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Abstract

Mothers' preference for introducing and elaborating on mental states in conversations with their young children has been shown to be a significant predictor of children's Theory of Mind development among Western samples. However, it is unclear whether this relationship still holds true in the Chinese cultural context. Exploratory in nature, the present study aims to study the relationship between mothers' mental state talk and the development of Theory of Mind (ToM) in Chinese children (4-5 years old) following the framework of Peterson and Slaughter's (2003) research. All participants ($N = 94$) were from middle-income families and were Chinese mothers of a 4-5-year-old typically developing children. Fifty-two pre-schoolers ($M = 4.47$ years, $SD = .49$) were boys.

Adopting a correlational study design, the current study first looks at if there were individual differences in mothers' conversational styles with their children. By running correlational analyses examining the relationships between different conversational styles, this assumption was confirmed. Given individual differences did exist, Pearson's correlation was performed to decide if mothers' preferences of language use significantly correlated with ToM development in Chinese children. The result from the correlation analysis indicated that no significant correlation emerged between mothers' self-reported preferences for sophisticated explanations of mental states and parental report of children's ToM.

This null result was again confirmed by a hierarchical regression analysis showing that mothers' conversational preferences were not predictors of Chinese children's ToM development when relevant control variables were included in the analyses. Additionally, two correlational analyses were conducted to address the research question that whether children's age and expressive vocabulary correlate with parental reports of ToM understandings. No correlation was found between age and ToM ability. However, there was a significant correlation between children's expressive language and ToM, giving further support to the social constructivist

account. An independent samples *t*-test to test the gender effect on parental-report ToM yielded no significant results.

Evidence of Internal consistency, content validity, and construct validity for the two translated questionnaires was given. However, accurate estimation of the psychometric properties of the two translated measures requires more research. Finally, Implications and future directions for research on the relationship between maternal mental state talk and ToM development in diverse and larger samples from a longitudinal lens were discussed.

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List of Abbreviations

CSUS	*Children's Social Understanding Scale (Tahiroglu et al., 2014)*
CUREC	*Central University Research Ethics Committee*
EMS	*Elaborated Mental State*
ENMS	*Elaborated Non-Mental State*
MCDI	*Mandarin Communicative Development Inventory (Tardif et al., 2008)*
MMSII	*Maternal Mental State Input Inventory (Peterson & Slaughter, 2003)*
NEMS	*Non-Elaborated Mental State*
NENMS	*Non-Elaborated Non-Mental State*
ToM	*Theory of Mind*

Appendices

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Chapter 1: Introduction

1.1 ToM: Definition and Its Importance

As one crucial aspect of social-emotional competence or social understanding, Theory of Mind (ToM) can be understood as the ability to understand one's mental states, such as intentions, feelings, and desires, reflecting cognitive perspective-taking (Eggum et al., 2011, Wellman et al., 2001). This capacity to understand mental states then allows people to explain and predict human behaviour, given that human action is the product of mental states and attitudes (Wellman & Woolley, 1990; Wimmer & Perner, 1983). Therefore, ToM is indispensable in learning the link between mental states and actual behaviours.

There are five key aspects of ToM (Wellman et al., 2006). The first component, diverse desires (DD), refers to different people can have different desirers about the same object. The diverse beliefs dimension (DB) implies that different people can have different beliefs about the same object. Knowledge access (KA) or knowledge - ignorance requires the child's understanding that a person may not know what the child knows. Children who acquire the false belief (FB) dimension understand that a person can have false beliefs. The last aspect of ToM, hidden emotion (HE), means that a person can feel one thing but display a different emotion.

Understanding factors that promote ToM development is important because it has been established that sophisticated ToM understanding contributes to children's higher social competence, positive peer relationship, and prosocial behaviour (Eggum et al., 2011). That said, ToM plays a significant role in social and emotional well-being. For example, teacher-rated social skills in 3- to 6-year-olds have been found to be positively related to ToM (Watson et al., 1999). Similarly, in another study, ToM at five years predicts prosocial behaviours at seven years (Kuhnert et al., 2017). Together, these findings indicate that ToM is indispensable in learning the link between mental states and actual behaviours.

1.2 Social Constructionism

Building upon Vygotsky's socio-cultural framework, the social constructivist account of ToM proposes that children's knowledge about mental states is influenced by social experiences such as family conversations and interactions (Goswami, 2004, p. 172). Therefore, according to the social constructivist theory, young children's insights into persons and minds are shaped by their social-interactive experiences rather than intrapersonal mechanisms (Montgomery, 2004). In such cases, it is reasonable to argue that family discourse can influence children's social understanding by referring to mental states in conversations (Goswami, 2004, p. 173). Thus, given the differences in how families talk about mental states in terms of frequency and content (Peterson & Slaughter, 2003), it is crucial to understand how different amounts and the quality of exposure to mental state talk could affect mental state understanding.

In general, this dissertation will take a social constructivist account and investigate how social knowledge develops from social interaction processes, emphasising mental state talk with mothers in particular. This paper takes this social constructivist stance in explaining how mental concepts acquire meaning given the considerable research showing the correlations between sociolinguistic factors and ToM development (Brown et al., 1996; Jenkins & Astington, 1996).

1.3 Language and ToM

Researchers who embrace this social constructivist stance have established that children's language ability correlates with their ToM understandings, given that language is symbolic and social (Cheung, 2006; Farrar & Maag, 2002). For instance, general language comprehension is found to be correlated with ToM understanding in Chinese children, whereas complements, in particular, contribute to ToM development in Western samples (Cheung, 2006; Tardif & Wellman, 2000). Moreover, language, particularly mental terms, provides the children with insight into others and their own internal mental states, consequently facilitating the development of ToM understanding (Moore et al., 1989). Thus, it is also believed that the acquisition of mental terms can

be seen as comprehension of mental state and thus represents the development of the concept of mind in children.

Indeed, at around thirty months of age, children begin to use mental verbs, such as want, think, and know, to express internal mental states and processes, with an increase in frequency and variety in subsequent years (Bretherton & Beeghly, 1982; Shatz et al., 1983). In addition, substantial studies have shown a link between the acquisition of mental terms and ToM development (Baron-Cohen et al., 1994; Bretherton & Beeghly, 1982; Brown et al., 1996). This correlation is also evident in another line of research on ToM development in children with autism, in whom both language and ToM development are delayed. Children with autism have difficulty in recognising mind-related words (e.g. want, know, think) as one aspect of ToM ability, thus providing evidence of autism-specific impairment in the child's concept of mind (Baron-Cohen et al., 1994).

We have seen how crucial the impact of language on ToM is in making children's own reflections on their inner states observable (Bretherton & Beeghly, 1982). Thus, knowing how these reflections are coded in language, and how such code is then deployed, are both vital in understanding the initial formation of mental concepts. Research on deaf late-signing children raised by hearing parents provides a crucial test for the significance of language on ToM. Studies have shown that late-signing children in a hearing family (i.e. those who learn sign language mainly outside of the family) are several years behind hearing children of hearing parents in ToM understanding, suggesting their difficulties in acquiring knowledge of mental states (Meristo et al., 2012; Morgan et al., 2014; Woolfe et al., 2002). The argument is that later-signing children have no easy means of communication with hearing family members, resulting in a lack of communication within the family. This shortage of linguistic input, in turn, contributes to delayed ToM development (Woolfe et al., 2002).

1.4 Maternal Mental State Talk and ToM

In addition to children's language ability and tendency to use mind-related vocabularies, children's communication with social others can also foster the development of ToM. Thus, how parents talk to their children may have a non-negligible influence on children's development of ToM.

In general, it is believed that collaborative talks with parents that are rich in mentalistic terms can help children's social-cognitive development (e.g. Pavarini et al., 2012). To support this influence of parent-child communicative pattern on children's ToM development, previous research driven by the socio-constructivist framework has shown that mothers differ in how they talk about mental states, which in turn influences the development of ToM in Western children (Peterson & Slaughter, 2003). Moreover, the findings from observational and experimental studies indicate that pre-schoolers who have mothers frequently discussing moods, feelings, and intentions with them have an advanced grasp of mental concepts (Dunn,1996; Hughes & Dunn,1998).

This well-established relationship between conversations about mental states and the advanced social understanding in Western children is in line with the theoretical proposal that naming psychological states fosters reflection on these states by making them explicit (Dunn et al., 1991; Ornstein et al., 2004). Furthermore, it has been argued that dialogue about mental states helps children understand the possibility of differing perspectives and conflicting emotions given the same encounter for different individuals, thus facilitating perspective-taking and mental state understanding (Harris, 1999).

1.5 ToM and Maternal Mental State Talk in Chinese Culture

Studies have shown that Western and Chinese mothers differ in the communicative pattern with their children, as the narrative in a specific culture reflects the predominant societal values and beliefs (Doan & Wang, 2010; Liu et al., 2016; Wang, 2001; Wang & Leichtman, 2000). Compared to their Western counterparts who

are keen to use mental talk to affirm an autonomous sense of self in early socialisation practices, Chinese parents refer to more external behaviours and fewer mental states with children (Doan & Wang, 2010; Liu et al., 2016). These cultural differences in parent-child communication practise, including the tendency and frequently to refer to mental states, may reflect underlying distinct linguistic structures and language usage rules. For instance, Mandarin emphasises verbs more than English by the very fact that it is pro-drop language, in which sentence objects are often dropped (Tardif et al., 1997). In addition, looking into the typology, English and Mandarin differs in transparency of morphological marking. Mandarin verbs are exclusively marked for aspect, with no subject-verb agreement. In addition, aspect in Mandarin is marked with a distinct morpheme that does not alter the stem (e,g., *zai 4 zou 3* indicates continuous walking, whereas *zou 3 le* implies past status). That said, Mandarin verbs are marked more consistently than English, in which verbs are marked somewhat inconsistently for person, number, and tense. Consequently, these differences in typology would then reinforce the developmental asynchrony in ToM understanding.

Apart from distinct linguistic traits, China and Western countries also embrace different social values. Within a divergent independent-interdependent cultural value systems, China prizes interpersonal harmony and interdependence, whereas Western cultures emphasise autonomy and individuals' internal state (Han et al., 1998; Markus & Kitayama, 1991). However, Doan and Wang (2010) found that maternal mental state talk positively predicts children's later social understanding independent of culture. Moreover, the emphasis on mental states over behaviours in mother-child conversions partially mediates the cultural influences on social understanding. In such cases, limited exposure to mental talk may hamper the ToM development of Chinese children (Liu et al., 2016), which makes studying the link between ToM and maternal mental state talk in the Chinese cultural context imperative.

1.6 Measuring Maternal Mental State Talk via Mothers' Self-Report

Typically, mothers' conversational styles with their children are assessed using a narrative assessment method, in which mothers need to interpret the story in a

wordless picture book (Bekar et al., 2018). Then, the narratives are coded in terms of the number of mental state terms, who the mental state refers to (i.e. the story characters, the mother herself, or the child), and the categories of mental state language (e.g. emotions, cognitions, and perceptions).

However, the story-telling paradigm requires intensive naturalistic analysis and coding, thus it is only applicable to small groups of parents from relatively homogenous backgrounds (Peterson & Slaughter, 2003). Given this limited accessibility of the traditional narrative assessment approach, Peterson and Slaughter invented a parental-report questionnaire, the Maternal Mental State Input Inventory (MMSII), to measure mothers' preferences for introducing and elaborating on mental states in conversations with their children aged four to five. Mothers' conversation styles with their young children were captured using the four dimensions in the MMSII, which includes Elaborated Non-Mental State (ENMS), Elaborated Mental State (EMS), Non-Elaborated Non-Mental State (NENMS), and Elaborated Non-Mental State (ENMS).

ENMS entails mothers who choose to convey physical reality or non-mentalistic concepts over mental states, whereas mothers who rate higher on the EMS dimension mention and elaborate upon mental states to their children (i.e. focusing on causes and consequences of internal states) (Peterson & Slaughter, 2003). Yet another conversation style is chosen by the high NENMS mothers whose conversations with the children lack mentioning and didactic elaborating upon mentalistic content. On the other hand, an alternative conversational style (NEMS) is to mention mental state concepts frequently, but in straightforward, traditional ways, without explanation.

Peterson and Slaughter (2003) explored whether there was a significant correlation between mothers' self-reported preferences for elaborated, explanatory talk about the mental states (EMS) and children's ToM development. They found that mothers who scored higher on the EMS dimension also had children who showed more advanced ToM understanding. Moreover, they went further in concluding that children's ToM development was best predicted by mothers' conversational preferences, as measured by the MMSII, when relevant control factors were included in the analyses.

Another study explores the relationship between maternal mental state talk, children's behavioural adaptation (i.e. social competence and internalising and eternalising behaviour), and school readiness. MMSII was used to assess mothers' preferences for talking with children about mental states. A moderating effect of emotional situation knowledge on the relationship between elaborated maternal mental state talk (EMS) and behavioural adaptation was found. The association between the two variables was only significantly positive for children with average and high emotion situation knowledge (Garner & Toney, 2020). Emotion situation knowledge consists of conceptual knowledge about emotions (Conway & Bekerian, 1987) and "scripts" on how to respond to emotionally charged situations (Channell & Barth, 2013). There was also a significant negative correlation between EMS scores and children's school readiness for children low on emotion situation knowledge (Garner & Toney, 2020).

1.7 The Present Study

To date, there has been no research studying the role of mothers' references to mental states in promoting the development of ToM among Chinese preschool-age children. Therefore, the current study is motivated by this gap in previous literature and will contribute to this field of ToM research by examining factors that influence ToM development in Chinese culture. This dissertation focused on China as the interdependent context because it conforms to the collectivistic values, which place emphasis on family and social goals over individual goals (Taumoepeau et al., 2019), yet it is relatively understudied in terms of the relationship between ToM and parent-child communication.

The current study was interested in the research question of whether Chinese children, like their Western peers, develop ToM through mental state talk. This research question raises the central developmental issue of the relation between language experiences and ToM development in Chinese culture given that narrative practices may reflect a culture's language theory, including the use and function of language (Doan & Wang, 2010).

This research followed the same paradigm as Peterson and Slaughter's (2003) work. In sum, building on the hypothesis that individual differences exist between mothers' conversational styles when communicating with their children, the overarching goal of this dissertation was to test whether mothers' preferences for mental state language relate to ToM development among Chinese children. That is, the present study investigated if Chinese children with mothers preferred to talk about mental states had better ToM understanding than those whose mothers talked less about mental states. The researcher hypothesised that Chinese mothers who preferred to engage children within conversations relating to mental states and elaborate upon mental states would have children with more advanced ToM development.

Underlying this broad research question, three sub-questions will be addressed:

1. Whether age correlates with ToM development. That is, do children have more advanced ToM understanding when they are older.
2. Whether Chinese children's expressive vocabulary relates to their ToM development.
3. Whether there are gender differences in ToM development in Chinese children.

The current research focused on the mother-child dyads because mothers tend to engage in more conversations with their children and are more likely to refer to mental states during the parent-child conversations compared to fathers (Denham et al., 1994; LaBounty et al., 2008; Leaper et al., 1998). Especially that traditional Chinese Confucianism highlights the role of women to be home- and child-oriented (Zhang, 2007). Following Peterson and Slaughter (2003), mothers' conversation styles with their young children were captured using the four dimensions in the MMSII for this dissertation.

1.8 Structure of the Dissertation

To start, the theoretical frameworks and related literature on ToM are reviewed. More specifically, a Mind-space framework is introduced, followed by a description of

the developmental trajectory of ToM. This Mind-space framework, which enables the revealing of individual differences in ToM ability, then leads to the discussion of the limitations of traditional ToM measures. Due to those limitations, a parent-report questionnaire to measure children's ToM understanding is introduced. The six subscales of this parent-report measure are discussed. Third, the methods and measures for the study is presented, comprising the research design and procedure, a description of participants, the recruitment process, and measurements used. This is followed by the ethical statement. Chapter 4 describes how the two English measures were translated into Chinese based on the best practices recommended in order to achieve measurement equivalence.

Then, the results section will be presented, starting with analytic strategies used to address the four research questions, followed by the results. First, a correlational analysis was run to address the study's questions focused on the individual differences in mothers' preferences of language used with their children. The relationship between mothers' elaboration and mentioning of mental terms and Chinese children's ToM development was then examined. The third research question explored potential moderators between the two variables. Finally, a regression analysis was conducted to investigate whether mothers' language use can predict ToM development in Chinese children when controlling for relevant moderators.

The final chapter is a discussion section that includes an interpretation of the findings and a summary of this study's contributions to the fields of education and psychological research. Moreover, the constraints of the current research, the implications of these research findings, and future directions for research on the psychometric properties of the two translated questionnaires are outlined. Also, a future study of the relationship between the two variables in the larger and diverse sample is proposed, and lastly some general conclusions.

Chapter 2: Literature Review

2.1 Individual Differences in ToM- A Mind-Space Framework

2.1.1 Shifting from the Binary Domain-General Representational Framework

People's basic beliefs about others' minds and behaviour (ToM), are assumed to be the same for everyone and everywhere (Heider, 1958, p. 79; Lillard, 1998). In short, the fundamental constitutes of an action sequence that lead us to believe that another person is attempting, intending, or capable of doing anything are universal (Heider, 1958, p. 80). According to Heider, people use their understanding of the basic constitutes of action to interpret, predict, and control behaviours. He further argues that underlying the basic constitutes exists a hierarchy of cognitive awareness that starts with more stimulus-bound detection of "facts" and moves deeper into the fundamental reasons for these facts. The so-called "facts" here can be understood as the "raw material" of social perception, or the social observations that need explanations and interpretations within interpersonal relations (Heider, 1958, p.81). In order to make sense of those "facts" and another person's actions, all people need to go through this cognitive hierarchical process. Therefore, there are no individual differences in the abilities to represent minds and infer mental states.

However, Conway et al. (2019) were dissatisfied with the current domain-general representational structures, such as language and executive function, that are framed upon the assumption of universal mental representation in explaining the development of ToM. They argue that while adopting a domain-general representational framework, variation within these domains would affect performance on most tasks, as skills, including language, intelligence, and memory, are not specific to mental-state representation.

Therefore, when combined with a binary responses standard in interpreting ToM ability (i.e. children either can represent a particular mental state or cannot), such

domain-general responses do not reveal variance in ToM regarding what it means to be better or worse at reflecting mental states. This lack of explanation and reflection of individual differences in ToM highlights the need for an alternate theory of mind framework that can address mental-state types and individual differences in the quality of mental-state representations by theorising on variance in ToM.

2.1.2 A Mind-Space Framework

Conway et al. (2019) proposed a multidimensional and dynamic Mind-space framework to account for the individual differences in the accuracy of mental state inference in terms of domain -specific representational content rather than domain -general abilities. In this Mind-space model, minds are represented on orthogonal dimensions, which may reflect cognitive abilities (e.g. intelligence), behavioural tendencies (e.g. recklessness), or personality traits (e.g. suspiciousness), allowing them to be individuated from one another. In such a way, multiple components of the mind that may be similar to, or discriminated from one another, can be represented in one model using the Mind-space framework. Therefore, an individual's representation of another mind can be expressed as a single vector, or location, in a space defined by numerous axes within such a Mind-space framework (Figure 1).

2.1.3 Mind-Space and the ToM

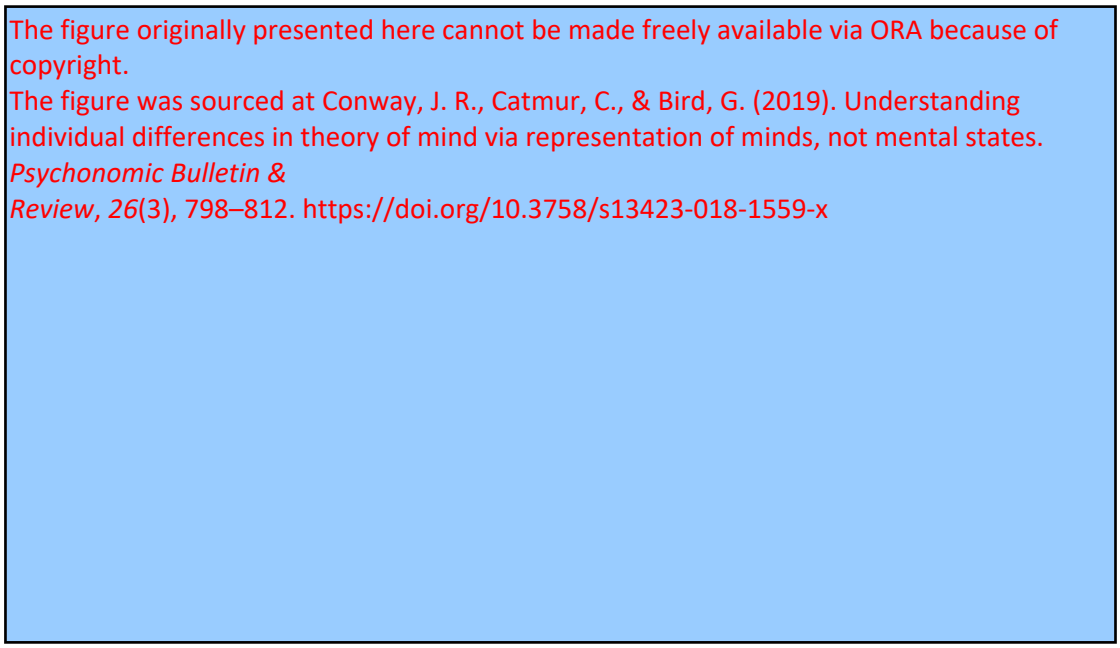
How is Mind-space relevant to the ToM? To answer this question, the term "mental-state" must be defined. Conway et al. (2019) define mental states as the products of the mind that creates them. Thus, they argue that the multiple aspects of minds and variations in mind type are likely to enable accurate and specific inference of the contents of another's mental states. Taking the laboratory Sally-Anne false-belief task as an example. In this task, children are told a story where Sally hides her ball in a covered basket and leaves. Later, Anne comes and moves her ball into a covered box. Then Sally returns. After showing this story, the child needs to answer where Sally will look first for her ball. To answer this question correctly (i.e. Sally will first look for the ball in her basket), the child has to understand false beliefs. That is, Sally will act on

the basis of a false notion that contradicts where the thing is actually located and where the child knows it is located. Thus, the Sally-Anne paradigm is believed to be the strongest indictor of mental-state representation (Baron-Cohen et al., 1985; Conway et al., 2019; Dennett, 1978).

However, according to the Mind-space framework, the Sally-Anne task may not reveal pure false-belief understanding as the knowledge of Sally's mind-space as well as the differential individuals' Mind-space representations may affect the correctness of the response (Conway et al., 2019). For instance, if the child knows that Sally is suspicious and suspects Anne of stealing her ball, what is considered a correct answer by that participant may change. In such cases, Sally will first check Anne's box to see whether Anne has stolen her ball. Consequently, it is reasonable to assume that a participant who recognises that Sally is at the extreme end of the suspiciousness dimension, which exists in that participant's Mind-space, is more likely to be accurate when inferring the content of Sally's mental states than someone who either does not represent suspiciousness as a property of minds or cannot locate Sally accurately along the suspiciousness dimension. That said, the child may fail the Sally-Anne task although the child has an accurate mental-state understanding and representation, demonstrating how a person's representation of Mind-space interacts with situational information to impact inferences about another person's mental state. This brings us to the next section, which will discuss several limitations of using the laboratory paradigms in assessing ToM.

