 216) = 23.59, p < .01, \text{partial } \eta^2 = .25$ ). But the between-subject effect of culture was not significant ( $F(1, 72) = 0.83, p = .37, \text{partial } \eta^2 = .01$ ). We performed repeated ANOVAs for Australian and Chinese educators separately to explicate the interaction effect (Figure 5). Australian educators used Educator most, followed by Child, which were then followed equally by Joint and Other referents. In contrast, Chinese educators used the Child referent the most, and rarely used the other three referent types (Educator, Joint and Other), which did not significantly differ from each other.

### **INSERT FIGURE 5 HERE**

Finally, with regard to the referents of modulations of assertion, there were significant effects of referent type ( $F(3, 216) = 8.28, p < .01, \text{partial } \eta^2 = .10$ ), culture ( $F(1, 72) = 16.42, p < .01, \text{partial } \eta^2 = .19$ ), and the interaction ( $F(3, 216) = 16.92, p < .01, \text{partial } \eta^2 = .19$ ). For this mental-state talk type, while Joint had a higher proportion than both Educator and Other referents, there was no significant pairwise difference

between Joint and Child. Neither were there significant pairwise differences between Child and Educator referents and between Educator and Other referents. Australian and Chinese educators differed only in their use of Joint ( $F(1, 72) = 29.99, p < .01$ , partial  $\eta^2 = .29$ ) and Other ( $F(1, 72) = 6.40, p < .05$ , partial  $\eta^2 = .08$ ) referents. The interaction effect (Figure 6) demonstrates that Joint was used most frequently by English educators, whereas Chinese educators most often ascribed modulations of assertion to the Child.

### **INSERT FIGURE 6 HERE**

#### **Discussion**

This study is the first to compare the frequency of mental-state talk used by native English-speaking Australian and native Mandarin-speaking Chinese infant educators. Our findings concurred with those of other infant-educator studies (Author/s 2012; Farkas et al. 2017) to indicate that, regardless of cultural context, desire talk was the most frequently used mental-state talk type. Analyses of mothers talk to has also been found to privilege desire talk to infants while increasing the use of cognitive terms as children age (Cheng et al. 2020; Taumoepeau and Ruffman 2006; Author/s 2007). Similarly, educators of older children have been found to preference talk about cognitions (Colonna et al. 2017). Together, these findings suggest that both Australian and Chinese educators and parents may respond linguistically to the developmental attributes of children by placing increasing emphasis on cognitive states and processes as children grow older.

Important differences in mental-state talk were also detected. Like family-based studies (Doan and Wang 2010; Dai, McMahon, and Lim 2020), we found that Chinese educators used significantly less mental-state talk than Australian educators. With the

exception of emotion terms, the Australian cohort used all mental-state talk types significantly more frequently than their Chinese counterparts. The patterns of use also differed between cohorts. While both cohorts favoured desire talk, this talk made up nearly 65% of Chinese educators' mental-state talk with cognitive talk the next frequent (17%) and all other categories occurring infrequently. In contrast, Australian educators' desire talk comprised around 42% of their mental-state talk, with the remaining 58% largely made up of cognition talk and perception talk (20% each) and modulation of assertion talk (14%). Such differences may reflect cultural differences in emphases during adult-child interactions. A Western emphasis on subjective experiences and perspectives may be reflected in the Australian educators' incorporation of perception, cognition and modulation of assertion talk, while a Chinese motivation to use language to guide actions and social connectedness may result in their predominant use of desire talk (Luo, Tamis LeMonda, and Song 2013; Cheng et al. 2020).

This study is also one of the first to examine the referents that educators assigned to mental-state talk. Consistent with previous ECEC studies (King and La Paro 2015; Barnes and Dickenson 2018), we found that both cohorts predominantly used the Child referent, with educators ascribing desires, emotions and perceptions most often to the child. As young children start to develop an understanding of these three mental states during infancy, it may well be that educators are scaffolding this understanding by helping infants to make connection between these mental-state terms and their direct motivational, emotional or perceptual experience (Barnes and Dickenson 2018).

Cultural differences were also apparent. When compared with Australian educators, the Chinese educators were more likely to use the Child referent for all talk types. Most strikingly, while Chinese educators almost exclusively ascribed cognitions

to the child, Australian educators used cognition talk to refer to their own and the child's cognitive states. For example, Chinese educators used phrases such as '*Think about it, put one of your feet in first*' (想想看, 先放一只脚进去) or '*Did you forget our tissue paper?*' (你是不是忘了我们的餐巾纸?), while Australian educators used phrases such as '*I think this one is pink*' and '*I wonder where your shoes are*' in addition to ascribing cognitions to child. Australian educators were also significantly more likely to use the Joint (e.g., *We forgot to do that, didn't we?*) and Other referents (e.g., *He thinks it's funny*) than Chinese educators. The more frequent inclusion of the Educator, Joint and Other referents by Australian educators could possibly reflect a Western focus on individual subjectivity as both the child's and others' perspectives are emphasised. The Chinese educators' predominant use of the Child referent may suggest a more direct and didactic interaction style, which emphasises information transmission and academic achievement (Doan and Wang 2010; Luo, Tamis LeMonda, and Song 2013).