Figure 1

ToM as a Mind-Space Framework (Conway et al., 2019).



2.2 Assessing ToM Development Using Laboratory Paradigms

This section describes the developmental trajectory of ToM evident from traditional laboratory ToM measures, followed by limitations associated with current standard ToM tasks.

2.2.1 A Hierarchical Developmental Trajectory of ToM

ToM in children is often examined using a variety of laboratory paradigms meant to measure comprehension of mental states (Tahiroglu et al., 2014). These measurements have yielded a wealth of useful information about ToM development. For example, research using laboratory approaches suggests that certain mental-state understanding develops following a predictable and hierarchical pattern in which previously-developed understandings lay a foundation and serve as prerequisites for later-developed understandings (de Villiers & de Villiers, 2014; Phillips et al., 2002; Saxe & Powell, 2006; Tahiroglu et al., 2014; Wellman & Liu, 2004).

Within this hierarchical developmental process, understanding that other individuals may have desires that one does not share is one of the first stages, at least among Western children. As an illustration, an 18-month-old could understand that others might choose broccoli, whereas they would choose goldfish crackers (Repacholi & Gopnik, 1997). In addition, characterised as "desire psychologists", children before the age of 3 appear to rely primarily on the construct of desire when thinking about human conduct. In one study, two-year-olds correctly predict actions, such as the suitable continuation and cessation of the search, based on the knowledge about a character's basic desire (i.e. X will continue researching in Place B if he does not find what he wants in Place A) (Wellman & Woolley, 1990). In addition, they can also accurately predict the characters' emotional reactions in terms of desire (i.e. Y will be sad if he does not find what he wants).

Moving beyond this desire psychology stage, in which children can only predicts one's actions based on what the person wants (i.e. desire), around the age of 3-4, children begin to understand the importance of beliefs in guiding action, but only if they are true beliefs (de Villiers & de Villiers, 2014). In short, 3-4 years-olds begin to conceptualise belief as a representational mental state that interacts with but is independent of desire. Adding and utilising a concept of belief allows them to explain why people may act in contradiction to one's desire (e.g. Bill may search for the desired object in one spot while it is actually at a second location because he believes it is at the first location). For instance, roughly starting from three years old, children include a concept of belief in one's explanatory apparatus by showing an understanding that people with the same desire may act differently due to differences in beliefs. However, by far, children still have not developed a false-belief understanding rather than an understanding of true beliefs.

Then, by the age of 4–5, typically developing toddlers can pass the classical Sally-Ann false-belief task (i.e. answering correctly that Sally will first search for her ball in the basket). Based on the time point of passing the false-belief tasks, many scholars conclude that a significant developmental transition to a representational mental model occurs at the age of four with the references to false beliefs beginning to

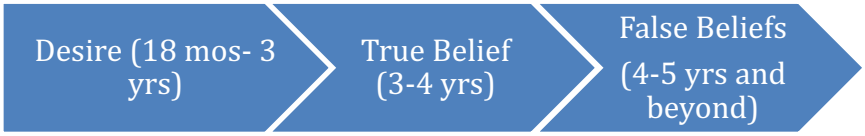
appear after the fourth birthday (Bloom & German, 2000; Gopnik, 1993; Raver & Leadbeater, 1993). Given the evidence of a significant shift in children's knowledge of other people's and their own psychological states around the age of four, this dissertation focuses on children between the ages of 4-5.

It is worth noting that the false-belief understanding is not the end of ToM development. Rather, the development of ToM is a life-long process and involves different aspects apart from the false-belief understanding (Miller, 2012, p. 2). Therefore, simply depending on false-belief tasks such as the Sally-Anne paradigm as indicators of children's social cognitive skills may not represent the entirety of children's ToM development.

The following figure depicts the chronology of the developmental states of ToM understandings measured by traditional ToM tasks:

Figure 2

Author-Generated Figure Representation of the Developmental Trajectory of ToM as Measured by Laboratory ToM Tasks



2.2.2 Limitations of the Current ToM Measures

Bloom and German (2000) propose two reasons why judging one's ToM ability based on the false-belief task alone is inappropriate. To begin with, they argue that the false-belief tasks assess abilities other than mental-state comprehension as one's true ToM understanding can be masked by the task demands (Bloom & German, 2000; de Villiers & de Villiers, 2014). For instance, in order to solve the false-belief task, the child must follow the actions of two characters in a story, understand that Sally could not have noticed the ball being switched, remember where the ball used to be and where

it is now, and understand the specific meaning of the question. In such cases, under-developed executive function, linguistic ability, and memory may prevent the child from making the necessary explicit decisions or choices. Based on this reasoning, several researchers have simplified the false belief task by rewording the questions to make them easier to understand, asking the children to act out their responses instead of responding verbally, giving the children a memory aid and so on. For instance, Freeman et al. (1991) found that children's success at acting out the seeker's path in the false-belief task (i.e. acting out Sally's searching path using a toy) is higher than when using a verbal response.

In another study, 3-year-olds were exposed to a Smartie tube which really contained pencils (Mitchell & Lacohée, 1991). Then the participants were asked what they thought was inside the box before they opened the box (i.e. Smarties). Most children in the control condition who answered the question verbally failed the task by saying "pencils", whereas 20 children out of 28 responded to the question by mailing a picture into a post box of what they thought inside gave the correct answer. The researchers argued that children may provide the incorrect answer on the traditional Smarties task (i.e. giving a response verbally) because they are prejudiced to make judgments about belief states based on known physical reality due to the way the question is framed. The point made is that the children can be confused by the meaning of "before we open the tube". In contrast, in the posting task, children were able to simultaneously focus on physical reality and acknowledge incorrect beliefs because the question precisely specifies the moment in time being referred to (i.e. when you post your picture, what did you think was in the tube").

The second reason to abandon the false-belief task as a test of ToM according to Bloom and German (2000) is that successful false-belief task performance is just one aspect of ToM development. In other words, Bloom and German believe that even though younger children may not show signs that they have an appreciation of false beliefs, it does not necessarily mean that they are not reasoning about mental states at all. This argument can be backed up by research in which 2-year-olds watched as an appealing toy was placed on a high shelf (O'Neill, 1996). While the child was watching,

the parent either witnessed the whole event together or did not. When children asked for assistance in retrieving a toy, they named the toy, named its position, and indicated its location substantially more often when a parent had not watched events than when she or he had. This result indicates that toddlers consider their communicative partners' knowledge states, suggesting an understanding of mental states.

Following a similar note, Tahiroglu et al. (2014) propose that the immensely complex and multidimensional mental state knowledge, which includes understanding desire, intention, and perception apart from belief, is only partially captured by false-belief tasks. In order to address this problem, many studies assess children's ToM by aggregating scores across a range of mental-state tasks (Wellman & Liu, 2004). However, although studies using various ToM tasks are able to capture a broader aspect of ToM development than those utilising single task paradigms, there are apparent limits to what can be assessed in one or two short sessions with young children (Tahiroglu et al., 2014).

In addition to the above two limitations, Tahiroglu et al. (2014) argue that the standard ToM tasks may lack ecological validity as many of them use personally irrelevant, hypothetical tasks involving unknown or inanimate characters in a highly-controlled laboratory setting. Thus, those tasks may overlook components of ToM that are visible in children's daily behaviours, communication, and social interactions (Raver & Leadbeater, 1993; Tahiroglu et al., 2014). As a result, laboratory ToM tasks are well-suited to revealing the developmental emergence of mental state concepts. However, it is less evident that they fit the criteria for excellent individual differences measurements on their own.

2.3 Parent-Reports of Children's ToM: The Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2004)

Given the limitations mentioned above, Tahiroglu et al. (2014) moved away from the standard laboratory ToM tasks, which focus on a single informant (the child), examined in a single setting (the laboratory), and sometimes with only a single task

type (e.g. the false-belief task). They created and validated the Children's Social Understanding Scale (CSUS), a parent-report ToM measure testing ToM development of children from 2-7. They argued that parent-report measure of ToM allows researchers to analyse a large variety of ToM components and provide greater ecological validity. Parents have the opportunity to observe their children in a variety of everyday scenarios over time. Hence, if scale items are framed suitably, parents might be able to provide comparably informative assessments of children's mental state comprehension.

According to Tahiroglu et al. (2014), individual differences in children's ToM arise for two reasons. First of all, children's rates of attaining various mental state understandings may vary, with some hitting these milestones early and others later. Second, even once children have gasped basic concepts, they may differ in their tendency to think about mental states and their ability to participate in mental state reasoning, and these disparities may continue throughout development. Because these two kinds of individual differences are expected to be substantially confounded early in development, CSUS includes items assessing both types to capture ToM widely.

The items are divided into six subscales, which reflect six core facets of ToM: belief, knowledge, perception, desire, intention, and emotion, as the global ToM should inspire and propagate specific theories of specific mental processes (Astington & Gopnik, 1991; Montgomery, 1992). In addition, different mind components are acquired through different processes (e.g. developing through a theoretical fashion or enculturation) (Astington & Gopnik, 1991).

Throughout this research, Tahiroglu's (2014) conceptualisation of these six key terms was used. "Belief" includes one's ability to know that different people's ideas about the same event can vary and that beliefs can be factually erroneous and change over time (Tahiroglu et al., 2014). "Knowledge" includes the understanding that people have varying levels of knowledge, that information can originate from a range of sources, and that knowledge itself has varying degrees of certainty. "Perception," visual perception in particular (e.g. gaze following), is closely linked to a person's mental

focus and hence what they may be thinking, seeking, fearing, and so on. Whereas "Desire" implies the understanding that people might want different things and that what we desire can change over time More importantly, since Freud, desire has been recognised as the dispositional foundation of our everyday psychology as we see human actions to be primarily desire-driven (Bartsch & Wellman, 1995, p. 65; Tahiroglu et al., 2014). "Intention" includes the understanding that human actions are goal-directed, that intentions may not be fulfilled, and that the same intention may result in different outcomes (Tahiroglu et al., 2014). "Emotion," on the other hand, entails the knowledge that people may have different emotions under the same situation, that people can feel conflicting emotions, and that there is an ability to show and read emotions through facial expressions.

However, as a source of information on children's mental-state understanding, parents' reports are useful but not without limitations. For instance, parents' capacity to infer what their children do and do not understand apparently varies (Tahiroglu et al., 2014). Moreover, their memories of what youngsters say and do are undoubtedly prone to error, not to mention that parents tend to overestimate or underestimate their children's abilitie. Therefore, Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2004) could not replace the traditional laboratory measures of ToM as CSUS score is not an absolute indicator of when certain mental state understandings occur. Rather, it complements those traditional measures by assessing children's relative standing on ToM in a broader sense, thus allowing the scale to reveal individual differences in ToM development. Given the current research focuses on individual differences in the development of ToM in the Chinese cultural context, CSUS is well-suited for the purpose of this dissertation.

2.4 Cultural Influences in the Development of ToM

In thinking about how Chinese children develop a Theory of Mind, as conceptualised in Western developmental psychology, two questions arise. The first question concerns what cultural differences and similarities there might be in the developmental trajectory of ToM. Secondly, given the cultural differences in ToM

development trajectories and communication patterns, can we say that maternal mental state talk, an influential factor of ToM development in Western children, also facilitates ToM understanding in Chinese children? If not, then what might be the alternative ways that Chinese children develop ToM.

2.4.1 Cultural Differences and Similarities in the Progressions of ToM Understandings

As mentioned earlier, at least among Western samples, the development of ToM follows a sequential and hierarchical developmental procedure (Wellman & Liu, 2004; Wellman et al., 2006). Indeed, evidence from Western samples has demonstrated that the progression of the five key aspects of ToM (i.e. diverse desires, diverse beliefs, knowledge access or knowledge-ignorance, and hidden emotion) follows a robust sequence (Wellman et al., 2006). However, which parts of these developmental procedures are culturally shared and which parts are culturally different? To address this question, researchers need to compare the progressions of ToM in children from a variety of sociolinguistic contexts.

One study by Wellman et al. (2006) which addressed the developmental trajectory of ToM understandings in Chinese children, found that despite some cultural differences, certain developments did appear to be shared. Therefore, they concluded that children's understandings are a mix of globally emerging and culturally unique insights. They confirm the assumption that the ToM also develops sequentially for Chinese children. The most interesting finding was that, despite an overall similarity between the sequences of ToM development in Chinese and American children, there was a critical difference in the scale order of comprehending knowledge-ignorance and various beliefs (Wellman et al., 2006).

Wellman et al. (2006) conclude that ToM understandings in both monolingual American and Chinese 3-5-year-old children appear to move systematically from diverse desires to knowledge-ignorance to false belief to hidden emotion. Indeed, 86% of Chinese children and 88% of American children in the sample fit into this pattern

exactly, given that they get more percentages correct on the easier items than the more difficult ones. This similarity supports the argument that understanding cognitive, or representational, mental states, including beliefs and knowledge, is conceptually more difficult than understanding noncognitive states like desires (Tardif & Wellman, 2000; Wellman & Woolley, 1990).

In evidencing this pattern, Tardif and Wellman (2000) also found that, as with their Western counterparts at around 21 months, monolingual Mandarin-speaking children tend to use the word "want" more frequently than other mental state terms referring to beliefs, such as "think", in everyday conversations. This similar pattern shared between Mandarin-speaking and English-speaking children demonstrates that Chinese children also acquire these ToM understandings systematically following a hierarchical order. In addition, this similarity of ToM development in children raised in different cultures also reflects the idea that all documented human languages contain terms that refer to wanting, thinking, and knowing (Wierzbicka, 1992, p. 135).

The following figure shows the sequential ToM developmental trajectory regarding when these four components emerge shared by children between the ages of three and five worldwide:

Figure 3

Author-Generated Table Representation of the Universal Chronological Order of the Emergence of Four ToM Components as Proposed by Wellman et al. (2006)

Age (in years)	3	4		5 and upward
Components	Diverse Desires			
		Knowledge Ignorance		
			False Beliefs	
				Hidden Emotion

Regarding the key cultural difference, understanding knowledge-ignorance emerges first and is easier than understanding diverse beliefs for Chinese children.

However, the order reverses for American children (Wellman et al., 2006). This difference was evaluated directly by comparing American and Chinese children who fail one of these two tasks. In this study, 64% of Chinese preschoolers who fail one of the two tasks pass the knowledge-ignorance task but fail the diverse-belief task, whereas 68% of American children fail the knowledge-ignorance task and pass the diverse-belief task.

Adding to this cultural difference, Tardif and Wellman (2000) note a cultural variation in the timing of beginning and end points in children's ToM development. To study the cross-cultural timing differences in ToM, they recorded everyday conversations of monolingual Chinese-speaking toddlers living in Beijing, with an average age of 22 months, and their caregivers over a 6-month period using an unobtrusive manner (i.e. the caregiver was asked to interact with the child as if the researcher was not present as far as possible). Data collection procedures were done by a Chinese researcher who was blind to the research purpose to minimise the experimenter and cultural biases.

Tardif and Wellman (2000) found that references to desiring and knowing appear earlier in Chinese children compared to their English-speaking counterparts. However, Chinese children refer to thinking at later ages than English-speaking children. They reason that this delayed reference to thinking may be due to the paucity of thinking-related conversations between children and adults in children's early years of development. Indeed, they argue that Chinese parents make great emphasis on "knowing" (e.g. practical knowledge) while Western parents comment more on "thinking" during parent-child conversations.

2.4.2 Cultural Variations in Maternal Mental State Talk as an Influential Factor of ToM Development

Parental mental state talk in children's development of ToM is important as language is one way children learn about their social environment and others' thoughts and beliefs (Howe et al., 2010). For instance, Dunn (1996) rejected the previous belief

that children are solitary thinkers isolated from the social world. He/she acknowledged the significance of children's conversational interaction with family members in ToM development. Moreover, the mother's mental state discourse, as a crucial component of early narrative input, aids Western children's ToM understanding by making internal states explicit and directing attention to mental processes (Peterson & Slaughter, 2003; Liu et al., 2016).

This idea that children's understanding of internal mental states is embedded in social contexts is in support of the social constructivist perspective, which states that cooperative social interactions can facilitate children's understandings of false beliefs (Montgomery, 2004). As evidence, it has been consistently shown that parental mental state language predicts Western children's ToM development trajectories (Peterson & Slaughter, 2003; LaBounty et al., 2008; Ebert et al., 2017). Nonetheless, caution should be exercised when attempting to generalise this finding in non-Western cultural contexts given that diverging language, communication patterns, or cultural experiences may cause cultural differences in the contributing factors of ToM development (Wellman et al., 2006).

One such cultural difference is parent-child conversational pattern. Cross-cultural studies have shown differences in how parents communicate with their children, given what one culture desires to foster in their children may be unvalued by another culture (Lu et al., 2008; Wang & Fivush, 2005). For instance, in comparison to Chinese mothers, American mothers tend to ask more elaborative questions, are more critical, and put more emphasis on personal themes and autonomy while reminiscing (Wang, 2001; Wang & Fivush, 2005). Considering communication as a routine of socialising practice, this finding aligns with the fact that American parents socialise their children into a sense of self by highlighting uniqueness and autonomy, whereas Chinese parents value social harmony and interpersonal interaction that reflect interdependent self-construal (Miller et al., 1996; Miller et al., 1997). Therefore, given this lack of mental-state talk and the emphasis of social connectedness in the Chinese cultural context, it is valid to question that whether Chinese children acquire ToM understandings in an

alternative way (Lu et al., 2008). In other words, ToM may have different developmental mechanisms for Chinese children.

Lu et al. (2008) lent support to this hypothesis that Chinese children develop ToM through a different pathway apart from mental-state talk and self-references through which ToM can develop. They found that neither mental-state talk nor reference to the self is related to the performance of false-belief tasks in Chinese children. Instead, whether or not they are able to pass the false-belief task is related to other-references during the autobiographical memory recall. Specifically, children who fail the false-belief tasks at Time 1 but pass the tasks at Time 2 have shown an increase in other-references between the two time points.

In summary, Lu et al.'s (2008) study is strong proof of the existence of a cultural difference between influential factors of ToM development. Most importantly, their finding shed light on the possibility that the association between the mother's use of mentalistic language and children's ToM development may vary between Chinese and Western cultures, which is the primary focus of this dissertation. In addition, this empirical evidence adds further support to a meta-analysis result showing that Chinese children perform as well as their Western counterparts on false-belief tasks despite the rare exposure to mental-state talks.

Chapter 3: Methods and Measurements

3.1 Introduction

This chapter presents the design and procedures of the study. Descriptions of the sample profile and recruitment procedure are provided along with descriptions of the measurements used. Scoring and Coding systems for each measure are explained with their psychometric properties. Methodological considerations can be found in Chapter 2.

3.2 Research Design

The study adopted a correlational design to explore whether mothers' self - reported use of language referring to mental states relates to parental reports of children's ToM development. As discussed in the Section 2.2.2, there are two major limitations linked with measuring children's ToM using traditional laboratory measures. Hence, a parental report of children's ToM was used to reveal individual variations on the development of ToM for the current dissertation.

The research was conducted wholly online due to the 2020 lock-down in China. During the study, all participants completed four questionnaires online in a fixed order:

1. A demographic questionnaire (see Appendix A)
2. Maternal Mental State Talk Inventory (MMSII; Peterson & Slaughter, 2003) (see Appendix B)
3. Mandarin Communicative Development Inventory (Short Form) (MCDI; Tardif et al., 2008a) (see Appendix C)
4. Children's Social Understanding Scale (Short Form) (CSUS; Tahiroglu et al., 2014) (see Appendix D)

3.3 Research Procedure

Before starting, an electronic consent form was sought from the mothers. Any mother who did not want to take part could choose the "I do not agree" option on the consent form whereupon the survey immediately ended with a "Thank You" message shown on a blank page. Those who agreed to participate would click the agree button so that they could start answering the questions.

While answering the questionnaires, participants could see the percentage of progress they made on a progress bar shown on the top of the screen. Moreover, they were free to stop answering the questionnaire at any point during the study and have a break if they wished. They could return to the questionnaire and start from where they had paused. In addition, for three of the four questionnaires, participants were allowed to skip any questions they did not want to answer. The exception was the Maternal Mental State Talk Inventory where the participants had to finish answering all items (MMSII; Peterson & Slaughter, 2003). When completing the questionnaires, participants were thanked for their time and their interest in the study by a message shown automatically at the end of the survey.

3.4 Participants

Mothers of 124 typically developing preschool-aged children (i.e. 4-5-year-old) took part in the study. Mothers were recruited based on the criteria that they have a child within the age range of 4-5, and the child has first language proficiency in mandarin. Thirty participants who did not complete the questionnaires as required (i.e. those who missed more than two items on the MMSII measure and more than three items on the CSUS) were excluded from the final analysis. Thus, 94 responses were entered into the final analysis. *T*-tests showed that the 94 participants and the 30 participants who were excluded from the final analysis did not significantly differ in terms of age, $t\,(122) = -.91$, $p = .31$, socioeconomic status, $t\,(122) = -1.10$, $p = .27$, their children's gender, $t\,(122) = .82$, $p = .41$, and current work status (i.e. work full-time

outside of home; work part-time outside of home; work full-time at home), t (122)= - .90, p= .37.

The average age of the maternal participants was 37.38 years (SD= 4.90), with an age range of 27 to 48 years. Two outliers who reported ages of 62 and 5, probably by mistake, were excluded in this calculation. Among those 94 mothers, 52 of them had boys whereas 42 of them had girls. Worth mentioning, the response of a mother whose child was 3.8 years old at the time of the test was also included, given the child was just a few months away from his 4th birthday.

The average score for socioeconomic status is 5.85 (SD = 1.60) when participants rated their social standing from 1 to 10 on a social ladder, indicating that participants were mainly from middle- and upper- income households. Sixty-seven participants (71.28%) worked full-time outside the home, including those who were full-time students. Nine participants (9.57%) worked part-time outside the home. Only, eighteen (19.15%) were full-time mothers at home (see Appendix E).

Table 1 shows the descriptive statistics of participant age and socioeconomic status.

Table 1

Descriptive Statistics of Participant Age and Socioeconomic Status

Variables	N	Maximum	Minimum	*M*	*SD*	*SE*
Age (in years)	92	48	27	37.38	4.90	.51
Social Economic Status	94	10	2	5.85	1.60	.16

Note. *M* = mean; *SD* = standard deviation; *SE* = standard error of mean. Maximum shows the highest value participants got for each variable. Minimum indicates the lowest value participants got for each variable. The analysis was carried out in SPSS 28.

In terms of demographic locations, participants were from seventeen different provinces and cities of China. Appendix F shows that 47 participants were from Beijing (50.00%). 12 were from Hebei province (12.77%). 10 participants were from Guangdong province (10.64%). The remaining 25 were from other provinces or cities (26.60%).

As a result of the recent relaxation on the One Child Policy in China, just under half of the sample, 42 participants (44.68%) have more than one child while 52 participants have only one child (55.32%) (see Appendix G). Most importantly, during the data collection period, the children of 67 participants (71.28%) could not go to their kindergarten in person due to the pandemic lock-down. Only 27 children were able to go to their kindergarten in person as normal (28.72%) (see Appendix H).

3.5 Recruitment

Participants were recruited using a snow-balling technique. First, a brief introduction of the study was sent via WeChat groups, followed by invitation to mothers of 4- and 5-year-old typically developing children to participate in the study (see Appendix I). Once mothers expressed interest, the link to the questionnaires with a parent information sheet (see Appendix J) and a parent consent form (see Appendix K) was sent to their emails. An opt-in strategy was employed, meaning that only participants who had signed the consent form could partake in the study. Then, those mothers who agreed to participate were asked whether they knew other mothers of 4- and 5-year-old children and whether they were willing to send the invitation letter to them. Many participants indicated that they knew other mothers in their neighbourhoods or whose children attended the same kindergarten as theirs.

After the participants introduced the study to other mothers, more than 50 mother contacted the researcher by email or via WeChat to request further information. They also expressed their willingness to help the researcher get in touch with other mothers they knew. At the end of this process 120 mothers had agreed to participate in the study and a link was sent to them through email or WeChat by the researcher. Alongside online recruitment, the researcher's parents, who live in Beijing, China, went around their neighbourhood in person and invited mothers they met fitting the desired profile to participate. As a result, another four mothers recruited this way agreed to participate. All participants were given a unique number to keep their identities confidential.

3.6 Measurements

3.6.1 Maternal Mental State Input Inventory (MMSII; Peterson & Slaughter, 2003)

3.6.1.1 Description

The Maternal Mental State Input Inventory (MMSII) was developed to assess mothers' preferences for discussing mental states with their 4- to 5-year-old children. The instrument contains twelve vignettes depicting everyday family interactions familiar to households with children around four to five, such as cooking, wrapping birthday presents, and playing on the sand at the beach (Peterson & Slaughter, 2003). Each vignette culminates with a dilemma involving a 4-year-old and the mother, accompanied by four options describing different actions or speeches by the protagonist mother. These are labelled for the research as: Elaborated Mental State option (EMS), Non-Elaborated Mental State option (NEMS), Elaborated Non-Mental State option (ENMS), Non-Elaborated Non-Mental State Option (NENMS).

Those four options from the participant's perspective are matching in word length and content richness. Mothers were asked to imagine they were the protagonist mother in the vignette. Then, they rated these four options for each vignette from 1 to 4 in terms of their preference and probability of choosing it in a real-life context with their children. The measure was translated into Chinese and adapted for the current dissertation, a process which is described in Chapter 4.

3.6.1.2 Scoring and Coding

The resulting rankings were converted into scores ranging from 4 (most preferred) to 1 (least preferred) for data analysis. Each respondent's totals for the EMS, ENMS, NEMS, and NENMS dimensions were calculated separately, therefore each scale score may range from 12 to 48.

3.6.1.3 Psychometric Properties

All four dimensions (i.e. EMS, NEMS, ENMS, NENMS) show high internal consistency (Cronbach's alpha equals .72, .65, .61, and .62, respectively) in the original English version (Peterson & Slaughter, 2003).

3.6.2 Mandarin Communicative Development Inventory (MCDI; Tardif et al., 2008a)

3.6.2.1 Description

Mandarin Words and Sentences Short Form within the Mandarin Communicative Development Inventory (MCDI; Tardif et al., 2008b) is a parental report on Mandarin-speaking children's expressive vocabulary production. Although this instrument was originally designed for typically developing Chinese children from 16-30 months, it can be used with younger or older children (Soli et al., 2012). Therefore, it was valid to use this instrument with children from 4 to 5 years of age.

The complete form contains two parts: Vocabulary (113 items) and Sentences and Grammar (2 items). Although participants were tested on both parts, only the first Vocabulary section was included in the final analysis. The 113 items are organised into 24 semantic or syntactic categories. Eleven of these categories are nouns (i.e. places to go, people, food and drink, body parts, animals, household item, toys, clothes, furniture, outside things, and vehicles). Other categories include games and routines (ball, doll, swim), verbs (want, give, drink), adjectives (beautiful), locatives (behind, beside), quantifiers (all, some), pronouns (he, I), classifiers (animal), question words (what, when, which), sentence final particles (*ma* 吗, *ao* 噢), time words (already, past, today), auxiliary verbs (can, should not), and conjunctions (because).

3.6.2.2 Scoring and Coding

Parents are asked to decide whether their children can or cannot say the words listed without support from adults, such as repetition (Tardif et al., 2008b, p. 17). Whilst the child does not need to pronounce the word as accurately as adults, the respondent needs to be satisfied that the child produces the word spontaneously rather than simply imitates the word spoken by an adult. Given that from eighteen months on, children's vocabulary increases rapidly, it can be difficult for caregivers to give reliable judgements about children's comprehension. Thus, respondents only needed to report

on words their children can say. In such cases, following Soli et al. (2012), the raw score of MCDI in the current study was expressed as the proportion of the words that the parent stated that the child "can say". The proportion was calculated using the total number of "can say" items divided by the total number of answered items.

3.6.2.3 Psychometric Properties

In terms of the psychometric properties, the MCDI short version has shown good content and convergent validity (Tardif et al., 2008b, p. 70). Additional evidence of validity rests on the fact that parental reports on the MCDI and children's performance on the Gesell Developmental Quotient Language Scale, a child measure of children's language development, are highly and significantly correlated, indicating good concurrent validity.

Apart from the validity, the scale indicates good internal consistency with individual item reliabilities for the 24 word categories within the Vocabulary section ranging from .84 to .99 as measured by Cronbach's alpha (Tardif et al., 2008b, p. 67). Furthermore, when treating each category as an item, alpha value was .93, suggesting high reliability across the categories. In addition, the scale shows high test-retest reliability (r = .89).

3.6.3 Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2014)

3.6.3.1 Description

To measure children's ToM understandings, parents filled out the 18-item short version of the Children's Social Understanding Scale (CSUS) online. The current study used the 18-item short form of CSUS rather than the 42-item full scale for the sake of participants' time. This instrument is designed for children between the ages of 2 to 7 (Tahiroglu et al., 2014). There are six highly correlated subscales: belief, knowledge, perception, desire, intention, and emotion. Each subscale has three items. Items are

quasi-randomly ordered. Parents need to rate each item on a 4-point Likert Scale (1= *definitely untrue*; 4= *definitely true*), with a "don't know" option. Completion of the CSUS short version takes about 15 minutes. A Chinese version was developed for the dissertation.

3.6.3.2 Scoring and Coding

In terms of scoring and coding, all answered items were summed and divided by the total number of items receiving a score. Specifically, if the participant chooses "definitely untrue" for an item, that person will get a score of 1 for that particular item and 2 if the participant chooses "somewhat untrue", etc. Items 4 and 10 are reverse items, thus they were reverse coded and scored in the following way: 4 became 1; 3 became 2; 2 became 3; 1 became 4. Moreover, if the mother skipped an item or chose "don't know" as a response to an item, that item received no score and was coded as missing.

3.6.3.3 Psychometric Properties

The original scale in English has shown excellent internal consistency, with Cronbach's alpha equals .89 and averaged corrected item-total correlation of .53, and high test-retest reliability (r = .88) (Tahiroglu et al., 2014). Additionally, the parental-report CSUS score is significantly correlated with the traditional laboratory ToM measures, thus showing evidence of convergent validity.

3.7 Ethical Statement

The Central University Research Ethics Committee (CUREC) has granted approval for this project (CUREC number: CIA-22HT-017) (see Appendix L). An opt-in consent was sought from participants. Consent was opt-in such that the researcher could ensure that the consent was freely given, and individuals could decline consent without negative consequences. Before obtaining consent from participants, the consent form was approved by the CUREC committee. Whilst the study aimed to be as

engaging as possible for participants, assessments could be paused during if a participant wanted to take a break to ensure they did not get bored or tired.

As the demographic questions contain personal information, the researcher was mindful that all research data, including personal data, should not be used for purposes other than this research. Thus, during the recruitment, the researcher was clear to the participants that their data would not be used for other purposes or shared with others. Moreover, the identities of participants would not be known as each would be given a unique number within the research. All issues regarding confidentiality were clearly stated in the participant information sheet in line with the professional guidelines of the British Educational Research Association and the British Psychological Society.

Chapter 4 Translation

4.1 Introduction

Culturally accurate translation of instruments is an important element to avoid misinterpretation of test items by participants, which can cause biased test results. This chapter starts by introducing the four measurement equivalence types, followed by describing 4-step best translation practices. Detailed descriptions of how the researcher employed those best practices in translating the Maternal Mental State Input Inventory (MMSII: Peterson & Slaughter, 2003) and Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2014) to meet the measurement equivalence will also be provided. Then, summaries of recommendations made according to the best practices will be presented. Finally, issues pertaining to psychometrics of the two translated measures will be considered, with a specific focus on internal consistency, content validity, and construct validity. Although the translations can never assume perfection, the researcher believes that a good level of reliability and validity could be achieved by meeting the measurement equivalence following those best practices.

4.2 Measurement Equivalence

The MMSII (Peterson & Slaughter, 2003) and CSUS (Tahiroglu et al., 2014) were originally developed in English. Culture has a considerable impact on how concepts are expressed (Davidov et al., 2014; van Widenfelt et al., 2005). Thus, according to Davidov et al. (2014), in terms of cultural adaptation of the instrument, a measurement equivalence, which demonstrates that the test measures the same attribute under different conditions, must be established. They propose four measurement equivalence types: semantic, idiomatic, experiential, and conceptual equivalence. Semantic equivalence refers to equivalence in the meaning of words (Guillemin et al., 1993). Idiomatic equivalence, on the other hand, can be understood as equivalence of meaning of colloquialisms in one language to alternative expressions in another target language. Experiential equivalence implies that the situations depicted in the source version must be appropriate for the target cultural setting. Conceptual equivalence

requires validation of the concept studied and the situations encountered by people in the target culture. The current research employed the above four equivalence types in translating the MMSII (Peterson & Slaughter, 2003) and CSUS (Tahiroglu et al., 2014) as standards for the translated version that can be considered culturally equivalent to the original one.

In order to achieve the ideal cross-cultural comparability, the preliminary consideration is to translate the items accurately (Davidov et al., 2014; Tsang et al., 2017). Additionally, the items must be both culturally meaningful as were the items asked of the original population (Geisinger, 1994). With that said, the goal of translating the English version into Chinese is twofold: 1) keeping the new version as close to the original as possible; 2) striving for a culturally equivalent version that measures the same constructs retaining the same meaning as the original version.

4.3 Best Practices and Translation Processes

Given the translation process is crucial for the evaluation of the quality of the translated version, a description of the process of translation of the MMSII (Peterson & Slaughter, 2003) and CSUS (Tahiroglu et al., 2014) follows below. This translation procedure carefully followed the guideline of cross-cultural test adaptation proposed by Tsang et al. (2017) to ensure measurement equivalence. According to Tsang et al., four sequential and consecutive steps need to be followed to achieve this measurement equivalence: forward translation, backward translation, review, and pilot testing. After detailed descriptions of each step and best practice recommendations from Tsang et al., this chapter demonstrates how successful the researcher was able to put these recommendations into practice.

4.3.1 Forward Translation

4.3.1.1 Best Practices

Ideally, during the initial stage of forward translation, bilingual translators should translate the questionnaires into their mother tongue to effectively capture the target language's subtleties (Hendricson et al., 1989). It is recommended that two translators are used. One translator who is aware of the concepts that the questionnaire intends to measure should provide a direct word-for-word translation that closely resembles the original version (Hendricson et al., 1989; Tsang et al., 2017). Meanwhile, a naïve translator, that is, one who is blind to the objective of the questionnaire, produces the second "idiomatic" translation. This aims not to achieve word-for-word equivalence but rather to capture the essence of each item. Merely literal translations may result in ambiguous statements, poorly constructed sentences, or even the loss of the original meaning of the items (van Widenfelt et al., 2005). However, the dual-translation process seeks to prevent the translation team from a literalism which could obscure the characteristics measured in the original scales (Borualogo & Casas, 2019).

4.3.1.2 Current Study

In the current research, following the above recommendations, the author translated the two measures on a word-for-word base. A second bilingual professional translator, who was ignorant about the purposes of the two measures, made the second translation. Then, the two versions were compared to detect any deviations of meanings and discrepancies were resolved between the translators. Five amendments in MMSII (Peterson & Slaughter, 2003) and three amendments in CSUS (Tahiroglu et al., 2014) were made at this stag.

4.3.2 Backward Translation

4.3.2.1 Best Practices

The second step is that the initial forward translation should then be back-translated (Tsang et al., 2017). Backward-translation refers to the procedure of translating from the target language back into the original language to ensure the accuracy of the translation. The idea is that back-translation may reveal misinterpretations

or imprecise wording in the original translation (Guillemin et al., 1993; Tsang et al., 2017) Back-translators should have no prior knowledge of the underlying intents and concepts of the instrument so that they are free from bias (Guillemin et al., 1993: Tsang et al., 2017).

4.3.2.2 Current Study

Following the best practice, the current study employed a third translator who was unaware of the instrument's objective to provide the back-translation. The back-translator was asked to refrain from searching for relevant materials regarding the original instruments before completion. Then, a comparison between the back-translation and the original questionnaire was made. No major amendments were made at this stage for the current translation.

4.3.3 Review and Prefinal Version

4.3.3.1 Best Practices

Tsang et al. (2017) recommend using a committee comprising experts familiar with the original construct, the forward and back-translators, and a methodologist, if possible, to evaluate how far the translated and original versions attain the measurement equivalence. They produce a consensus which forms the prefinal version of the translated questionnaire.

4.3.3.2 Current Study

The review committee for the current research involved the three translators, including the researcher herself. The committee assessed the instructions to the questionnaires, all questionnaire items, as well as the responses to each question to determine whether the translated and original versions were semantically, idiomatically, experientially, and conceptually equivalent (Guillemin et al., 1993).

Most importantly, the committee ensured that the translation was comprehensible to Chinese mothers of typically developing 4- to 5-year-olds by using everyday language free from colloquialisms, avoiding imprecise wording and hard-to-understand technical terms (e.g. Theory of Mind). As van Widenfelt et al. (2005) recommend, even adult questionnaires should be written at a level that elementary school children can read. In the current study, no changes were made at this stage.

4.3.4 Pilot Testing

4.3.4.1 Best Practice

With a prefinal version of the measures agreed by the committee, Tsang et al. (2017) recommend pilot testing to ensure source and prefinal version equivalence. Piloting is a valuable step since it provides information about the potential reactions of participants to the instrument instructions, items, and response categories (van Widenfelt et al., 2005).

4.3.4.2 Current Study

In the pilot test of the current study, five Chinese mothers (M= 34.20; SD= 2.59) with a 4- to 5-year-old child (M= 4.80; SD= .45; four boys and one girl) completed the translated versions of both questionnaires to check for any errors and deviations in meaning. All pilot respondents completed all items on each questionnaire.

Furthermore, in order to determine whether the questionnaires were correctly understood at all times, respondents were asked to demonstrate their understanding of each item in an open-ended manner. This was managed within an online conversation with the researcher while they were filling in the questionnaires. Specifically, the researcher asked them what they thought of the question or item, and what they understood the question or item was asking. This process can help pinpoint any nuances and ambiguities of the final version and increase cultural relevancy (Guillemin et al., 1993; Tsang et al., 2017). For instance, the researcher was able to discuss items that

were likely to be unclear to the respondents with the five mothers during the online meeting, making any necessary amendments to the translations accordingly. Three amendments on the translated MMSII (Peterson & Slaughter, 2003) and amendments on the rating scales of CSUS (Tahiroglu et al., 2014) were made on this basis.

4.4 Amendments in the Translation Process

This section details the amendments made in the two translated versions during the translation process to achieve the aforementioned measurement equivalence. Challenges encountered during translation processes are listed, followed by the reasoning behind the adjustments made to solve these discrepancies.

4.4.1 Mandarin Communicative Development Inventory (MCDI; Tardif et al., 2008a)

While comparing the two translations during the process of forward translation, the two translators found some discrepancies between the translations. In Vignette 1, for the fourth choice, "much more fun" was translated into "*hen 3 you 3 qü 4* 很有趣" by one translator and "*geng 4 you 3 qü 4* 更有趣" by the other. After the discussion between the two translators, they decided that "*geng 4 you 3 qü 4* 更有趣" was more accurate and suitable for the scenario. Besides, the translators changed the word "shortbread" into "mooncake" since shortbread is unfamiliar to most Chinese people.

In addition, the two translators reached an agreement that "garage" in Vignette 5 should be translated into "*che 2 ku 4* 车库" instead of "*di 4 ku 4* 地库" as " *che 2 ku 4* 车库"is more familiar to most Chinese families. Moreover, "cushion" in the same vignette was translated into "*sha 1 fa 1 dian 4* 沙发垫" instead of "*ruan 3 dian 4* 软垫" to better fit into Chinese linguistic habits given that it is more common for Mandarin speakers to say "*sha 1 fa 1 dian 4* 沙发垫" than "*ruan 3 dian 4* 软垫". Moreover, one translator wrongly translated the word "ferris wheel" in Vignette 12 into "*xiao 3 chuan*

2 小船", which means small boat in English. This translation error was corrected by the second translator.

During the back-translation phase, the back-translation was compared with the original scale to see if there were any major distortions in the meanings of the items. The comparison showed no significant differences in the meanings of the items in the two versions confirming the accuracy of the original translation, implying no need for major amendments at this stage.

During the piloting phase, the five mothers commented that they understood the four choices under each vignette, but would never handle the given situation in such a way, nor did they expect other Chinese mothers would. The translation team (i.e. the researcher, the second forward-translator, and the backward-translator) discussed this with them. However, because the researcher did not want to change the contents of the choices, which include the elaborated mental state talk, the essence of this research, only some wording and items were slightly altered to make the sentences more acceptable to the Chinese mothers. In such cases, "motel" was translated into "*bin 1 guan 3* 宾馆" (hotel in English) considering that motel is not familiar to most Chinese. Additionally, "Snakes and Ladders" was replaced with "Lego", which now is very popular among Chinese children. "Beach towel" was replaced by "beach chair" as two testing respondents said that they did not know what a beach towel was.

Table 2 lists the forward- and backward translations for amended vocabularies in MMSII. The original wordings in English were also presented.

Table 2

MMSII Amended Vocabularies in Chinese and English

English Original Version	Chinese Translation	Back Translation
Much more fun	*Geng 4 you 3 qü 4* 更有趣	Very fun
Shortbread	*Yue 4 bing 3* 月饼	Moon cake
Garage	*Che 2 ku 4* 车库	Garage
Cushion	*Sha 1 fa 1 dian 4* 沙发垫	Cushion
Ferris wheel	*Mo 2 tian 1 lun 2* 摩天轮	Ferris wheel
Motel	*Bin 1 guan 3* 宾馆	Hotel
Snakes and Ladders	*Le 4 gao 2* 乐高	Lego
Beach towel	*Sha 1 tan 1 yi 3* 沙滩椅	Beach chair

4.4.2 Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2014)

In terms of the translation of the items in the forward translation phase, no major distinctions in sentence meanings were found. This may be because the sentence length of the discrete items was short and did not contain idioms without corresponding expressions in Chinese. The wording differences included the translations of "know", "discuss", and "pretend". One translator translated "know" into "*zhi 1 dao 4* 知道", whereas the other translated that into "*dong 3 de 2* 懂得." "*zhi 1 dao 4* 知道" and "*dong 3 de 2* 懂得" have the same meaning in Chinese as both of them can refer to "know" in English. The researcher decided to take "*dong 3 de 2* 懂得", as it implies internal "acknowledgement" and "agreement". In short, the child will act according to what he/her "*dong 3 de 2* 懂得". In contrast, even if the child "*zhi 1 dao 4* 知道" something, he/she may not put this knowledge into practice.

Same as "*zhi 1 dao 4* 知道" and "*dong 3 de 2* 懂得", both "*tao 3 lun 4* 讨论" and "*tan 2 lun 4* 谈论" can be translated into "discuss". "*tan 2 lun 4* 谈论" was used in

the final version because "*tao 3 lun 4* 讨论" usually means conversations between two people, which may not be the case in this item. Whereas "*tan 2 lun 4* 谈论" can either be used in the context of a two-person conversation or a solo presentation. Regarding the translation of "pretend", the translation of "*zhuang 2 zuo 4* 装作" was preferred over "*jia 3 zhuang 1* 假装". This choice was made because "*zhuang 2 zuo 4* 装作" was more commonly used among Chinese in daily conversations. Moving forward from the forward translation, no main deviations from the original meaning of the initial English version were found in the back-translation, thus assuring the forward translation's accuracy.

The translation of the response scale was not as straight-forward as the translation of items. The translation of the 4-point Likert Scale (1= *definitely untrue*; 4= *definitely true*) was one of the most crucial and complicated aspects of the CUSU translation. Subtle modifications to the language of the response categories can have a substantial impact on the item's response characteristics, thus influencing how the participants respond (van Widenfelt et al., 2005). Therefore, translators carefully considered the translation of the item response categories so that the translated version was scaled in the same way as the original version. More importantly, translators were aware that this scale needed to fit Chinese cultural expectations so that participants understood the response categories accurately to avoid a skewed response style.

In the initial forward translation phase, the two translators decided to translate the response scale as the following: "*definitely untrue*" = "*jue 2 dui 4 bu 4 zhe 1 shi 2* 绝对不真实" ; "*somewhat untrue*"= "*you 3 xie 1 bu 4 zhen 1 shi 2* 有些不真实" ; "*somewhat true*" = " *you 3 xie 1 zhen 1 shi* 2 有些真实" ; "*definitely true*" = "*jue 2 dui 4 zhen 1 shi 2* 绝对真实"; "don't know" = " bu 4 zhi 1 dao 4 不知道". However, during pilot-testing, respondents remarked that the original translation sounded awkward due to the conceptual gaps between Chinese and English. Specifically, when translated into Chinese, "true" can only be used to present the objective reality whereas "untrue" means the opposite of reality. In that case, the meaning of "true" in Chinese is closer to "real" in English. Therefore, given that the Chinese meaning of "true" is

not appropriate for answering the item questions, the researcher changed "true" and "untrue" into "fit" and "unfit" to make the choices more understandable to Chinese participants. The translated 4-point response scale then became: "1 = *jue 2 dui 4 bu 4 fu 3 he 2 绝对不符合*"; "2 = *you 3 xie 1 bu 4 fu 3 he 2 有些不符合*"; "3 = *you 3 xie 1 fu 3 he 2 有些符合*"; "4 = *jue 2 dui 4 fu 3 he 2 绝对符合*"; "DK = *bu 4 zhi 1 dao 4* 不知道".

4.5 Psychometric Properties of Translated MMSII and CSUS

4.5.1 Re-Establishment of Psychometric Properties in Adapted Instruments

Reliability and validity are two major measures of psychometric properties (Tsang et al. 2017). In test adaptation, when the test is used with different populations or in diverse circumstances, some variables may vary in form and quantity (Geisinger, 1994). Therefore, when a measure is used with a new population or situation, its validity and reliability must be re-checked to make sure that both versions of an assessment tool measure the same qualities or concepts (Geisinger, 1994; Guillemin et al., 1993). In short, the psychometric properties established in the original version cannot be assumed in the adopted one. This re-establishment of psychometric properties is especially important during cultural adaptation, when a test is converted from a source language or culture to a target language or culture (Bernal et al., 2009; Perera et al., 2020). Therefore, the current dissertation also investigated the psychometric properties of the two translated questionnaires.