Finally, Australian educators predominantly used the Joint referent 'we' when using modulation of assertion terms. In the context of giving directions to young children, the Joint referent is argued to introduce a tone of negotiation (Author/s 2019), so it is possible that Australian educators adopt a similar tone to emphasise the perspectival nature of modulation of assertion talk to infants. The inclusion of Joint referent was unique to our study, and the finding that over 16% of mental-state terms were assigned to a Joint referent suggests that this referent type should not be overlooked as an important pedagogical discourse feature in future research.

### ***Limitations, future directions and implications***

This study illustrated several significant differences in Australian and Chinese educators' use of mental-state talk during their interactions with infants. While

demonstrating how language use cannot be separated from the cultural contexts in which it occurs, several considerations need to be kept in mind in order to avoid simplistic West-East dichotomies. First, the study methodology involved replicating, as closely as possible, the observations method used in the Australian study. Although both cohorts were observed during play, it is acknowledged that cultural differences not only occur in the ways that adults talk to infants, but also in the play styles that are promoted in Western and Chinese contexts (Bornstein and Cheah 2006). While independent-oriented Western approaches to play in both ECEC and home contexts emphasise child individuality, self-direction and expression, Chinese approaches tend to be more teacher-directed, structured and academically focussed (Liu et al. 2005; Rao, Ng, and Pearson 2009). With mental-state talk associated with the degree to which autonomy and individual agency is promoted during play (Author 2013), it may be that the talk differences reported in this study are partially the product of different play styles rather than solely attributed to cultural linguistic differences. As play in Western cultures can also range from free to structured play (Edwards 2017), future studies are needed to examine how mental state talk is supported or constrained by qualitatively different play styles.

It should also be noted that the coding scheme used in this study was derived from those developed in English-speaking countries. This raises the question of whether the differences detected in this study resulted from the different linguistic encoding of mental states in the two languages. For example, the relative absence of modulation of assertion talk in the Chinese cohort may be a result of cultural differences in how individual perspectives are acknowledged in different languages. While English speakers explicitly modulate assertion by using modal verbs and adjuncts such as ‘may’, ‘could’, and ‘probably’ (Author/s 2007), Chinese speakers do so less frequently. Instead,

the phrase ‘好不好’ (Is that OK?) is frequently used to indirectly suggest possibility to young children. Also noted by Dai and colleagues (2020), this raises questions about how best to capture and code mental-state talk in different languages and cultures.

With its aim of determining differences between the two cultural cohorts, our study has not addressed the question of individual differences. Existing ECEC mental-state talk research has determined relationships between educators’ mental-state talk and their qualification level (Farkas et al. 2017), years of experience (King and La Paro 2015), and the activity context of the interaction (Barnes and Dickenson 2018). While the present study is the first to report broadly on the prevalence of mental-state talk in a Chinese-speaking cohort, future research is needed to explore factors related to individual differences.

With the above cautions in mind, our findings provide a first glimpse of how children are socialised into an understanding of the mind in culturally specific ways by their early childhood educators in Australia and China. Our findings, as well as those showing cultural differences in home contexts (Cheng et al. 2020; Dai et al. 2020; Doan and Wang 2010), caution against a universal approach to understanding how adults talk to infants about the mind. Findings also have implications for understanding different cultural developmental trajectories in children’s understandings of the mind, such as why English-speaking children develop an understanding of subjective beliefs earlier than knowledge and ignorance, whereas the opposite developmental pattern is evident in Chinese children (Wellman et al. 2006). With increasing numbers of young children worldwide growing up in multilingual households (Langeloo et al. 2021; Verdon et al. 2014) findings also have implications for educators who have children from different language backgrounds than the majority language in their centres. With a clearer understanding of how children’s home language experiences may be shaping their

identities as thinkers and knowers, educators are better placed to work in partnership with parents to ensure that all children in their centres develop and use mental-state language in ways that will both enhance their cultural identify and support their learning.

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*Data availability:* The de-identified quantitative dataset is held by the corresponding author and can be made available on reasonable request. The data supporting the findings of this study are available within the article.

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