4.5.2 Maternal Mental State Input Inventory (MMSII; Peterson & Slaughter, 2003)

4.5.2.1 Reliability

Internal consistency, the extent to which all scale items measure the same underlying characteristic (Pallant, 2020, p. 27), for each of the four dimensions (i.e. NEMS, EMS, NENMS, ENMS) was calculated separately. In practise, a Cronbach's

alpha of at least .60 has been suggested as an indication of acceptable internal consistency (Tavakol & Dennick, 2011). Same as the English version, all four dimensions in the Chinese version have shown moderate internal consistency, with Cronbach's alpha equals to .66, .68, .75, and .60, respectively, justifying the use of these total scores for the four dimensions as summary measures in all subsequent statistical analyses.

Table 3 shows a comparison of reliability of the four dimensions between the original and translated MMSII (Peterson & Slaughter, 2003).

Table 3

Comparison of reliability between the original and translated MMSII (Peterson & Slaughter, 2003)

The figure originally presented here cannot be made freely available via ORA because of copyright.
The figure was sourced at Peterson, C., & Slaughter, V. (2003). Opening windows into the mind: Mothers' preferences for mental state explanations and children's theory of mind. *Cognitive Development*, *18*(3), 399–429. https://doi.org/10.1016/s0885-2014(03)00041-8

4.5.2.2 Validity

Test discriminability, the test ability to distinguish between high and low performers (Lee, 2019), was used to give evidence of the content validity, which assesses how well individual items represent the construct being measured (Field, 2018, p. 53). But it should be cautious that this analysis cannot be treated as standalone legitimate evidence of content validity.

Test discriminability was decided first by dividing participants into two groups. Specifically, the researcher split the participants into high - and low - performance

groups by setting percentiles of twenty-seven and seventy-three (Fan, 1954; Vurgun & Ozsaker, 2012). That is, participants who had score equals to or lower than the twenty-seven percentile score belonged to the low-performance group, whereas participants who had score equals to or higher than the seventy-three percentile score belonged to the high-performance group. Then, an independent- samples *t*-tests were conducted to see whether those two groups differed significantly regarding the means of each dimension in the translated MMSII. *T*-test results showed that all four dimensions have good discriminability, t = -18.49, -18.93, -18.19, -15.42, for NEMS, EMS, NENMS, and ENMS, $p < .001$, two tailed (Table 4). Therefore, the test overall has a good discriminability.

Table 4

Differences between High and Low-Performance Groups in MMSII Subscales

Dimensions	Group	*n*	*M*	*SD*	*t*	*df*	*p*
NEMS	Low	31	21.10	1.74	-18.49	41.45	***
	High	28	33.39	3.11			
EMS	Low	28	25.00	3.55	-18.93	39.86	***
	High	27	39.22	1.76			
NENMS	Low	26	20.69	2.24	-18.19	47.09	***
	High	29	35.41	3.66			
ENMS	Low	26	25.12	.67	-15.42	50	***
	High	26	37.81	.48			

Note. *M* = mean; *SD* = standard deviation; NEMS = Non-Elaborated Mental State; EM*S* = Elaborated Mental State; NENMS = Non-Elaborated Non-Mental State; ENMS = Elaborated Non-Mental State. Variances of the sub-groups were not equal for the NEMS, EMS, NENMS dimension (Levene's F = 7.44, 13.99, and 17.67, $ps < .01$). Variances of the sub-groups were equal for the ENMS dimension (Levene's F = 2.38, $p = .13$). The analysis was carried out in SPSS 28.

***$p < .001$

4.5.3 Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2014)

4.5.3.1 Reliability

The CSUS Chinese version has an excellent overall internal consistency (Cronbach's alpha ranges from .88 to .89), comparable to the original English version (Cronbach's alpha = .89) (Tahiroglu et al., 2014). There were 22 cases (23.40%) that contained missing values, as shown by the missing value pattern (Appendix M). Note that just as in the original Tahiroglu et al.'s study, internal consistency was computed with missing values replaced by imputed values using five multiple imputations. The multiple imputation strategy was used here to work with missing values for two reasons. First of all, multiple imputation offers improvement over traditional approaches (i.e. listwise, pairwise, and mean substitution) by utilising the consistency (or inconsistency) of estimates produced from multiple imputations as extra information (Acock, 2005). More importantly, it can estimate unbiased standard errors by pooling the parameter estimates, thus allowing researchers to take into account possible differences between multiple imputations that single imputation does not.

The second reason for applying multiple imputations came from the Little's MCAR test for missing value analysis. The Little's MCAR test using the expectation-maximisation (EM) method showed that data were not missing completely at random, Chi-Square = 355.68, $p < .01$. According to Acock (2005), when data are not missing completely at random, the multiple imputations approach as the optimal strategy produces the smallest percentage error in parameter estimates compared to other traditional methods.

4.5.3.2 Validity

Same as the translated MMSII (Peterson & Slaughter, 2003), the evidence of content validity for the content validity came from test discriminably. The *t*-test result has suggested that the two groups differed significantly in terms of performances on

CSUS as indicated by the average scores, t (30.49) = -14.84, $p < .001$, two tailed, suggesting good test discriminability (Table 5).

Table 5

Differences between High and Low-Performance Groups in CSUS Average Scores

Group	*n*	*M*	*SD*	*t*	*df*	*p*
Low	25	2.00	.43	- 14.84	30.49	***
High	25	3.35	.16			

Note. *M* = mean; *SD* = standard deviation. Variances of the sub-groups were not equal (Levene's $F = 23.02$, $p < .001$). The analysis was carried out in SPSS 28.

***$p < .001$

This dissertation also brings to light the test quality of the translated questionnaire through looking into extraction, which refers to the proportion of variation shared by each item with other items that latent factors can explain (Pallant, 2020, p. 188). According to Pallant (2020, p. 206), small extraction absolute values (i.e. < .3) imply a poor fit between an item and its factor solution, whereas large absolute values (i.e. > .8) indicate that an item may be redundant.

Appendix N shows that four items have extraction values smaller than .3. No one item has an extraction value greater than .8, implying a possible absence of redundancy. However, the researcher did not exclude those items from the final analysis because the aim of this dissertation was to see whether the findings using the English language measures was replicated in the current study. With this goal of replicating the original finding, the researcher tried to keep the number of items the same in the two versions.

In addition to the content validity, the current study conducted factor analysis for the translated CSUS (Tahiroglu et al., 2014) to give evidence for its construct validity, which concerns how well a test measures the concept it was designed to measure (Field, 2018, p. 53). Factor analysis is an effective statistical technique for

evaluating the internal structure of a measure, as factor analysis involves the determination of the measure's subdomains or subconstruct as well as their relationships (Goodwin, 1999). With that said, Goodwin views factor analysis as a way for assessing construct validity. Factor analysis was only conducted in the translated CSUS, given the items in MMSII were not developed according to dimensions.

Nonetheless, it is worth mentioning that researchers should not rely solely on factor analysis results as proof of construct validity, given that no simple metric can be employed alone to quantify a measure's construct validity (Westen & Rosenthal, 2003; Goodwin, 1999). Thus, multiple approaches are needed to establish construct validity. For example, future research could look at how parental reports of Chinese children's ToM correlate with children's performances in traditional laboratory ToM tasks to determine the convergent validity, one component of construct validity.

The researcher first looked at whether the three items placed in the same subscale in the original English version still significantly correlated in the translated one. It may be that in translation, the item has changed its fit within the subscale. The idea is that items attributed to the same subscale mirror the same ToM concept, thus should be significantly correlated. However, the correlations between items set within the same subscale were not reported in the original Tahiroglu et al.'s (2014) paper. Thus, the researcher was impossible to compare this result with the original Tahiroglu et al.'s finding. Considering the 4-point Likert scale constitutes an ordinal scale, as no equal distances assumed between the four points, Spearman's rho correlation coefficients were reported here. A close examination of the correlations between translated items within each subscale of the original English version revealed that Chinese items within the knowledge, intention, and emotion subscales frequently correlated poorly within subscales (Appendix O). If this fit is poor, it would be advisable to run an exploratory factor analysis for the translated scale.

After the correlations between items within the same subscale were examined, exploratory factor analysis was performed. The researcher used Principal Axis factoring given that this extraction technique is more suitable for smaller samples (i.e.

sample size less than one hundred) (Tabachnick & Fidell, 2014, p. 688). Principal Axis factoring analysis revealed the presence of three factors with eigenvalues exceeding 1, explaining 43.79%, 7.18%, and 3.59% of the variance respectively (Table 6). These results were from Extraction Sums of Squared Loadings (unrotated) given that Rotation Sums of Squared Loadings (rotated) only represent each factor's non-unique contribution to total shared variance when using Oblimin rotation (UCLA: Statistical Consulting Group, n.a.). Oblimin rotation, a type of oblique rotational strategy that simplifies factors by minimising cross-products of loadings, was used because it allows a wide range of factor correlation (Tabachnick & Fidell, 2014, p. 691), which was the case here given the high intercorrelation between the two factors ($r > .3$) (Pallant, 2020, p. 206). An inspection of the scree plot revealed a clear break after the second component, implying the possibility that the translated CSUS might contain two factors (Appendix P). Therefore, two-factor solution was set in the sequential analysis.

Table 6

Total Variance Explained by the Three Factors

Factor	Total Eigenvalues	% of Variance Explained
1	8.30	43.79
2	1.64	7.18
3	1.19	3.59
Cumulative	-	54.57

Note. The analysis was carried out in SPSS 28.

A subsequent two-factor solution showed that 43.67% and 6.85% of the variance were explained by those two factors separately. The two-factor solution cumulatively explained 50.52% of the variance compared with over fifty-four per cent explained by the four-factor solution. This drop was expected because items were forced to load on only two components, thus increasing the proportion of unexplained variance. However, 50.52 per cent was still a very respectful percentage of explained

variance. Together, findings suggested that the items might not comprise a single cohesive construct of ToM, as indicated by Tahiroglu et al.'s (2014) sample.

Finally, Oblimin rotation was performed to interpret the variable loadings. The rotational solution revealed the presence of a simple structure with both components displaying several strong loadings, and all variables, except for the item "my child is good at playing hide and seek", loading strongly on a single component (Appendix Q and R). However, since Tahiroglu et al. (2014) did not provide information on factor loadings, it was impossible to compare the current factor loading values with the original ones. In the current study, both pattern and structural matrices have shown that items "when given an undesirable gift, my child pretends to like it so as not to hurt the other person's feelings" and "when talking on the phone, my child behaves as if the listener knows what she/he is wearing" loaded on one factor. All the rest fifteen items belonged to the second factor.

Both items on the first factor involve the need to pretend and require imagination. Therefore, it was not surprising to see those two items loaded together. The second factor, which consists of the other fifteen items, requires the child's ability of perspective-taking. In addition, most items in the second factor are other-focused. That is, they more focus on children's understanding of others' mental states rather than their own, indirectly reflecting the highlighting of significant roles of others in the Chinese culture (Lu et al., 2008).

In sum, this finding revealed that the ToM may be conceptualised using two factors for Chinese children, comparing to the six components in Tahiroglu et al.'s (2014) Western sample. This divergence in the factor analysis between the original and translated versions shed light on the possibility that the operationalisation of ToM may vary as a function of cultural group (Slaughter & Perez-Zapata, 2014).

Chapter 5: Results

5.1 Introduction

The current study, which was exploratory in nature, had four goals. The first goal of this research examined individual differences in mothers' preferences of discussing mentalist concepts in simple versus elaborated, explanatory contexts with young children. Given that mother do differ from one another in mentioning and elaborating on mentalistic concepts, the second goal was to investigate the relationship between mothers' use of language referring to mental states and children's ToM development in the Chinese cultural context.

Assuming that there was a significant link between maternal mentalistic talk and children's ToM development, the third goal was to explore potential moderators between the two variables. Specifically, this research question investigated the relationships between age, expressive vocabulary, and ToM understanding, followed by examining gender differences in ToM development. The final goal investigated whether mothers' self-reported preferences for introducing and elaborating on mental states in conversation with their young children predicted parental reports of Chinese children's ToM when relevant moderators were controlled for. In this chapter, each research question will be answered in turn, with a description of the analytic strategy used and a report of the results.

5.2 Individual Differences in Mothers' Preferences for Elaborating on Mentalistic Concepts

5.2.1 Analysis Strategy

The first aim of this dissertation was to examine whether Chinese mothers differ systematically in the frequency of mentioning mental states and tendencies to offer causal explanations for mentalistic concepts in their conversations with their young children. To address this research question, the pattern of correlations between the four dimensions of the MMSII scale (Non-Elaborated Mental State, Elaborated Mental State,

Non-Elaborated Non-Mental State, and Elaborated Non-Mental State) was investigated. This investigation of correlations between dimensions also gives evidence for the construct validity of the translated MMSII.

5.2.2 Pearson's Correlation Coefficient

Pearson's correlation coefficient test was used for this analysis. All four variables met the assumptions of this statistical test. That is, variables need to be continuous and normally distributed without significant outliers (Field, 2018, p. 463). All four variables were measured on a ratio scale. In addition, there were no major dispersions from normality as implied by the small skewness and kurtosis values close to zero (Table 7). Only one outlier outside the 1st quartile – 1.5*interquartile range was spotted in the boxplot for Elaborated Non-Mental State (ENMS) scores (Appendix S). Given the relatively large sample size (N = 94), one outlier was not expected to change the pattern of assumption analysis and results as a large sample size will reduce the extremeness of the outlier (Tabachnick & Fidell, 2013, p. 120). Thus, this outlier was included in the analysis.

Table 8 indicated that there was a significant negative relationship between Elaborated Mental State (EMS) and Non-Elaborated Mental State (NEMS) scores, $r = -.41$, $p < .001$. In short, mothers who gave detailed explanations for mentalistic concepts when interacting with their children were less inclined to prefer oblique, non-contrastive references to mental states (i.e. NEMS choices). Similarly, there was also a significant negative correlation between EMS and Non-Elaborated Non-Mental State Talk (NENMS), $r = -.86$, $p < .001$. In contrast, EMS scores were positively related to Elaborated Non-Mental State (ENMS), $r = .33$, $p = .001$. This positive correlation is understandable given that both choices involve lengthy, didactic elaboration.

A positive relationship between NEMS and NENMS scores was found, $r = .23$, $p = .03$. Meanwhile, a negative relationship existed between NENMS and ENMS, $r = -.46$, $p < .001$, and ENMS and NEMS, $r = -.79$, $p < .001$.

Table 7 presents descriptive statistics for all tasks, children's age and gender.

Table 7

Descriptive Statistics of Four MMSII Dimensions, CSUS Average Scores, MCDI Proportion, Children's age, and Gender

Variable	*N*	Maximum	Minimum	*M*	*SD*	*SE*	Skewness	Kurtosis
MMSII								
NEMS (48)	94	41.00	17.00	26.67	5.35	.55	.54	-.17
EMS (48)	94	44.00	16.00	32.50	6.00	.62	-.52	-.23
NENMS (48)	94	40.00	15.00	28.09	6.22	.64	.28	-.49
ENMS (48)	94	44.00	16.00	31.63	5.32	.55	-.34	.37
CSUS_Average	94	3.78	1.17	2.75	.56	.06	-.90	.50
MCDI_Proportion	94	1.00	.43	.94	.09	.01	-3.19	12.30
Age (in months)	94	60	45.6	53.64	.49	.05	.11	-1.95
Gender (f/m)	94	-	-	42/52	-	-	-	-

Note. *N* = 94. NEMS = Non-Elaborated Mental State; EM*S* = Elaborated Mental State; NENMS = Non-Elaborated Non-Mental State; ENMS = Elaborated Non-Mental State; *M* = mean; *SD* = standard deviation; *SE* = standard error of mean. Maximum shows the highest value participants got for each variable. Minimum indicates the lowest value participants got for each variable. Inside the bracket beside each sub-dimension of MMSII shows the maximum scores participants could get for each sub-dimension. The analysis was carried out in SPSS 28.

Table 8 shows the inter-correlations among all the measure.

Table 8

Full Correlation Coefficient Matrix for All the Measures

Variables	NEMS	EMS	NENMS	ENMS	CSUS_ Average	MCDI_ Proportion	Mothers' Age	Children's Age
NEMS	-	- .41***	.23*	- .79***	.06	- .09	.02	.12
EMS		-	- .86***	.33**	.08	.08	.01	- .19
NENMS			-	- .46***	- .02	- .01	- .05	.19
ENMS				-	- .12	.01	.04	- .17
MCDI_ Proportion					.24*	-	.12	.04
Mothers' Age						.12	-	- .02
Children's Age								-

Note. $N = 94$. NEMS = Non-Elaborated Mental State; EM*S* = Elaborated Mental State; NENMS = Non-Elaborated Non-Mental State; ENMS = Elaborated Non-Mental State. All correlations with MCDI_proportion were calculated using Spearman's rho. Other correlations were shown by the Pearson's correlation coefficient. The analysis was carried out in SPSS 28.

* $p < .05$

** $p < .01$

*** $p < .001$

5.3 The Relationship Between Maternal Mental State Talk and ToM Development

5.3.1 Analysis strategy

To address this research question appropriately, EMS and CSUS average scores were used in the analysis. The creations of these scores were explained in Section 3.6.1, 3.6.2, and 3.6.3 separately. The relationship between EMS and CSUS average scores was examined using Pearson's Correlation.

5.3.2 Pearson's Correlation Coefficient

Both variables were measured at the ratio scale given assumed equal intervals between distances and the probability of absolute zero. In addition, normality was assumed given the low skewness and kurtosis values near zero (see Table 7).

Boxplots revealed four outliers for the CSUS average (Appendix T). However, these scores were included in the analysis as they only account for less than five percent of the sample size (N = 94), which will not cause significant concern for the overall normality. This is because a relatively large sample size will reduce the influence of outliers on assumptions (Tabachnick & Fidell, 2013, p. 120). No significant correlation was found between EMS scores and CSUS average, r = .08, p = .47 (Table 8).

5.4 Potential Moderators

5.4.1 Analysis Strategy

The third goal looked at potential moderators between the two variables, Firstly, the researcher ran two correlation analyses to see how children's age and expressive vocabulary related to ToM understanding. For the first analysis, children's age and CSUS average were selected. In terms of the correlation between children's expressive vocabulary and ToM understanding, MCDI proportion and CSUS were entered into the analysis. Then, gender difference in parental report of ToM understanding was investigated by conducting an independent-samples t-test. For this analysis, CSUS average served as the dependent variable while gender served as the grouping variable.

Boy ($M = 2.79$, $SD = .51$, $N = 52$) was coded as "1" and girl ($M = 2.70$, $SD = .63$, $N = 42$) was coded as "2". The null hypothesis that there was no gender difference in CSUS average scores was tested.

5.4.2 Correlation Analysis

All three variables, age, MCDI proportion, and CSUS average, were continuous variables measured on ratio scale. In addition, the assumption of normality was met for age and CSUS average, given the small skewness and kurtosis values of the two variables (Table 7). This dissertation followed a rule of thumb of Aminu & Mohd Shariff (2017) that the absolute value of skewness greater than three and kurtosis absolute value greater than ten may suggest a problem.

In terms of the MCDI proportion, it was negatively skewed, showing a ceiling effect (Appendix U and V). This ceiling effect implies that items in MCDI might be too easy for 4-5-year-olds. The presence of ceiling effect heightens the possibility of getting a false referential statistic result in a Pearson's correlation analysis (Austin & Brunner, 2003). Therefore, given the violation of the assumption of normality for running a parametric Pearson's correlation analysis, a non-parametric Spearman's rho correlation coefficient was suitable for exploring the relationship between expressive vocabulary and ToM understanding (Field, 2018, p. 472).

The result indicated that age was not significantly related to parental reports of ToM ($r = -.02$, $p = .83$), possibly due to the restricted age range in the sample. However, children's expressive vocabulary did positively correlate with their ToM understanding, $r_s = .24$, $p = .02$. This relationship implies that children's expressive language may be a moderator between the two variables, thus should be controlled for in the sequential regression analysis.

5.4.3 Independent-Samples *T*-Test Analysis

Given that the independent-samples *t*-test is a parametric test, it is subject to non-normality (Field, 2018, p. 599). As discussed in Section 5.3.2, the data met the assumptions of normality required to conduct an independent samples *t*-test comparing the means CSUS scores for girls and boys. Further, a Levene's test showed that the variances of the two sub-groups (boys and girls) were approximately equal, $F = 2.91$, $p = .09$.

No significant gender difference in parental report of ToM was found, t (92) = .75, p = .46, two-tailed. The mean level difference was .09, 95% C.I. [- .14, .32]. The magnitude of the differences in the means was small, Cohen's d = .16. Descriptive and inferential statistics are presented in Table 9.

Table 9

Gender Differences in Parental-Report of ToM Understanding

Group	*n*	*M*	*SD*	*t*	*df*	*p*
Boys	52	2.79	.51	.75	92	.46
Girls	42	2.70	.63			
Total	94	2.75	.56			

Note. *M* = mean; *SD* = standard deviation. Variances of the sub-groups were equal (Levene's $F = 2.91$, $p = .09$). The analysis was carried out in SPSS 28.

5.5 Maternal Mental State Talk as a predictor of ToM

5.5.1 Analysis Strategy

Although Pearson's correlation analysis showed a null result, a hierarchical multiple regression analysis was performed to investigate whether mothers' use of mental terms boosts the model's overall predictability. CSUS average served as the dependent variable. Following what Peterson and Slaughter (2003) had done, the

child's chronological age and expressive vocabulary were entered at the first step as control variables. Mother's EMS scores were entered at Step 2 to explore suppressor effects, which are operating when the addition of a predictor increases the predictive power of the regression model (Watson et al., 2013). This exploration of suppressor effects was necessary because suppressor effects can play an important role in elucidating the construct validity of psychological measurements by identifying variance in a predictor shared with the suppressor variable.

5.5.2 Hierarchical Multiple Regression Analysis

The assumption of no multi-collinearity was met given no Tolerance values were smaller than .1 and no VIF values were greater than 10 (Table 10), suggesting predictor variables were not highly intercorrelated (Pallant, 2020, p. 155). In addition, the dataset met the assumption of independence of errors since the Durbin-Watson statistic equals 2.24, indicating no correlation between adjacent residuals. This conclusion is drawn based on the conservative rule of thumb that values less than one or greater than three cause concern (Field, 2018, p. 514). The assumption of homoscedasticity was also met given that the band encompassing the residuals was approximately equal at width at all values of the predicted dependent variable, as illustrated in Appendix W. Finally, the normal P-P plot of regression standardised residual showed that most points lie in a straight diagonal line from bottom left to top right, indicating no major deviations from normality (Appendix X).

As shown in Table 10, children's chronological age and expressive vocabulary together predicted approximately 2.30% of the variability in parental-report CSUS scores. The resulting equation was not statistically significant, $F\,(2, 91) = 1.07, p = .35$. When mother's EMS scores were entered at the next step, there was a non-significant slight increment in the prediction pf CSUS scores, F (change) = .18, p = .67, with Multiple R = .16, R^2 = .03. Given this increment was not significant, the suppression effect was not robust. The overall equation at Step 2 was not statistically significant, F (3, 90) = .77, p = .52. Not surprisingly, none of the three predictors independently predicted CSUS scores, with all ps > .1.

Table 10

Mothers' EMS Scores Predict Parental Reports of Children's ToM Understanding

	Model 1						
	B	*s.e.*	*β*	*p*	*sr*	Collinearity Statistics	
						Tolerance	VIF
Intercept	2.24	.78		*			
MCDI_Proportion	.85	.62	.14	.17	.14	1.00	1.00
Age	- .07	.12	- .06	.56	- .06	1.00	1.00
	R^2	·02 F (2 ,91) = 1.07 p = .35					
	R^2 Changed						
	Model 2						
	B	*s.e.*	*β*	*p*	*sr*	Collinearity Statistics	
						Tolerance	VIF
Intercept	2.10	.85		*			
MCDI_Proportion	.80	.63	.14	.20	.13	.97	1.03
Age	- .06	.12	-. 05	.65	- .05	.96	1.04
EMS	.00	. 01	.05	.67	.04	.94	1.07
	R^2	·03 F (3 ,90) = .77 p = .52					
	R^2 Change	.00 F (1 .90) = .18 p = .67					

Note. *sr* = semipartial correlation coefficient; EM*S* = Elaborated Mental State. Durbin-Watson statistic equals 2.24. All parameter estimates are from SPSS 28.

* $p < .05$

Chapter 6: Discussion

6.1 Interpretation of Findings

The primary aim of this dissertation was to explore the role of maternal mental state talk in Chinese children's ToM development. Specifically, this dissertation is interested in whether the role of mental state talk in supporting ToM development can be generalised to the Chinese culture, or whether it is specific to Western culture. Main statistical analysis first focused on whether there were individual differences in the language preferences of mothers. Assuming individual differences did exist, the second main goal of this dissertation was to explore the correlation between maternal mental state talk and parental-report ToM understanding. The final goal was to analyse how maternal mental state talk may predict ToM development by conducting a hierarchical regression analysis.

In line with Peterson and Slaughter's (2003) study, the current study showed that mothers differed in their self-reported preferences for mentioning and elaborating upon mental states. However, the theoretically important distinction between conversations involving causal elaborations and those that did not was a variable that empirically differentiated mothers' choices in this sample. In contrast, it was the distinction between mental and physical concepts that differentiated mothers' preferences in Peterson and Slaughter's (2003) sample, emphasising the importance of mental concepts in Western contexts. Specifically, the researcher found that some mothers favoured elaborated, explanatory talk about both mental states and the actual physical life, i.e. reality detached from the inner mental world. Whereas those who chose contrasting conversational styles, Non-Elaborated Mental State (NEMS) and Non-Elaborated Non-Mental State (NENMS), mentioned mental and physical life frequently, but without any clarifications. Yet, the findings show that mothers who preferred to mention mental states (e.g. one's feelings) with their children did not differ from mothers who chose to talk about physical reality. This suggests that mothers do not fall into distinct groups in terms of highlighting the differences between mental and

physical life. This result was not surprising given the lack of mental state talk in the Chinese cultural context (Lu et al., 2008).

With regards to the second research question, there was no significant correlation between maternal mental state talk determined by EMS scores in the Maternal Mental State Input Inventory (MMSII; Peterson & Slaughter, 2003) and children's ToM shown by the Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2014), $r = .08$. This finding conflicts with what Peterson and Slaughter (2003) found with their Western sample. Two possible explanations might account for this null result:

1) Chinese children develop ToM understanding through other pathways rather than referring to mental states, given the little exposure to mental state talk in Chinese families.

2) The self-report nature of the instruments used to measure children's ToM and mothers' preferences of conversational styles is not sensitive enough to capturing any real existing individual differences.

Regarding the first explanation, Lu et al. (2008) argue that because referring to others and social roles is highly encouraged in the Chinese society (Wang, 2001), Chinese children develop their ToM understanding through referring to others. Their one-year longitudinal study provided evidence to support this argument by showing that children who increased their references to others in memory recall tasks from Time 1 to Time 2 also improved on false belief task performance between the two time points. Therefore, this finding implies an alternative pathway for ToM development in the Chinese context. The null relationship between mothers' talk about mental concepts and Chinese children's ToM in this current dissertation is in line with this supposition.

Another piece of evidence comes from intervention, in which Liu et al. (2016) experimentally exposed 4-5-year-old toddlers to mental state clarifications (e.g. why is the fox happy in the end) or behaviour clarifications (e.g. what does the fox say to the crow), or physical characteristics of object speak (control group) (e.g. where did the story happen) through storytelling. The result showed that despite similar false-belief

scores in the pre-test, children in the behaviour clarification group performed better on post-exposure false-belief tasks than those in the other two groups, suggesting an effect of behaviour clarifications on Chinese children's false-belief understanding. Together, these findings demonstrated that behaviour clarifications aid Chinese children's mental comprehension, suggesting a culturally specific mechanism for the development of ToM.

The second explanation is concerned with how children's ToM and mothers' language use were measured. As mentioned in Sections 1.6, children's ToM is typically measured using traditional laboratory ToM tasks (e.g. the Sally-Ann task), as in Peterson and Slaughter's (2003) study. Therefore, this link between maternal conversational preferences and children's ToM may be specific to traditional ToM tasks where the child is the test subject. Given the non-significant correlation in the second research question, a null result in the regression analysis was expected. Indeed, the results of the regression analyses showed that mothers' EMS scores did not significantly predict children's ToM when controlling for children's age and expressive vocabulary.

For the third research question exploring moderator effects, no age effect was found as CSUS scores did not function as children's age, r = -.02. Conversely, regression analysis revealed that children's more advanced expressive language skill was associated with better ToM understanding, r_s = .24, despite the near-ceiling effects on the expressive language measure. This finding supports the social constructivist account, which emphasises the significant role of language on ToM development. Nonetheless, Peterson and Slaughter (2003) did not find a relationship between language and false-belief task performance. Differences in the pattern of results in the two studies may relate to the use of quite different measures of children's language. The current study used expressive vocabulary measure while Peterson and Slaughter used a receptive vocabulary measure. Previous research on the association between ToM and language found that receptive language-specific measures had weaker effects on ToM than expressive language (Brock et al., 2018).

In addition, no gender-related differences in parental-report of ToM were found, t (92) = .75, casting doubt on evidence pointing to more advanced performance on ToM tasks for girls than boys (Calero et al., 2013). One reason for this null result could be the restricted children's age range in this study (i.e. 4-5). According to the gender intensification hypothesis, the increasing pressure to conform to established gender-role stereotypes causes gender differences in ToM to increase over time (Galambos et al., 1990). For instance, a significant advantage of girls over boys in ToM performance was found in children 6 to 8 years old (Calero et al., 2013).

6.2 Contributions to Education Research and Psychology

6.2.1 Cultural Adaptation

This study set a precedent for using a translated parent-report questionnaire to test ToM understanding in Chinese children. Previous research studying ToM development in Chinese children examined children's ToM within a laboratory paradigm in which the child is the test subject. The current study, on the other hand, made the first attempt to study Chinese children's ToM understanding from the parents' point of view by translating an English parent-report questionnaire measuring children's ToM into Chinese. Similarly, parental conversational styles were more conventionally measured using a storytelling framework, whereby the mother interprets a story in a wordless book to her child. Whereas in this study, a novel self-report approach was trialled. To the best of the researcher's knowledge, no previous Chinese self-report questionnaire existed to test mothers' language use. Therefore, an English instrument was adapted into Chinese. Literal translations of the two English measurements were to be avoided for myriad reasons, from ambiguous statements to the distorted meaning of the original version that resulted from literalism (van Widenfelt et al., 2005). For those reasons, the researcher followed the recommended best practices to achieve the best possible psychometric properties of the translated versions. For instance, a third translator who did not have previous knowledge about the two measures provided the back-translation. With that said, the current research adapted and piloted the two questionnaires, paving the way for their use as a validated tool in future research. This cultural adaptation is particularly valuable given that this

was the first time these two questionnaires were translated into Chinese and tested with Chinese participants.

6.2.2 Studying ToM in Cultural Contexts: Implications for Pedological Practices

Extending on previous works showing Chinese children do not develop ToM through referring to mental states (Liu et al., 2016; Lu et al., 2008), this study again confirms the possible existence of alternative pathways for ToM development in non-Euro-American contexts. Therefore, the present work will contribute to the field of cultural psychology by shedding light on the influential factors that facilitate ToM development in Chinese children, highlighting the importance of studying ToM development in specific cultural contexts. As some cultural psychologists claim, the mind and culture are mutually constituted, suggesting that ToM cannot be studied independently of cultural contexts (e.g. Lu et al., 2008).

This cultural difference in influential factors of ToM development also has implications for educational practices. Knowing that Chinese children may develop ToM through diverse ways, pedagogical approaches should be adopted into the Chinese culture to promote Chinese children's ToM understanding within the family and classroom contexts. For instance, parents and teachers should be aware that introducing and elaborating on mental states in conversations may not be beneficial for Chinese children's ToM development. Rather, training using other references and behavioural clarifications may be of more help (Liu et al., 2016; Lu et al., 2008).

6.3 Constraints

One constraint of this study is the sample size, which indirectly influences the accuracy of the tests for psychometric properties. Although the researcher gave evidence of good internal consistency, construct, and content validity of the two translated measures, their psychometric properties should be revisited in subsequent samples, as the current study contained a relatively small sample size (N = 94). One

guideline recommended for establishing sufficient evidence of reliability and validity of measures is that sample sizes for testing should include at least two hundred cases (Frost et al., 2007). However, the current research may be viewed as the necessary pilot before testing the psychometric properties of the two translated measures in larger samples.

Another constraint relates to the population from which the sample was drawn. Because participants were mainly recruited online, which required them to have a computer at home, participants in this study were from relatively uniform socioeconomic backgrounds (i.e. middle- and high-income households). In addition, the snowballing sampling technique also implied that participants in this sample might have similar demographics. Therefore, the current results cannot be assumed to pertain to participants with lower socioeconomic status and future research should seek to include participants from diverse backgrounds. Nonetheless, although participants in this study may not be representative of the larger population containing people from mixed socio-economic backgrounds, they do comprise daily mother-child conversational dyads. Given that the primary research question concerns the relationship between mothers' use of language during conversations with their children, these mother-child conversational dyads were central to this dissertation.

The final constraint concerns possible confounding variables. The demographic questionnaire has shown that most children (71.28%) stayed at home during the data collection period because of the pandemic lockdown. That means, children spent more time at home than would typically be the case, rather than socialising with their peers. To what extent this lack of peer interactions could hamper children's language and ToM development has not been assessed. Piagetian theory proposes that peers foster social cognitive growth through talking, sharing, playing, and quarreling together (Pryor & Day, 1985, p. 211). In addition, peers may have stronger influences than adults on children in the age range between four to five, when the peer group becomes an essential part of socialisation, since peers present mental sets that are more similar to the child's own compared to adults (Fawcett & Garton, 2005; Ryalls et al., 2000; Yue et al., 2017). More typical in-person interaction with peers might also interact with the

relationship between the mother-child dyads. However, there may be unintentional positive effects. Parents working at home because of the pandemic inevitably spend much more time interacting with their child. Thus, there may have been a boost in the accuracy of parental reports.

6.4 Implications

Although no significant relationship between self-reported maternal state talk and children's ToM development was found in this study, this does not necessarily imply that mothers' use of mental terms has no influence children's ToM understanding. The argument here is that the results of the current study did not entirely rule out the influence of mentioning and elaborating on mental terms on Chinese children's ToM understanding. The same social-cognitive factors, such as mental state talk, verbal ability, and executive processes, may operate in all cultural groups (Lu et al., 2008).

With the relaxation of the One Child Policy and the increasing trend for internationalisation in modern China, it might be expected that Chinese child-rearing practices may begin to converge with those of European-Americans. In such cases, this anticipated influence of Western culture on Chinese society might change the relationship between mothers' preferences of conversational styles and children's ToM. This effect was reported in Chinese American bilingual immigrant children (Doan et al., 2018).

It is also intriguing to speculate on whether the distinctions represented in mothers' Maternal Mental State Input Inventory (MMSII; Peterson & Slaughter, 2003) selections might translate into everyday conduct of Chinese mothers, or whether they merely reflect child-rearing ideologies that have no direct correlation to practice in the Chinese context. In short, we do not know whether the mothers' self-reported choices on the MMSII truly represent how these mothers would communicate with their children in real life. For instance, a high EMS score may not necessarily indicate that the mother will consistently produce explanations that include mental concepts when communicating with their child.

Although the structured, self-report approach may not be entirely reliable, responses to the MMSII are likely to predict, at least in part, how mothers respond in real-life scenarios similar to those depicted in the MMSII vignettes. Thus, self-reported conversational preferences are of theoretical interest in their own right. Further investigations, such as linking naturalistic-observational data on mother discourse with results on the MMSII, would offer valuable insight into the degree to which self-reported parental preferences can be seen in actual practice.

6.5 Future Directions

6.5.1 Psychometric Properties of the Translated Measures

One focus for future directions is to further investigate and refine the psychometric properties of the two translated measures. Future research could evaluate the two questionnaires with Chinese bilingual immigrant parents. Including Chinese immigrants who are exposed to both Western and Chinese cultures when developing and testing translated versions could serve to further enhance the psychometric properties of the adopted questionnaires by balancing viewpoints from both cultures. For example, Chinese bilingual immigrant parents are familiar with both cultures and languages. Involving them in the process of development could provide insight into whether the original English items reflect the way Chinese think about the topic and improve the questionnaire for use in the Chinese context. It would also be of interest to obtain other forms of reliability (e.g. test-retest reliability) from larger and more diverse samples. In the assessment of the individual differences, good test re-test reliability indicates a test's internal validity and assures that the measurements collected in one sitting are both representative and stable over time (Hobbs, 2016). Consequently, it provides information regarding the general consistency of a measure, the distinguishability of individual measurements, as well as whether the variability is attributable to true individual differences rather than measurement error (Matheson, 2019).

6.5.2 Mental State References and ToM Development in Children with Atypical Developments

Evidence has shown that the ToM development of children with atypical mental or physical conditions, including those on the autistic spectrum. is often delayed (Cohen et al., 1994; Miller, 2006; Spanoudis, 2016). Intervention research has suggested that caregivers' use of mental terms fosters ToM development in Western children with autism, Down syndrome, and Williams syndrome (Kaiser et al., 2001). Considering the link between mental term references and ToM development in the Chinese context, one potential field for future research is to study whether mothers, and other caregivers, learning to elaborate on internal states could facilitate ToM development in non-typical developing Chinese children.

6.6 Conclusion

Does maternal mental state talk relate to ToM development in Chinese children? This question speaks to a larger consideration of cultural variations in the influential factors of ToM development. Findings in the current study enrich the current understanding of ToM development in children by highlighting the importance of considering the cultural context when studying children's social and cognitive development. Specifically, in the Chinese culture, where social relationships, external actions, and contextual factors tend to be prioritised over internal states (Lu et al., 2008; Nisbett & Masuda, 2003), a platform (e.g. other-reference or behavioural clarification) may serve as the alternative to a mental state discourse that facilitates children's ToM development.

In sum, how maternal mental state talk manifests and influences the developmental outcome varies from culture to culture. Cognitive advancements are ultimately the result of the interaction between culture, context, and the individual. Although a null relationship was found in the current research, using the translated tool developed here, it would still be valuable to investigate in what ways children's future formation of ToM understanding is facilitated by maternal discourse using a longitudinal lens.

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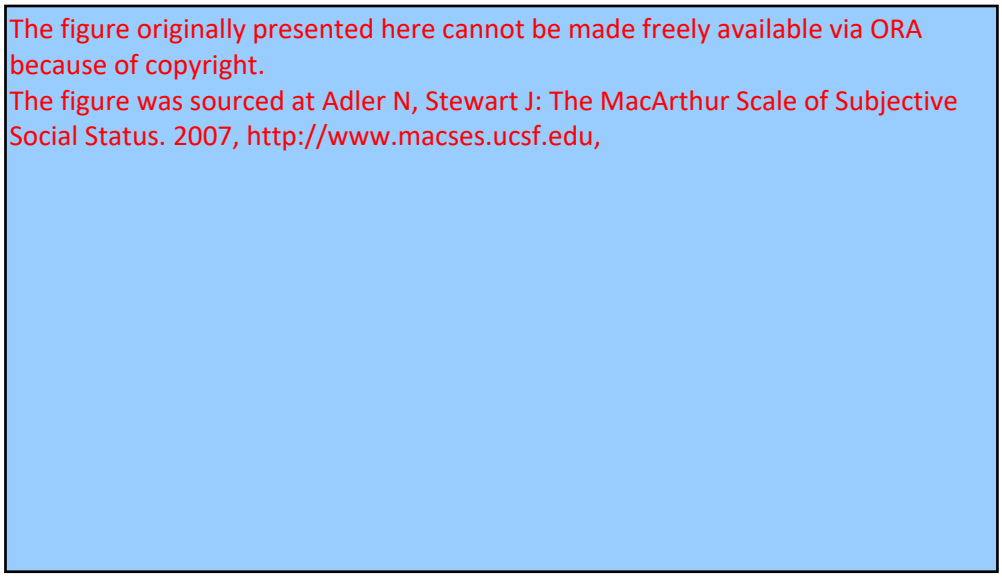
Appendices

Appendix A

Demographic Questionnaire

1. What is your child's gender?

   Male Female
2. How old is your child?
3. What is your age?
4. Think of this ladder as showing where people stand in their communities. People define community in different ways. Please define it is whatever way is most meaningful to you. At the top of the ladder are the people who have the highest standing in their community. At the bottom are the people who have the lowest standing in their community.



Now, where will you put yourself on this ladder? (From 1 to 10)

5. Is your child a single child?

   Yes No

   If not, how many siblings does your child have?
6. Whether your child attends kindergarten or not?

   A. No, my child does not attend kindergarten.

   B. Yes, my child attends kindergarten. But because of the Covid lockdown, he/she needs to stay at home recently.

C. Yes, my child attends kindergarten, and he/she attend kindergarten in-person as normal

7. What is your current working status?
   A. Works full-time in the home
   B. Works part-time outside the home
   C. Works full-time outside the home

基础信息调查问卷

1. 孩子的性别

   女　　男

2. 孩子的年龄
3. 母亲的年龄
4. 这个梯子呈现出人们在社会群体中的位置。不同的人对社会群体有不同的定义，请以你认为最合适的方式定义。梯子顶端代表在社会群体中处于最高位置；梯子末端代表在社会群体中处于最低位置。

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The figure was sourced at Adler N, Stewart J: The MacArthur Scale of Subjective Social Status. 2007, http://www.macses.ucsf.edu,

现在你会把自己放在梯子的哪个位置上？（从 1 到 10）

5. 孩子是独生子么？

   是　　否

   如果不是的话，孩子有几个兄弟姐妹？孩子是第几个出生的？

6. 孩子是否在上幼儿园
   A. 我的孩子没有在上幼儿园
   B. 是的，我的孩子在上幼儿园。但是因为疫情现在在家
   C. 是的，我的孩子在上幼儿园，并且每天正常去幼儿园。
7. 母亲的工作
   A. 全职母亲
   B. 在外半兼职
   C. 在外全职工作

Appendix B

Maternal Mental State Talk Inventory (MMSII; Peterson & Slaughter, 2003)

Maternal Mental State Input Inventory

Instructions: Here are 12 stories, or vignettes, each describing a parent with a young child. We would like you to try to imagine that you are that parent, and that the child in the story is your son or daughter [Child's First Name] during the year when he or she turned 4. There are four response choices given with each vignette. These describe ways a parent might handle the situation. Your task is simply to rank them "1", "2", "3", or "4" according to how likely you would be to use that strategy. Please give a "1" to your preferred choice, or the one you would be most likely to use, then give a "2" to the strategy you would be second most likely to use, "3," to the next most, and "4," to the one you least prefer and would use least often (or not use at all). There are no right or wrong answers to any of these items. Each choice has advantages and disadvantages, depending on the child's individual nature and the family's unique circumstances.

Therefore, all options reflect good parenting practice. Accordingly, please answer in terms of your best estimate of your own actual behavior, either as you recall it, or as you imagine it would be.

Vignette 1: 'In the Kitchen'

Yesterday, Mum promised Joyce, age 4 years, that the two of them would bake a cake together. They went shopping this morning. But Mum had left her shopping list behind, and completely forgot to buy eggs, and there are no eggs at home. Now Joyce is asking if they can bake the cake soon. Mum says:

(#a) "Joyce there are no eggs. Let's bake shortbread instead of a cake because shortbread tastes yummy and we do not need eggs to make it."

(*b) "Joyce, I forgot to buy eggs. Let's bake shortbread instead of a cake because shortbread tastes yummy and we do not need eggs to make it."

(**c) "Joyce, I have a terrible memory! I forgot to buy eggs! I was thinking 'We need eggs' when we were at home in the kitchen, but at the shops that thought was all gone. It must have slipped out of my mind! Let's bake shortbread instead of a cake because shortbread tastes yummy and we do not need eggs to make it."

(##d) "Joyce, I have a great idea! Let's make shortbread instead of a cake.

We don't have any eggs. But that won't matter. Shortbread doesn't need eggs, and is much more fun to make, anyway! It is like playing in the sand at the beach. We get to mash up the butter and then stir in the sugar, until it feels all crumbly and soft—just like the sand at the beach when we are digging and building castles."

Vignette 2: 'Fruit Basket'

Mum and Jake, age 4, are waiting in a motel room for Dad to come back. They have been there for a while, and Jake is starting to show signs of boredom. None of his toys or books are with them, but there is a big bowl of fruit in the room. Noticing Jake's impatience, Mum says: "Jake let's play a game with the fruit basket." The game Mum suggests is:

(##a) 'Color matching': Mum points to a piece of fruit (e.g. the banana) and Jake has to find another item in the room that is the same color (e.g. the yellow lampshade), naming the color as he does so. Then Jake gets a turn to point at a piece of fruit and Mum has to match it, and so on until they run out of simple colors. Then they will combine colors (yellow banana plus red apples for the orange bedspread) and so on.

(#b) 'Hide and Seek': Mum hides her eyes and tells Jake to hide each of the pieces of fruit somewhere in the room and then she will look for them and so on.

(*c) 'Drawing': Mum takes a pencil and paper from her handbag and draws a long pointed cylinder, saying it is the banana. Then she asks Jake if he would like to draw a picture of the apple, and so on.

(**d) 'Pretending': Mum picks up the banana and holds it to her ear like a telephone. "Ring! Ring! she says. I'm phoning you! Find your mobile phone: It's in the fruit basket!" Then she acts out another pretend sequence with the next piece of fruit (e.g. an apple is an alarm clock) and so on.

Vignette 3: 'Dad's Birthday'

This morning Mum and John, age 4, went shopping and picked out a special gift for Dad's birthday, which is coming up in 2 days' time. As they wrap the

present together, John remarks that he can hardly wait for Daddy to come home this evening so he can tell him what they've bought for him. Mum says:

(#a) "John, don't tell Dad what we've bought him, that's not allowed. Wait until his birthday and then he'll open the present."

(##b) "John, don't tell Dad what we've bought him, that is how birthdays are: You buy a present, wrap it up nice, and then wait for the person to open it on their birthday. And you know what? We need to bake a cake for Daddy, too!"

(*c) "John, don't tell Daddy what we've got him. We want him to be surprised on his birthday."

(**d) "John, don't tell Daddy what we've bought him. He doesn't know what is inside this box, now that it's all wrapped up. if you tell him, he won't be surprised when he opens it. Let's keep it a secret so he will get a surprise."

Vignette 4: 'The Dog Barking'

Spot, the family dog, passes in front of the sliding glass door one evening after dark and begins to bark excitedly. Jane, age 4, turns to Mum and asks: "Mum, why is Spot barking?" Mum replies:

(#a) "Dogs bark for lots of reasons: Maybe he is barking at his reflection. Or maybe he hears or sees something outside in the courtyard."

(*b) "Maybe he heard a noise outside and thinks that there is someone prowling around in the courtyard."

(**c) "Maybe he has seen his reflection in the window and thinks that it is another dog. Because he is a dog, he doesn't know about reflections and mirrors like we people do. He sees a reflection of himself. But doesn't know its him, so he thinks it is a different dog."

(##d) "He could be barking for lots of reasons. Maybe he has heard something outside, or maybe he has seen his reflection. But there is a way we could find out: Let's slide the door open. That will hide his reflection so he should stop barking if that was the reason. Or else he will go outside to investigate the sounds."

Vignette 5: 'Lost Keys'

Mum tossed her keys onto the seat of the sofa and then rushed out of the room to answer the phone. While she was gone, the keys slid down a big crack between the cushions and disappeared from view. Emma, age 4, watched at this happening. Now Mum is coming back. She needs the keys and decides to search for them. First she looks all over the sofa and the table beside it. Then she has an idea. Firmly believing she left the keys on the bedside table where the phone is, she heads back to the bedroom to retrieve them. Emma follows her, asking "Why are you going into the bedroom again, Mum?" Mum says:

(#a) "To get the keys: I need the keys to unlock the garage. They are probably by the phone."

(**b) "To get the keys: I need them to unlock the garage, and I don't know where they are. I thought I put them on the sofa, but I could not see them there when I looked there just now. Maybe I just imagined putting them on the sofa. Really, I must have left them by the phone when I rushed in to answer it just now."

(##c) "To get the keys: I need them to unlock the garage. I'm just going into the bedroom again to get them, because they are probably by the phone. I am glad you are coming with me because we can both comb our hair in front of the big mirror in the bedroom once I get the keys."

(*d) "To get the keys: I need them to unlock the garage and I don't know where they are, so I'm going to look for them by the phone."

Vignette 6: 'Keys Found'

Following on from the previous vignette, Emma says: "but, Mum, your keys are not in the bedroom. I saw them slip down behind the cushions of the sofa. That is where they still are, in the lounge room." Mum says:

(##a) "Oh what a relief! It is good you saw where the keys went. I might never have found them. That so is like your sandpit! Things sink down into it and then get buried. Speaking of sandpits, let's go unlock the garage quickly and then we can go outside and play together in the sand. We can build a castle in your sandpit. Wouldn't that be fun?"

(**b) "Oh what a relief! And what a clever little mind you have! You noticed where the keys went and then, when they were hidden, you still knew

where they were, even though you couldn't see them. My mind was not as clever as yours. I did not think about the crack in the cushions. So I was all wrong and thought the keys were by the phone, when they were really under the sofa!"

(#c) "Oh what a relief! Let's unlock the garage quickly and then we play for a while outside."

(*d) "Oh what a relief! That was very clever of you to notice the keys and to tell me where they were when you couldn't see them."

Vignette 7: 'I Spy'

Mum and Jeremy, age 4, are playing a guessing game called 'I Spy with My Little Eye.' The rules they play by are like this: One person thinks of something that they can see in the room and says nothing about it except what colour it is. The other person then has 10 guesses to discover what object they have singled out. If they get it right in less than 10 guesses they win and get a point and an extra turn. On this particular day, Jeremy has begun to lose patience because Mum keeps winning and he keeps losing. Each time it's Mum's turn, she identifies his secret item on the first or second guess. But he can never manage to get hers right within the 10 turns allowed. Jeremy frustrated asks Mum how come she always guesses right. Mum says:

(##a) "Maybe I am just too lucky with this game. Let's play something else. Go get your set of puzzles and board games out, and we can choose something else that will be more fun. Maybe we will do a puzzle together. Or we could play your favourite, Snakes and Ladders. Would you like that?"

(#b) "Maybe I am just lucky. Don't feel bad. We can play something else."

(**c) "Maybe it is because I can use a trick that you do not know about. I can read your thoughts by looking at your eyes. Every time you think of something to 'spy,' you look at it. If you want to fool me, be sure you don't look at the thing you are thinking about."

(*d) "If you don't want me to guess what you are thinking about then you must be sure you don't look at it."

Vignette 8: 'At the Beach'

Mum and Christa, age 4, are at the beach. They have been in the water for

quite a while and Mum thinks Christa may be getting too cold. She suggests getting out, but Christa is reluctant to get out of the splashing waves that she is enjoying mirthfully. Mum thinks it would be a good idea to play on the sand for a while and suggests the following game:

(##a) 'Chasey': They will play a chasing game in which the one who is "it" will run after the other one and try to tag them. If the person being chased sits down in the sand, they are safe as long as both hands are touching the sand. But if a hand comes up they can be tagged. The goal is to reach the beach towel without being tagged. Then they will earn a point and have a turn to be "it" and chase the other one.

(#b) 'Digging tunnels': They will each sit opposite one another on the sand, a short distance apart, and try to dig a tunnel towards each other until their hands met.

(**c) 'Fairy tale castle': They will build a sand castle together and tell each other a story as they build it about the fairy prince and princess who live inside. They have to take turns completing the story, each person thinking up a pretend event or sequence of events to add where the other one left off, describing the imaginary inhabitants' adventures.

(*d) 'Shell garden': They will draw a design in the sand that they will pretend is a garden. They will add decorations to it by finding bits of shell, pebbles, and seaweed to represent flowers and shrubs.

Vignette 9: 'The Empty Flask'

Mum is collecting Kevin, age 4, from preschool, and meets a friend at the gate. They are conversing when Kevin comes up. So Mum does not notice that Kevin has slipped his empty flask into her things, sliding it under the cover of her shopping bask. The friend leaves, and Mum says to Kevin, "Quick run back into your classroom and get your flask: You forgot to bring it!" Kevin looks a little puzzled, but hurries obediently back inside. Then Mum opens her basket and sees the flask. She goes in and collects Kevin, saying:

(#a) "Come on Kevin. We have your flask after all. Let's go home."

(*b) "Come on Kevin. Your flask is in my basket. I didn't see you put it there, so I didn't know we had it. Let's go home."

(**c) "Come on Kevin. I am sorry I sent you back for your flask. It was my

mistake. I wasn't paying attention when you came out, so I didn't see you put the flask in my basket. Because I hadn't seen it, I did not know it was there. But it was, and I should have looked. Even grown-ups' minds get mixed up sometimes! Let's go home."

(##d) "Come on Kevin. We have your flask after all. But it is quite an old one, isn't it? It is getting quite stained and worn out. It is time we bought you a new one. On the way home, let's do that. We can stop at the shops and you can choose the new one. What colour would you like for your new flask?"

Vignette 10: 'Phone Call'

Mum and Susan, age 4, are together in the kitchen when the telephone rings. Mum listens to the other person on the phone and then smiles happily, saying "Oh yes, I would LOVE to come!" After she is off the phone Susan asks: "Who was that on the phone, Mum?" Mum frowns unhappily, saying "It was the next-door neighbor. She has invited me over to look at her holiday photos. I really do not want to go!" mum exclaims. "But mum" says Susan, "You looked very happy just now when she invited you, and you told her you wanted to go. Why was that?": Mum says:

(##a) "I was being polite," says Mum. "But never mind that now. We do not have time to discuss what I said now, because we have work to do! It will be fun! We can make some biscuits for me to take next door when I go visiting. Come look at the pictures on the recipe cards and help me choose which biscuits to make!"

(#b) "It's polite to be cheerful and agreeable when someone gives you an invitation," says Mum.

(*c) "I was pretending to be happy because I did not want to hurt our neighbor's feelings" says Mum.

(**d) "Sometimes we have to hide the thoughts that are inside our minds," says Mum. "If our neighbor knew that I did not want to see her photos because I think they're boring, her feelings would be hurt. So to avoid hurting her, I had to say something that I was not really thinking. I was just pretending to be happy to come, so that she would not guess my real thoughts."

Vignette 11: 'Grandpa's Present'

Mum and Joshua, age 4, are visiting Grandpa in his high-rise unit. While they are there, he receives a parcel in the mail and opens it. It is a card from an old friend enclosing a packet of seeds. Grandpa sighs and looks unhappy.

On the way home, Joshua asks Mum why Grandpa was sad when he got such a nice present of flower seeds. Mum says:

(*a) Not everyone likes the same things. You and I would like seeds but Grandpa doesn't have a garden and doesn't need or want seeds.

(#b) "Grandpa told me that he was very happy to see me and was very VERY happy to see you. We had a lovely afternoon with him, didn't we? And that was a lovely, yummy tea he fixed for us."

(**c) "It is hard to know what someone else is thinking. Even though Grandpa is my dad, I do not always know what thoughts are in his mind. But sometimes I can guess his thoughts. I think maybe he was sad to get seeds because they reminded him of his garden at the home before he moved into the unit, and he misses it."

(##d) "Flower seeds are a nice present, aren't they? Maybe we should give ourselves a present, just like Grandpa got. We could buy some more flower seeds for ourselves. What kinds should we buy? What flowers have we growing in our garden right now? —roses, daisies, and what else? Can you suggest another kind of flower we should plant?"

Vignette 12: 'Ghost train'

Mum and Hank, age 4, went to a theme park and had a ride through a stage set that was set up to resemble a haunted house. As they emerge from the dark house which had been well-equipped with authentic-looking ghosts, witches and monsters, Mum has a tense expression on her face. "Why are you scared Mum?" Hank asks somewhat anxiously. "Are those ghosts real?" Mum says " ."

(##a) "No, they are not real, dear. They are made with machines and lights just like our television set at home. There is really no such thing as a ghost, and no such thing as a haunted house. So there is no reason to be scared. Do you want to go on that ride again, or shall we try another one? We could go on the little ferris wheel or the carousel."

(#b) "No, they are not real, dear. Now let's ride the carousel. It is lots of fun."

(**c) “No, they are not real, dear. They are just pretending. I am not really scared because I know there is no such thing as a real ghost or a real haunted house. But when we were on the ride, I was pretending to feel scared because it was fun to imagine things when you are playing. In the dark, those ghosts looked so real that it was very easy to pretend they were and feel a little scared, even though I knew the ghosts weren’t actually real.”

(*d) “No, they are not real, dear, only pretend, and I wasn’t really scared but I pretended to feel that way.”

母亲和孩子交流中的心智言谈调查表

说明：下列是 12 个故事片段，每个场景都有一个家长和一个儿童。
我们希望您能够试着将您自己和您的孩子代入小故事中家长和孩子的角色，假设您的孩子【孩子的名字】就是故事中设定的4岁。

每个片段下面会给出四种具体的回应语句。
这些回应能体现出家长面对该情境时的处理方法。您的任务就是对这些回应方式进行排序，用数字来表示您选择该种回应方式的可能性。

“1”代表该选项是您的首选，或您最有可能选择该种回应方式；“2”代表该选项是您的第二选择；“3”代表该选项排在您的第三优先级；“4”代表该选项是您最不经常或从不使用的回应方式。

这些选项没有对错之分。
每个选择都各有利弊，取决于孩子的个性和家庭环境。
所有的选项都反映的是良好的育儿实践。因此，请您尽量还原您可能会做出的真实回应，然后进行选择。您可以根据回忆或想象来进行回答。

片段1：《在厨房》

昨天，妈妈答应4岁的乔乔一起做蛋糕。
今早，乔乔和妈妈一起去购物了。但是，妈妈忘带了购物清单，忘记买鸡蛋，而家里也没有鸡蛋了。

现在，乔乔问妈妈一会儿能不能开始做蛋糕。妈妈说：
(#a)“乔乔，家里没有鸡蛋了。咱们不做蛋糕，换成冰皮月饼吧。冰皮月饼也很好吃，而且不需要鸡蛋就能做。”

(*b)“乔乔，妈妈忘记买鸡蛋了。咱们不做蛋糕，换成冰皮月饼吧。冰皮月饼也很好吃，而且不需要鸡蛋就能做。”

(**c)“乔乔，你看妈妈这记性！我忘记买鸡蛋了！在厨房我还一直想着‘咱们得买鸡蛋’，结果到了商店就彻底忘了，压根没想起来！咱们不做蛋糕，换成冰皮月饼吧。冰皮月饼也很好吃，而且不需要鸡蛋就能做。”

(##d)“乔乔，我有个好主意！咱们不做蛋糕，换成冰皮月饼吧。
咱家没鸡蛋了。但是没关系，冰皮月饼不需要鸡蛋，而且做起来更有趣！
就像在海边玩沙子一样有意思。咱们把面团揉匀，然后加入油搅拌到松软，就像我们在沙滩上挖砂坑、堆城堡那样。

片段2：《果篮》
妈妈和4岁的小杰在旅店房间里等爸爸回来。他们已经等了一段时间了，小杰开始觉得无聊了。

小杰的玩具和书都不在身边，但房间里有一大碗水果。
妈妈注意到了小杰的无聊，对小杰说：“小杰，咱们用那碗水果来玩个游戏吧！”
妈妈说的游戏会是：

(##a)“颜色连连看”：妈妈指定一个水果（比如香蕉），然后小杰需要在房间里找到另一样和这个水果颜色一样的物品（比如黄色的灯罩），边指边说它的颜色。
然后，由小杰来指定水果，妈妈来找颜色相同的物品。依次轮换，在找完所有单色之后，他们需要将颜色进行组合（例如，黄香蕉加红苹果组成橙色的床单），以此类推。

(#b)“捉迷藏”：妈妈遮住眼睛，告诉小杰把碗里的水果分别都藏在房间里，然后再由妈妈来找水果。

(*c)“画图游戏”：妈妈从包里拿出纸和铅笔，在纸上画出一个长长的，尖尖的圆柱体，告诉小杰这是香蕉。然后问小杰愿不愿意在纸上再画出一个苹果，等等。

(**d)“假扮游戏”妈妈拿起香蕉，假装是电话，放在耳边。
“铃！铃！”妈妈说。“我在给你打电话！找出你的手机，在果篮里面！”然后妈妈再用下一个水果来假扮道具（比如，用苹果假装闹钟）。

片段3：《爸爸的生日》
今天早上，妈妈和4岁的小强去购物。他们选中了一件特殊的礼物，想在两天后爸爸生日的时候送给他。
他们在一起包礼物的时候，小强表示，他已经迫不及待地想在爸爸今晚到家的时候就告诉他礼物是什么了。

妈妈说：

(#a)“小强，别告诉爸爸我们打算送他什么，不许这么做。我们等到爸爸生日当天，他亲自打开包装就知道了。”

(##b) “小强，别告诉爸爸我们打算送他什么。过生日就是买好礼物，等到当天让对方亲自拆开。 你买好礼物，精心包装好，然后等到生日的那天让收到礼物的人亲手拆开。还有，你猜怎么着，咱们还得给爸爸做个生日蛋糕!”

(*c) “小强，别告诉爸爸我们打算送他什么哦。咱们要在爸爸生日的时候给他一个惊喜。”

(**d) “小强，别告诉爸爸我们打算送他什么，他还不知道盒子里面是什么。现在我们现在已经把礼物包好了，如果你告诉了他，到时候就没有惊喜了哦。咱们要保密，这样爸爸到时才会很惊喜的。”

片段4：《狂叫的狗》

一天晚上，宠物狗斑斑经过玻璃推拉门，兴奋地叫起来。

4岁的珍珍问妈妈：“妈妈，斑斑为什么叫啊？”

妈妈回答：

(#a) “狗狗嚎叫有很多原因啊，它可能是在对着自己的影子叫，或者可能听到或看到了院子里的什么东西。”

(*b) “可能它听到了外面有什么声音，觉得院子里有人。”

(**c) “它可能看到了玻璃上自己的倒影，觉得那是别的狗狗。
它只是一只狗狗，所以不像我们人类一样知道倒影和镜子。他能看到自己的倒影，但是并不知道那是它自己，还以为是另一只狗狗。”

(##d) “它叫有很多原因啊，或许是它听到外面有动静，或许是它看见了自己的倒影。咱们可以用个方法试一下。咱们把门拉开，这样它就看不到自己的倒影了。如果它是因为倒影才叫的，看不见自己的倒影它就不会再叫了。如果它走出去了，那就是因为它听到了外面的声音。”

片段5：《钥匙丢了》

妈妈把钥匙丢到沙发上立马冲出房间接电话了。

她离开的时候，钥匙从沙发垫后面滑了下去。

4岁的小艾目睹了全过程。

现在妈妈回来了。妈妈要用钥匙，所以她开始找钥匙。

首先，她找遍了沙发，也查看了桌子底下。

然后她冒出一个想法。她坚信自己把钥匙落在了放电话的那个床头柜上，然后就回到卧室去找钥匙。

小艾跟着妈妈，问道：“妈妈，你为什么还要去卧室呀？”

妈妈说：

(#a) “去拿钥匙：我得拿钥匙开车库。钥匙可能放在电话边上了。”

(**b) “去拿钥匙：我得拿钥匙去开车库，可是钥匙我不知道放哪了。

我觉得我放沙发上了，但是刚才没找到啊。可能只是我以为我把它放沙发上了。

我肯定是刚才接着接电话，就把它放电话旁边了。”

(##c) “去拿钥匙：我得用钥匙开车库。钥匙可能在电话旁边，所以我得回卧室拿。你跟着我过来我很开心，因为我拿了钥匙之后，咱们可以一起对着卧室的大镜子梳头发。”

(*d) “去拿钥匙：我得拿钥匙开车库。但是我不知道钥匙放哪了，所以我得去电话旁边找找看。”

片段6：《钥匙找到了》

（接上一个片段）小艾说到：“但是妈妈，你的钥匙不在卧室呀。

我看到从沙发垫后面滑下去了。钥匙还在客厅。”妈妈说：

(##a) “啊，太好了！你知道钥匙在哪里，你真棒！不然我可能永远都找不到了。

就像你挖的沙坑一样，东西放在里面会沉下去，然后被盖住。提到沙坑，咱们一块去开车库然后去外面一起玩沙子吧。咱们可以在你的沙坑里堆一个城堡。有意思吧？”

(**b) “啊，太好了！你的小脑袋真聪明！你注意到了钥匙在哪，就算被遮住了看不见，你也知道在哪儿。我就不如你聪明，我根本没想到它藏在沙发垫后面。我还一直错误地认为钥匙在电话旁边，但它实际上就在沙发下面！”

(#c) “啊，太好了！咱们去开车库然后在外面玩一会儿吧。”

(*d) “啊，太好了！你可真聪明，就算没看到也知道钥匙在哪，还来提醒我。”

片段7：《火眼金睛》

妈妈和4岁的小米在玩一个游戏，叫做“火眼金睛”。

游戏规则是这样的：一个人心里想着房间里的一件物品，只描述物品的颜色。另一个人有10次机会猜这是哪件物品。如果在10次以内猜对，得1分，奖励接下来连续出题两次。

在这天，小米玩着玩着开始失去耐心，因为妈妈一直赢，而小米一直输。

每次到了妈妈猜物品的时候，她总能在前两次就猜出正确的物品。

而小米从来没能在10次以内猜对妈妈指定的物品。

小米很沮丧，他问妈妈为什么她总是能猜对。

妈妈说：

(##a) “可能我只是玩这个游戏的运气太好了。咱们来玩点别的吧。把你的拼图和桌游拿来，我们玩点更有意思的。咱们或许可以一起拼个拼图。或者咱们玩你最喜欢的‘乐高’。你觉得怎么样？”

(#b) 可能是我运气太好。别沮丧。咱们玩点别的吧。

(**c)大概是因为我有一个你不知道的小技巧。我可以通过你的眼睛读出你的心思。每次你想着一件物品的时候，你都会看向它。如果你想骗到我，那就不要在想它的时候往那里看哦。”

(*d)“如果你不想让我猜中的话，那你在想的时候就不要看那件物品。“

片段8：《在海边》

妈妈和4岁的达达在海边。他们在水里已经待了一段时间了，妈妈觉得达达可能太冷了，于是提议上岸。但是达达却不想上岸，不愿离开不断冲过来的海浪，因为此时她正在兴头上。

妈妈觉得在沙滩上玩一会儿也不错，于是提议玩游戏：

(##a)“你追我跑”：她们会玩一个追逐游戏，一个人跑，一个人追。

如果被追的人坐在沙滩上，双手都碰到沙子，那她就是安全的。但如果一只手拿上来了，那她就会被抓住。如果被追的人在不被抓住的前提下到达海滩椅在的地方，那个人就可以得到一分，然后转变为追逐者，再继续下一轮。

(#b)“挖隧道”：她们会面对面坐在沙滩上，两人之间留出一定距离，然后开始向着对方的方向，用手挖隧道，直到两人的手碰到一起，游戏结束。

(**c)“童话城堡”：妈妈和达达会一起堆一座沙堡，在堆的时候给对方讲一个故事，讲述想象中王子和公主在城堡里的生活。她们需要轮流讲述，来完善这个故事。每人都要假设一段或一系列故事情节，接在对方停下的地方，描述一下想象中的城堡生活。

(*d)“贝壳花园”：她们会在沙滩上画一个形状，把它当作一个花园。

然后寻找贝壳、卵石、和海藻，放在这个形状上面，当作花卉和灌木。

片段9：《空瓶子》

妈妈去幼儿园接4岁的凯凯，在门口遇到了一个朋友。

凯凯出来的时候，他们还在聊天。所以妈妈并没有注意到凯凯把他的空瓶子悄悄放进了她的购物筐里，被别的东西挡住了。

朋友走了之后，妈妈对凯凯说：“ 快点回教室拿你的瓶子去，你忘记拿了吧！”凯凯看起来有点疑惑，但也讯速地返回了教室。

然后，妈妈打开购物筐，看到了里面的瓶子。

她来到教室，接到了凯凯，说道：

(#a)“走吧凯凯，找到瓶子了，咱们回家吧。”

(*b)“走吧凯凯，你的瓶子在我购物筐里，我刚才没看见你放进来，不知道已经拿到了。咱们回家吧。”

(**c)“走吧凯凯，不好意思，我还让你回来拿瓶子，我的错。

你出来的时候我没注意到，没看见你把瓶子放在我筐里了。所以不知道瓶子已经放在筐里了。我确实应该先看一下的。就算是大人，脑子有时候也会糊涂！咱们回家吧。”

(##d)“走吧凯凯，找到瓶子了。但这个瓶子挺旧的了吧，它都脏了，磨损了。该给你买个新的了。

咱们回家路上买一个吧。逛逛商店，你选一个新瓶子。

你想要什么颜色的瓶子？”

片段10：“电话”

妈妈和4岁的珊珊在厨房里，这时电话响了。

妈妈接起电话，和电话那头的人聊着，开心地笑着，说道：

“好啊，我很乐意去！”妈妈挂了电话之后，珊珊问道：

“妈妈，你在和谁打电话呀？”妈妈不高兴地皱起眉头，说：“是隔壁邻居，她邀请我去看看她假期拍的照片。我真的不想去！”妈妈叹道。

“但是妈妈，”珊珊说，“那为什么，刚才在电话里她邀请你的时候你看起来特别开心，而且告诉她你很想去啊？”

妈妈说：

(##a) “我那是礼貌一下，”妈妈说道，“不用在意。我也没时间和你解释刚才我说的话，因为咱还有事情要做！很好玩的事情！咱们可以做点饼干，去邻居家的时候带给她。快来看看菜谱上的这些图片，帮我选一个饼干款式！”

(#b) “在别人向你发出邀请的时候，表现得兴奋并且接受邀请的话，会比较礼貌。”妈妈说。

(*c) “我那是假装开心，因为我并不想给邻居泼冷水。”妈妈说。

(**d) “有时候我们心里的想法是不能外露的，”妈妈说，
“如果邻居知道我因为觉得看那些照片很无聊而拒绝邀请，会很受伤的。
所以我要避免伤害她，就得说一些违心的话。
我假装高兴地接受邀请，这样她就不会知道我的真实想法了。”

片段11：“外公的礼物”

妈妈带4岁的亚亚去高层公寓看望外公。他们到了外公家，外公正好收到一个包裹，正准备打开。
里面是一个老朋友寄来的一包种子，附带一张卡片。
外公叹了口气，看起来不太高兴。
在回家的路上，亚亚问妈妈，外公为什么收到那么好的鲜花种子却不高兴。
妈妈说：
(*a) “不是所有人都会喜欢同样的事物的。你和我喜欢那些种子，但是爷爷家没有花园，所以他并不需要，或者不想要花种。”

(#b) “外公跟我说，他见到我很开心，见到你更开心。
咱们下午过得很好不是吗？
爷爷泡的茶也很好喝。”

(**c)“要想知道别人的想法是很难的。 就算外公是我爸爸，我也不知道他脑子里在想什么。但有时候我可以猜到他的想法。我觉得外公不高兴可能是因为这些花种让他想起来搬过来之前住的那个有花园的房子，他很想念那个花园。

(##d)“鲜花种子确实是很棒的礼物。 或许咱们也要应该自己买个礼物，和外公收到的一样？咱们可以给自己买点花种。应该买哪种呢？咱们家花园里现在种的是什么来着？玫瑰、雏菊，还有什么？你建议咱们再种个什么花呢？”

片段12：“幽灵火车”

妈妈和4岁的涵涵去了主题公园，玩儿了一个乘坐小火车穿过一个内部装饰类似鬼屋的游乐项目。

房子里面黑黑的，有幽灵、女巫和怪兽，看起来就像真的一样。当他们从房子里出来的时候，妈妈看起来神情有些紧张。

“妈妈，你为什么害怕呀？”

涵涵也有些不安地问道。“那些幽灵是真的吗？”妈妈回答“ .”

(##a)“宝贝，那些并不是真的。他们是用机器和灯光造出来的，就像家里的电视机一样。实际上根本没有幽灵，也没有鬼屋。所以其实没必要害怕。

你想再坐一次吗？还是我们去玩其他的项目？

我们可以去坐摩天轮或者旋转木马。”

(#b)“宝贝，那些并不是真的。咱们去坐旋转木马吧，很好玩的。”

(**c)“宝贝，那些并不是真的。他们只是假装的。我并不害怕，因为我知道世上没有真的幽灵，也没有真的鬼屋。

但是我们在玩的时候，我假装很害怕，因为在体验的时候想象一下那些东西还是挺好玩的。

在黑暗中，那些幽灵看起来太逼真了，很难不去因为认为他们是真的而感到害怕。所以即使我知道他们并不是真的幽灵，我也会觉得有点害怕。”

(*d) “宝贝，他们并不是真的，只是假扮的。我当时其实没有很害怕，只是假装害怕而已。”

Appendix C

Mandarin Communicative Development Inventory (Short Form) (MCDI; Tardif et al., 2008)

The figure originally presented here cannot be made freely available via ORA because of copyright.
The figure was sourced at Tardif, T. and Fletcher, P. (2008a). *Mandarin Communicative Development Inventory.* Peking University Medical Press.

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Appendix D

Children's Social Understanding Scale (Short Form) (CSUS; Tahiroglu et al., 2014)

Children's Social Understanding Scale (Short Form)
Instructions: Please read carefully before beginning:

On the following pages you will see statements that describe children's everyday behaviors and thinking. We would like you to tell us how well each statement describes your child's behavior and/or thinking. There are no "correct" answers. The skills and behaviors describedin the statements develop gradually, and children differ widely in their behavior and ways of thinking. It is these differences we hope to learn about.

Please read each statement and decide whether it's a "True" or "Untrue" description of yourchild's thinking and behavior. Use the following scale to indicate how well a statement describes your child:

Circle #	If the statement is:
1	Definitely Untrue
2	Somewhat Untrue
3	Somewhat True
4	Definitely True

Please do your best to respond to all of the items. However, if you cannot answer an item because you have no idea whether your child thinks or behaves in that way, then circle "Don't Know" (DK).

Please be sure to respond by circling a number or "Don't Know" for every item.

Thank you for helping us learn more about children's development!

	My Child…	Definitely Untrue	Somewhat Untrue	Somewhat True	Definitely True	Don't Know
1	Talks about differences in what people like or want (e.g. "You like coffee but I like juice").	1	2	3	4	DK
2	Uses words that express uncertainty (e.g. "We might go to the park"; "Maybe my shoes are outside").	1	2	3	4	DK
3	Realizes that experts are more knowledgeable than others in their specialty (e.g. understands that doctors know more than others about treating illness).	1	2	3	4	DK
4	Has trouble figuring out whether you are beingserious or just joking.	1	2	3	4	DK
5	Is good at playing "hide and seek" (e.g. is hard to find, does not make give-away noises).	1	2	3	4	DK
6	Talks about how her/his beliefs have changed over time (e.g. "I used to think that drinking from a cupis hard, now I think it's easy").	1	2	3	4	DK
7	Talks about people's mistaken beliefs (e.g. "Hethought it was a dog but it was really a cat"; "I thought mommy was coming but it was reallydaddy").	1	2	3	4	DK
8	Understands that hurting others on purpose is worse than hurting others accidentally.	1	2	3	4	DK
9	When given an undesirable gift, pretends to like it soas not to hurt the other	1	2	3	4	DK

	person's feelings.					
10	When talking on the phone, behaves as if the listener can actually see her/him (e.g. assumes that the listener knows what s/he is wearing).	1	2	3	4	DK
11	Understands that different people can have different feelings about the same thing (e.g. one child likes adog but another child is scared of it).	1	2	3	4	DK
12	Takes into account what others want (e.g. takes turns, shares toys, compromises with other childrenregarding which game to play).	1	2	3	4	DK

	My Child…	Definitely Untrue	Somewhat Untrue	Somewhat True	Definitely True	Don't Know
13	Talks about the difference between the way thingslook and how they really are (e.g. "It looks like a snake but it's really a lizard").	1	2	3	4	DK
14	Talks about conflicting emotions (e.g. "I am happy to go on vacation, but I am sad about leaving friendsbehind").	1	2	3	4	DK
15	Is good at directing people's attention (e.g. points atthings to get others to look at them).	1	2	3	4	DK
16	Talks about the difference between intentions and outcomes (e.g. "He tried to open the door but it was locked").	1	2	3	4	DK
17	Understands that telling lies can mislead other people.	1	2	3	4	DK
18	Talks about the difference between what people wantand what they actually get (e.g. "She wanted a puppy but she got a kitten").	1	2	3	4	DK

孩子社会理解调查表

说明：请在开始之前仔细阅读

在接下来的几页中您会看到有关描述孩子日常行为和思考的陈述。答案没有正确与否。这些在陈述中所描述的能力 和行为有一个缓慢的发展过程，并且每个孩子都有不同的行为和思考模式。我们正是希望去了解孩子们在行为和思考模式上的不同。

请阅读以下陈述，并且决定每一条陈述是否“真实”或“不真实”地反应了您孩子的行为和想法。请用以下的标准来表明每一条陈述和您孩子本身的行为和思考的符合程度：

圈 #（数字） 如
果这条陈述：

1 绝对不符合

2 有些不符合

3 有些符合

4 绝对符合

请尽可能答完所有的题目。可是如果您因为不确定您孩子是否这样表现或思考而无法回答某项题目, 请圈“不知道”(DK)。

请确保每项题目都用圈某个数字或者“不知道”来回答。
感谢您让我们对儿童的发展有了更深入的了解。

我的孩子……	绝对不符合	有些不符合	有些符合	绝对符合	不知道
谈论每个人的喜好和想要的东西上的不同（例如：“你喜欢咖啡，但是我喜欢果汁”）	1	2	3	4	DK
运用表达不确定性的词语 (例如：“我们可能会去公园” ;“我的鞋子可能在外面”)。	1	2	3	4	DK
意识到专家在他们的专业领域比其他人知识更加渊博。(例如：了解医生比其他人更懂得如何治疗疾病）。	1	2	3	4	DK
很难区分对方是认真的还是只是在开玩笑	1	2	3	4	DK
擅长玩儿“捉迷藏” (例如： 躲藏的地点很难被人找到, 不出暴露躲藏地点的响声).	1	2	3	4	DK
谈论他（她）的看法随着时间而改变了 (例如：“我曾经认为用杯子喝水很困难，现在我我觉得很简单)。	1	2	3	4	DK
谈论别人错误的看法 (例如：“他以为那是一条狗，但其实那是一只猫”； “我以为妈妈要过来了，但过来的其实是爸爸”)。	1	2	3	4	DK

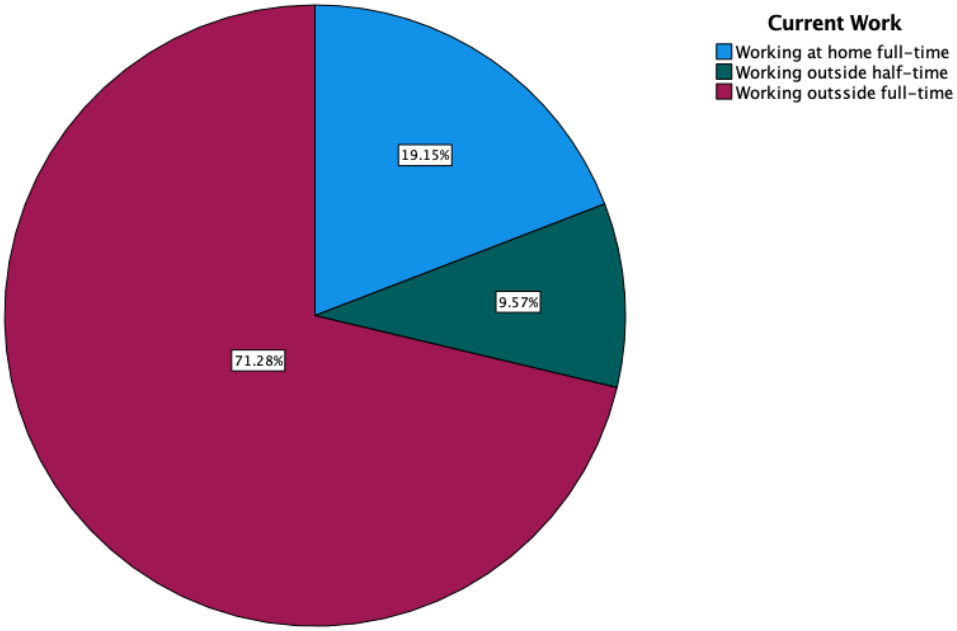
懂得故意伤害别人比意外伤害他人 更糟糕。	1	2	3	4	DK
当收到自己不喜欢的礼物时为了不伤 害送礼物的人的感情而装作很喜欢。	1	2	3	4	DK
在打电话时表现得仿佛电话另一端的 倾听者可以看见他（她） (例如：假设 电话另一端的倾听者知道他/她现在穿 得是什么)。	1	2	3	4	DK
懂得不同的人对同一件事情可以有不 同的感受(例如：一个孩子喜欢狗，但 是另一个孩子害怕狗)。	1	2	3	4	DK
考虑到别人想要什么 (例如：轮流， 分享玩具，和其他孩子商量要玩儿什 么游戏)。	1	2	3	4	DK

My Child…	绝对不符合	有些不符合	有些符合	绝对符合	不知道
谈论事物的外观和实际情况之间的区别 (例如：“它看起来像一条蛇，但实际上它是一条蜥蜴”)。	1	2	3	4	DK
讨论相矛盾的情绪 (例如：“我很开心可以去度度假，但是想到抛下我的朋友让我很伤	1	2	3	4	DK

心”).					
擅长指引他人的注意力 (例如：“指向某个东西从而让别人看向它).	1	2	3	4	DK
谈论意图和结果的不同 (例如：“他试图去打开门但是门却是锁住的)。	1	2	3	4	DK
懂得说谎可以误导别人。	1	2	3	4	DK
谈论人们想要的和真正得到的的区别 （例如：“她想要一只小狗，却得到了一只小猫”）。	1	2	3	4	DK

Appendix E

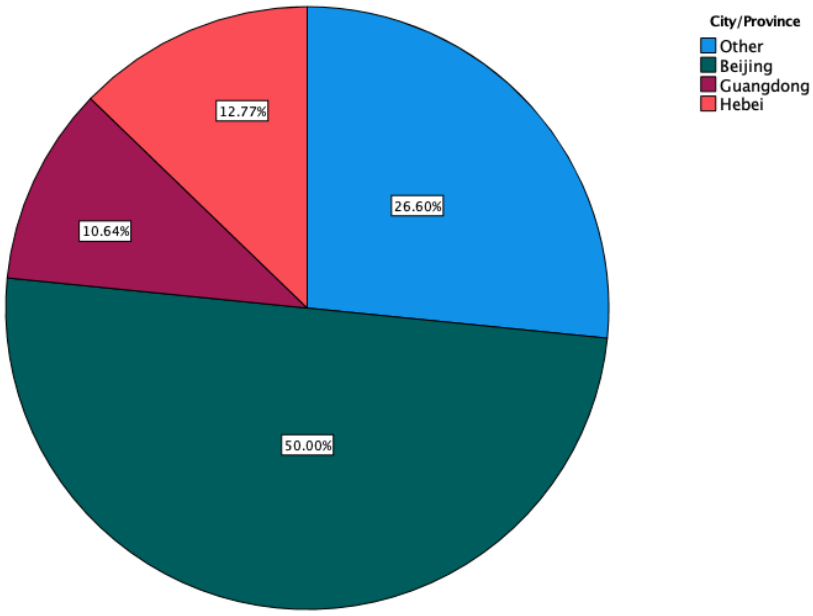
Participants' Current Working Status (as Percentage)



Note. The graph was generated by SPSS 28.

Appendix F

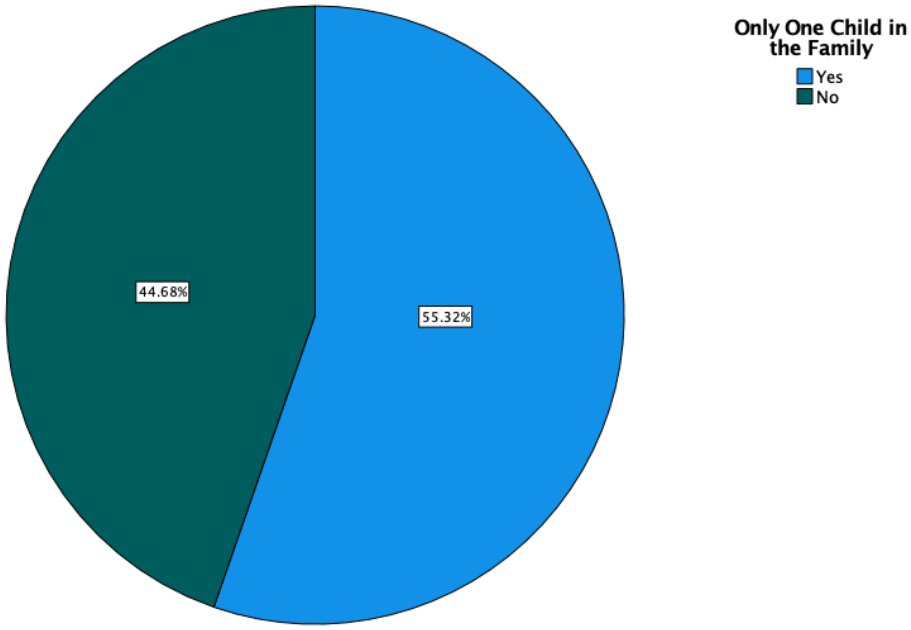
Participants' Current Demographic Locations (as Percentage)



Note. The graph was generated by SPSS 28.

Appendix G

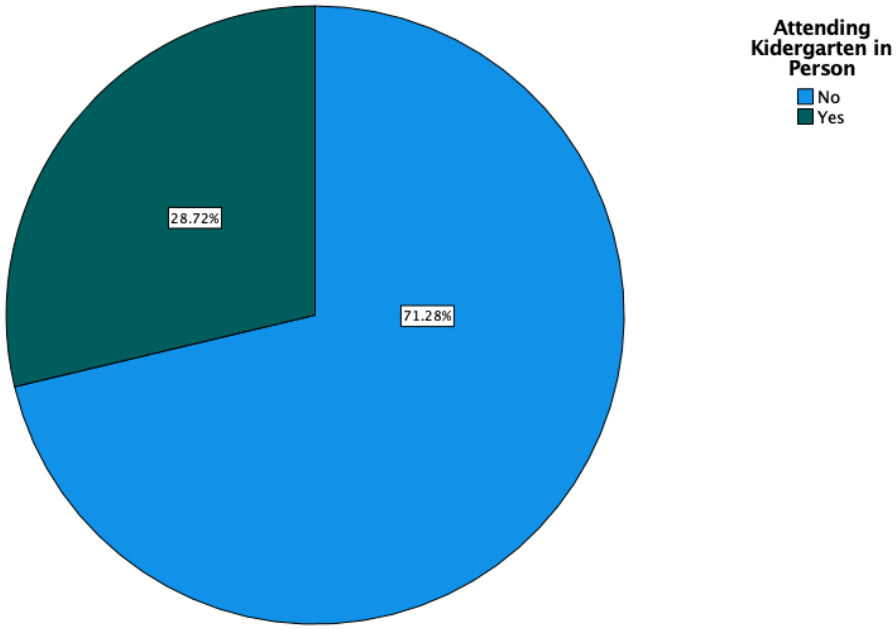
One-Child Family (as Percentage)



Note. The graph was generated by SPSS 28.

Appendix H

Kindergarten Attendance (as Percentage)



Note. The graph was generated by SPSS 28.

Appendix I

Invitation Letter

Invitation Letter

This study is investigating the relationship between the language used by mothers to talk about intentions, beliefs and feelings and how their children attribute intentions, beliefs and feelings to other people (their theory of mind). The study will examine factors that influence Theory of Mind development in Chinese children, investigating whether these factors differ compared to children in the West, who have been the focus of most research in this area until now.

We are looking for mothers of a 4-5-year-old to participate in the study. So, if you are a mother of 4-5-year-old and are interested in this research, please contact the researcher through Wechat or email. Your participation would be highly valuable to us. Looking forward to your participation and thank you for your patience!

Sincerely,

The researcher's name

邀请信

这项实验意在探究母亲所用语言对儿童心智发展的影响。简单来说，就是在谈论意图、信念和感受时，母亲所用语言与儿童对他人意图、信念和感受的理解（即儿童的心智理论）之间的关系。由于此类研究一直以来都以西方儿童为研究对象，因此该研究将主要考察影响中国儿童心智理论发展的因素，并对比这些因素是否与影响西方儿童的因素有所不同。

我们诚挚邀请4-5岁儿童的母亲参与此项实验。如果您是一名4-5岁儿童的母亲并且对该实验感兴趣，请通过微信或者邮件的方式联系实验员。您的参与对我们来说非常珍贵。期待您的参与并且感谢您的耐心！

祝好，

实验者姓名

Appendix J

Participants' Information Sheet



UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford OX2 6PY
Tel: +44(0)1865 274024 Fax: +44(0)1865 274027
general.enquiries@education.ox.ac.uk www.education.ox.ac.uk
Director: Victoria Murphy

Maternal Language Use during Mother-Child Interactions and the Development of ToM in Chinese Children

Information for Participants

Invitation

You are being invited to take part in a research study. Before you decide to participate, it is important to understand why the research is being conducted and what your participation entails. Please take time to read the following information carefully. Please ask if there are any aspects of the project that are unclear or if you would like more information. Take time to decide whether or not you would like to take part in this research.

What is the Purpose of the Study?

This study is investigating the relationship between the language used by mothers to talk about intentions, beliefs and feelings and how their children attribute intentions, beliefs and feelings to other people (their theory of mind). The study will examine factors that influence Theory of Mind development in Chinese children, investigating whether these factors differ compared to children in the West, who have been the focus of most research in this area until now.

Why Have I Been Invited to Take Part?

For this study, we are looking for mothers of 4–5-year-old children to take part in our research.

What will Being in the Study involve?

We will ask mothers to fill in four questionnaires. The first will give us some brief details about mothers and their child. The second will ask mothers to select their likely responses to 12 common everyday family scenarios. The third questionnaire asks mothers about the language their children use. The last questionnaire asks the mother how well each listed statement describes the child's behaviour or thinking.

Do I Have to Take part? What are the Risks and Benefits of Taking Part?

It is your decision to take part in this study. You can decide to stop participating at any time and withdraw your and your child's data at any point after the research. You do not need to answer questions that you do not wish to. Every effort will be made to preserve

confidentiality, all data resulting from the research will be anonymised (i.e. each participant will only be identified by a code). Data from participants will be aggregated for analysis and no participant will be identifiable in any report relating to the research. There are no known risks to taking part.

What will Happen to the Information and Data in the Questionnaires

The information you provide as part of the study is the research data. Any research data from which you or your child can be identified (e.g. name, date of birth), is known as personal data. All data will be stored confidentially. All personal data will be destroyed as soon as the data-collection has been completed. At the same time, all electronic informed consent and questionnaire data will be kept in a locked file on a computer, in line with the Data Protection Policy of the University. Electronic task results will not contain personal data and only a code number will be used to identify participants. Results from you will be combined with results from other mothers for statistical treatment and not used in any way that would identify you or your child.

What will Happen to the Results of this Research?

The results of this research will form the basis of an Oxford MSc dissertation. Anonymised results may be published in academic journals or presented in academic conferences. If you wish to obtain a copy of the published results, please inform the researcher. You can withdraw your data any points after the research. The study will be completed by August 12th, 2022, after which time the results will be available on request.

Who Organizing the Research?

The research is organised as an independent MSc research project in conjunction with the Department of Education, Oxford University.

How Should I Raise a Concern and Make a Complaint?

If you have any concerns or complaints, please contact the researcher via the email addresses listed below.

Contact for Further Information or Follow-up

Should you have any further questions about this research, please feel free to contact:
Department of Education, 15 Norham Gardens, Oxford, UK OX2 6PY.
Your inquiries are most welcome.

牛津大学
教育系
15 Norham Gardens, Oxford 邮编：OX2 6PY
电话：+44(0)1865 274024 传真： +44(0)1865 274027
general.enquiries@education.ox.ac.uk www.education.ox.ac.uk
导师： Victoria Murphy

母亲和孩子交流中的心智言谈调查表

受试者须知

实验邀请

我们特邀您参与一项调查研究。您需要提前了解研究目的以及参与获益。请仔细研读下列说明。如对本研究有任何不清楚的地方，或想了解更多信息，请联系我们进行提问。请仔细考虑是否参与本研究。

研究目的

这项实验意在探究母亲所用语言对儿童心智发展的影响。简单来说，就是在谈论意图、信念和感受时，母亲所用语言与儿童对他人意图、信念和感受的理解（即儿童的心智理论）之间的关系。由于此类研究一直以来都以西方儿童为研究对象，因此该研究将主要考察影响中国儿童心智理论发展的因素，并对比这些因素是否与影响西方儿童的因素有所不同。

我为什么会受到邀请？

针对此次研究，我们需要招募4-5岁儿童的母亲参与实验。

参与研究会涉及什么？

我们会请参加实验的母亲填写四份问卷。第一份问卷主要涉及关于母亲和孩子的基本情况。第二份问卷会要求母亲针对 12 个日常家庭场景选择她们可能会做出的反应。第三份问卷会针对孩子语言使用的情况对母亲进行提问。最后一份问卷会让母亲对关于一些描述孩子日常行为和思考的陈述是否符合自己孩子的实际情况作出判断。

我必须参加吗？参加会有什么风险和好处？

参加与否取决于您自己的意愿。如果参与了实验，您也可以在在实验过程中随时提出停止，并在研究结束后随时撤回您的数据。您无需回答您不想回答的问题。我们会尽力确保您和孩子的信息严格保密。研究中产生的所有数据都将进行匿名处理（即每个参与者只能通过代码来识别）。我们将对参与者的数据进行汇总和分析，在与研究有关的任何报告中都无法识别参与者。参与研究没有已知风险。

问卷涉及的信息和数据将如何处理？

研究数据是指您在参与研究过程中所提供的信息。个人数据是指任何可以辨认出是您或您的孩子的研究数据（例如，姓名、出生日期）。任何含有个人数据的电子文件将储存在电脑中，并在数据收集完成后立即销毁。同时，根据牛津大学的数据保护政策，所有电子测试结果和知情同意书将在电脑文件中进行保存并设置密码。电子测试结果不会包含个人数据，参与实验者只用代码来进行识别。您的测试结果将与其他母亲的测试结果整合起来进行统计处理，并且从结果中无法辨别您或您的孩子。

这项研究的结果将如何处理？

这项研究的结果将作为牛津大学硕士论文的基础来使用。在匿名化处理之后可能会在学术期刊或学术会议上发表。如果您想获得已发表的研究，请联系研究人员。您可以在研究后的任何时间提出撤回您的数据。该研究将在 2022 年 8 月 12 日之前完成，在此之后，研究结果将应要求提供。

这项研究由谁组织？

这项研究是一个独立的硕士研究项目，与牛津大学教育系共同组织。

如何提出疑问和投诉？

如果您有任何疑虑或想要投诉，请通过下列电子邮件联系研究员。

获取更多信息和后续的联系方式

如果您对这项研究有任何其他问题，请随时联系研究人员：

牛津大学教育系, 15 Norham Gardens, Oxford, UK 邮编：OX2 6PY

欢迎来信咨询。

Appendix K

Participants' Consent Form

UNIVERSITY OF OXFORD
DEPARTMENT OF EDUCATION
15 Norham Gardens, Oxford OX2 6PY
Tel: +44(0)1865 274024 Fax: +44(0)1865 274027
general.enquiries@education.ox.ac.uk www.education.ox.ac.uk
Director: Victoria Murphy

Research Consent Form

Project Title: Maternal Language Use during Mother-Child Interactions and the Development of ToM in Chinese Children

Researcher:

Declaration of Consent: I have read the participant information sheet and have had the opportunity to ask questions about the study and receive satisfactory answers to questions

I understand that I may withdraw from the study without penalty at any time by advising the researchers, and any data already recorded will be discarded

I understand that this project has been reviewed by, and received ethics clearance through, the University of Oxford's Central University Research Ethics Committee

I understand that my personal data and task results will be treated in total confidence, kept securely in a password-controlled server; and what will happen to the data at the end of the project

I understand how to raise a concern and make a complaint, and agree to participate in this study

I agree to voluntarily take part in this research

I confirm that I have read the associated information sheet and understand the intent and purpose of this research
I agree that data captured by this research can be shared among the research team on this project.
Name of Participant: _____
Email:_____
Signature: _____ Date: _____
Name of Researcher_____ _____ Signature and Date:
_____

牛津大学

教育系

15 Norham Gardens, Oxford 邮编：OX2 6PY

电话：+44(0)1865 274024 传真：+44(0)1865 274027

general.enquiries@education.ox.ac.uk www.education.ox.ac.uk

导师：Victoria Murphy

研究知情同意书

项目名称：母亲和孩子交流中的心智言谈调查表

研究者：

同意声明：我已阅读受试者信息表，并且我有机会提出有关该研究的问题并得到解答。

我清楚我可以在实验过程中任何阶段要求退出，并且无需承担任何后果。任何已经记录的实验数据将不会被保留。

我清楚本研究项目已经过牛津大学中央大学研究道德标准委员会的审查，并获得了研究道德标准许可。

我清楚我的个人资料和测试结果将完全保密，安全地存储在一个有密码控制的服务器中；并且我清楚在项目结束后，这些数据将如何处理。

我了解如何提出质疑和投诉，并同意参与这项研究。

我同意自愿参加这项研究。

我确认我已经阅读了相关信息表，并理解本研究的意图和目的。

我同意在本研究中采集的数据可以在项目相关的研究人员间共享。

受试者姓名：_____ 邮箱：_____

签名：_____ 日期：_____

研究者姓名_____ 签名和日期：_____

Appendix L

CUREU Approval

Maternal Language Use during Mother-Child Interactions and the Development of ToM in Chinese Children

The above application has been considered on behalf of the Departmental Research Ethics Committee (DREC) in accordance with the procedures laid down by the University for ethical approval of all research involving human participants.

I am pleased to inform you, then, that, on the basis of the information provided to DREC, the proposed research has been judged as meeting appropriate ethical standards, and accordingly, approval has been granted.

Please continue to follow all current guidance issued by CUREC during the pandemic, notably COVID-19: CUREC guidance on research involving human participants, https://researchsupport.admin.ox.ac.uk/governance/ethics/coronavirus

If relevant please also check the CUREC website for their best practice research guides, these can be very useful in refining the writing up of ethical considerations in your research – see https://researchsupport.admin.ox.ac.uk/governance/ethics/resources/bpg

Good luck with your research study,

Keep well and safe,

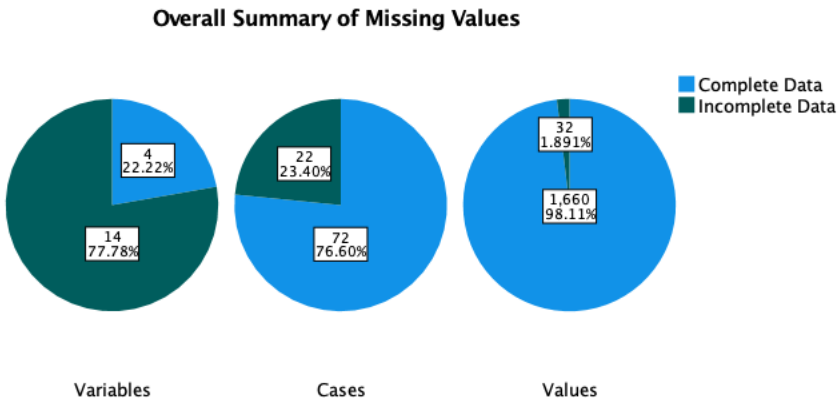
Yours sincerely,

All good wishes,

Liam

Appendix M

Missing Value Analysis for CSUS Chinese Version



Note. Little's MCAR test, Chi-Square = 355.68, $p < .01$. The analysis was carried out in SPSS 28.

Appendix N

Communalities for CSUS Chinese Version

Items	Initial	Extraction
When given an undesirable gift, pretends to like it soas not to hurt the other person's feelings.	.45	.05
Understands that different people can have different feelings about the same thing (e.g. one child likes a dog but another child is scared of it).	.62	.52
Takes into account what others want (e.g. takes turns, shares toys, compromises with other childrenregarding which game to play).	.65	.52
Talks about the difference between the way thingslook and how they really are (e.g. "It looks like a snake but it's really a lizard").	.72	.62
Talks about conflicting emotions (e.g. "I am happy to go on vacation, but I am sad about leaving friendsbehind").	.51	.45
Is good at directing people's attention (e.g. points atthings to get others to look at them).	.63	.54

Table Continue…

Items	Initial	Extraction
Talks about differences in what people like or want(e.g. "You like coffee but I like juice").	.79	.72
Uses words that express uncertainty (e.g. "We mightgo to the park"; "Maybe my shoes are outside").	.64	.50
Realises that experts are more knowledgeable than others in their specialty (e.g. understands that doctors know more than others about treating illness).	.54	.43
Has trouble figuring out whether you are beingserious or just joking.	.31	.14
Is good at playing "hide and seek" (e.g. is hard tofind, does not make give-away noises).	.30	.09
Talks about how her/his beliefs have changed overtime (e.g. "I used to think that drinking from a cupis hard, now I think it's easy").	.77	.63
Talks about people's mistaken beliefs (e.g. "Hethought it was a dog but it was really a cat"; "I thought mommy was coming but it was really daddy").	.76	.69

Table Continue…

Items	Initial	Extraction
Talks about the difference between what people wantand what they actually get (e.g. "She wanted a puppy, but she got a kitten").	.53	.44
When talking on the phone, behaves as if the listener can actually see her/him (e.g. assumes that thelistener knows what s/he is wearing).	.41	.18
Talks about the difference between intentions and outcomes (e.g. "He tried to open the door but it waslocked").	.68	.61
Understands that telling lies can mislead otherpeople.	.52	.34
Understands that hurting others on purpose is worsethan hurting others accidentally.	.45	.34

Note. The extraction method was Principal Axis Factor. The factor number was set as one. The analysis was carried out in SPSS 28.

Appendix O

Correlations among Chinese Items within Each Subscale in CSUS English Version

Desire	Talks about differences in what people like or want(e.g. "You like coffee but I like juice").	Takes into account what others want (e.g. takes turns, shares toys, compromises with other children regarding which game to play).	Talks about the difference between what people wantand what they actually get (e.g. "She wanted a puppy but she got a kitten")
Talks about differences in what people like or want (e.g. "You like coffee but I like juice").	-	.45**	.47**
Takes into account what others want (e.g. takes turns, shares toys, compromises with other children regarding which game to play).	.45**	-	.48**
Talks about the difference between what people wantand what they actually get (e.g. "She wanted a puppy but she got a kitten").	.47**	.48**	-
Perception	Is good at directing people's attention (e.g. points atthings to get others to look at them).	Talks about the difference between the way thingslook and how they really are (e.g. "It looks like a snake but it's really a lizard").	When talking on the phone, behaves as if the listener can actually see her/him (e.g. assumes that the listener knows what s/he is wearing).
Is good at directing people's attention (e.g. points atthings to get others to look at them).	-	.51**	- .26*

Table Continue…

Talks about the difference between the way thingslook and how they really are (e.g. "It looks like a snake but it's really a lizard").	.51**	-	- .22*
When talking on the phone, behaves as if the listener can actually see her/him (e.g. assumes that the listener knows what s/he is wearing).	- .26*	- .22**	-
Knowledge	Uses words that express uncertainty (e.g. "We mightgo to the park"; "Maybe my shoes are outside").	Realises that experts are more knowledgeable than others in their specialty (e.g. understands that doctors know more than others about treating illness).	Is good at playing "hide and seek" (e.g. is hard tofind, does not make give-away noises).
Uses words that express uncertainty (e.g. "We might go to the park"; "Maybe my shoes are outside").	-	.44**	.13
Realises that experts are more knowledgeable than others in their specialty (e.g. understands thatdoctors know more than others about treating illness).	.44**	-	.14
Is good at playing "hide and seek" (e.g. is hard tofind, does not make give-away noises).	.13	.14	-

Table Continue…

Belief	Understands that telling lies can mislead other people.	Understands that telling lies can mislead other people.	Understands that telling lies can mislead other people.
Understands that telling lies can mislead other people.	-	.40**	.43**
Talks about how her/his beliefs have changed over time (e.g. "I used to think that drinking from a cupis hard, now I think it's easy").	.40**	-	.75**
Talks about people's mistaken beliefs (e.g. "He thought it was a dog but it was really a cat"; "I thought mommy was coming but it was really daddy").	.43**	.75**	-
Intention	Talks about the difference between intentions and outcomes (e.g. "He tried to open the door but it was locked").	Understands that hurting others on purpose is worse than hurting others accidentally.	Has trouble figuring out whether you are beingserious or just joking.
Talks about the difference between intentions and outcomes (e.g. "He tried to open the door but it was locked").	-	.37**	- .29**
Understands that hurting others on purpose is worse than hurting others accidentally.	.37**	-	- .12

Table Continue…

Has trouble figuring out whether you are being serious or just joking.	- .29**	- .12	-

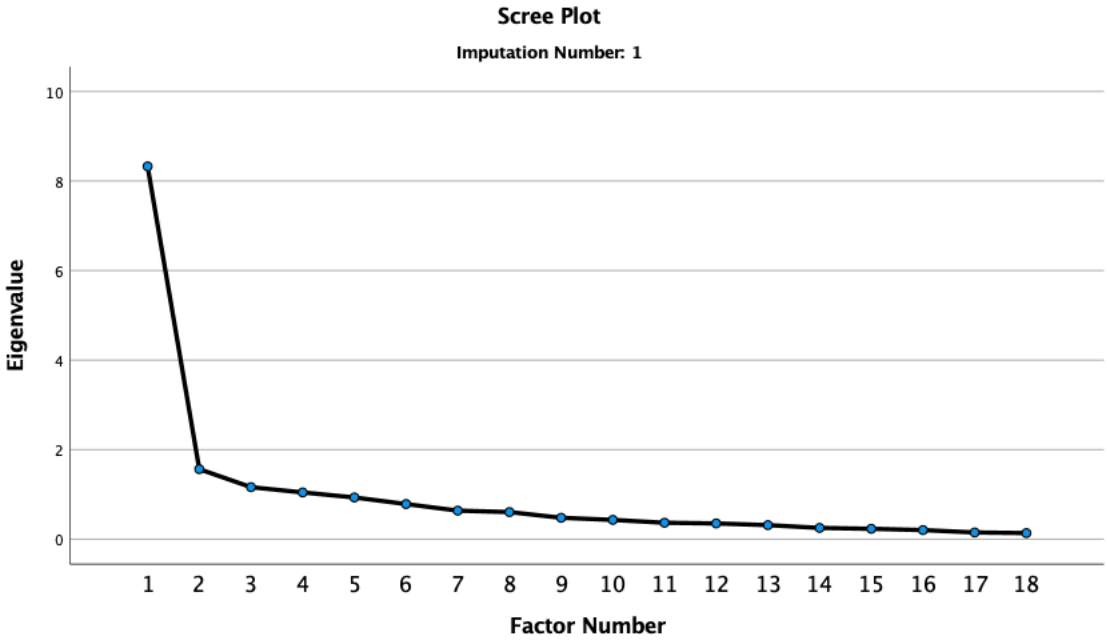
Emotion	Talks about conflicting emotions (e.g. "I am happy to go on vacation, but I am sad about leaving friendsbehind").	When given an undesirable gift, pretends to like it soas not to hurt the other person's feelings.	Understands that different people can have different feelings about the same thing (e.g. one child likes a dog, but another child is scared of it).
Talks about conflicting emotions (e.g. "I am happy to go on vacation, but I am sad about leaving friends behind").	-	.21*	.42**
When given an undesirable gift, pretends to like it soas not to hurt the other person's feelings.	.21*	-	- .09
Understands that different people can have different feelings about the same thing (e.g. one child likes a dog, but another child is scared of it).	.42**	- .09	-

Note. Correlation is pooled Spearman's rho. The analysis was carried out in SPSS 28.

*$p < .05$

Appendix P

Scree Plot Exploring Number of Factors in Translated CSUS



Note. The analysis was carried out in SPSS 28.

Appendix Q

Pattern Matrix for Translated CSUS Using Principal Axis Factoring

Items	Factor	
	1	2
Talks about differences in what people like or want (e.g. "You like coffee but I like juice").	.92	
Uses words that express uncertainty (e.g. "We mightgo to the park"; "Maybe my shoes are outside").	.83	
Realises that experts are more knowledgeable than others in their specialty (e.g. understands thatdoctors know more than others about treating illness).	.65	
Has trouble figuring out whether you are being serious or just joking.	- .36	
Is good at playing "hide and seek" (e.g. is hard to find, does not make give-away noises).		
Talks about how her/his beliefs have changed over time (e.g. "I used to think that drinking from a cupis hard, now I think it's easy").	.82	

Table Continue…

Items	Factor	
	1	2
Talks about people's mistaken beliefs (e.g. "He thought it was a dog but it was really a cat"; "I thought mommy was coming but it was really daddy").	.86	
Understands that hurting others on purpose is worse than hurting others accidentally.	.54	
When given an undesirable gift, pretends to like it soas not to hurt the other person's feelings.		. 90
When talking on the phone, behaves as if the listener can actually see her/him (e.g. assumes that thelistener knows what s/he is wearing).		- .39
Understands that different people can have different feelings about the same thing (e.g. one child likes adog but another child is scared of it).	.80	
Takes into account what others want (e.g. takes turns, shares toys, compromises with other children regarding which game to play).	.70	

Table Continue…

Items	Factor	
	1	2
Talks about the difference between the way things look and how they really are (e.g. "It looks like a snake but it's really a lizard").	.82	
Talks about conflicting emotions (e.g. "I am happy to go on vacation, but I am sad about leaving friendsbehind").	.61	
Is good at directing people's attention (e.g. points atthings to get others to look at them).	.68	
Talks about the difference between intentions and outcomes (e.g. "He tried to open the door but it was locked").	.72	
Understands that telling lies can mislead other people.	.51	
Talks about the difference between what people want and what they actually get (e.g. "She wanted a puppy but she got a kitten").	.59	

Note. The rotation solution was Oblimin Rotation. The analysis was carried out in SPSS 28.

Appendix R

Structural Matrix for Translated CSUS Using Principal Axis Factoring

Items	Factor	
	1	2
Talks about differences in what people like or want (e.g. "You like coffee but I like juice").	.86	
Uses words that express uncertainty (e.g. "We mightgo to the park"; "Maybe my shoes are outside").	.75	
Realises that experts are more knowledgeable than others in their specialty (e.g. understands that doctors know more than others about treating illness).	.66	
Has trouble figuring out whether you are being serious or just joking.	- .36	- .35
Is good at playing "hide and seek" (e.g. is hard to find, does not make give-away noises).		
Talks about how her/his beliefs have changed over time (e.g. "I used to think that drinking from a cupis hard, now I think it's easy").	.80	

Table Continue…

Items	Factor	
	1	2
Talks about people's mistaken beliefs (e.g. "He thought it was a dog but it was really a cat"; "I thought mommy was coming but it was really daddy").	.85	
Understands that hurting others on purpose is worse than hurting others accidentally.	.56	
When given an undesirable gift, pretends to like it soas not to hurt the other person's feelings.		.85
When talking on the phone, behaves as if the listener can actually see her/him (e.g. assumes that the listener knows what s/he is wearing).	- .35	- .46
Understands that different people can have different feelings about the same thing (e.g. one child likes a dog but another child is scared of it).	.75	
Takes into account what others want (e.g. takes turns, shares toys, compromises with other childrenregarding which game to play).	.72	

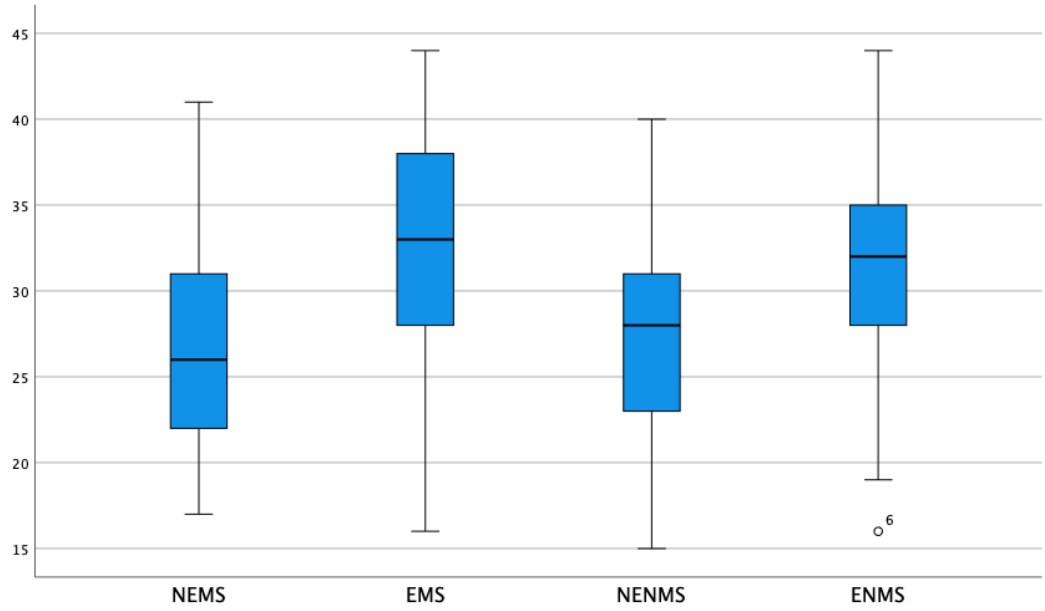
Table Continue…

Items	Factor	
	1	2
Talks about the difference between the way things look and how they really are (e.g. "It looks like a snake but it's really a lizard").	.79	
Talks about conflicting emotions (e.g. "I am happy to go on vacation, `but I am sad about leaving friends behind").	.66	.35
Is good at directing people's attention (e.g. points atthings to get others to look at them).	.72	.34
Talks about the difference between intentions and outcomes (e.g. "He tried to open the door but it was locked").	.78	.39
Understands that telling lies can mislead other people.	.60	.46
Talks about the difference between what people want and what they actually get (e.g. "She wanted a puppy but she got a kitten").	.67	.44

Note. The rotation solution was Oblimin Rotation. The analysis was carried out in SPSS 28.

Appendix S

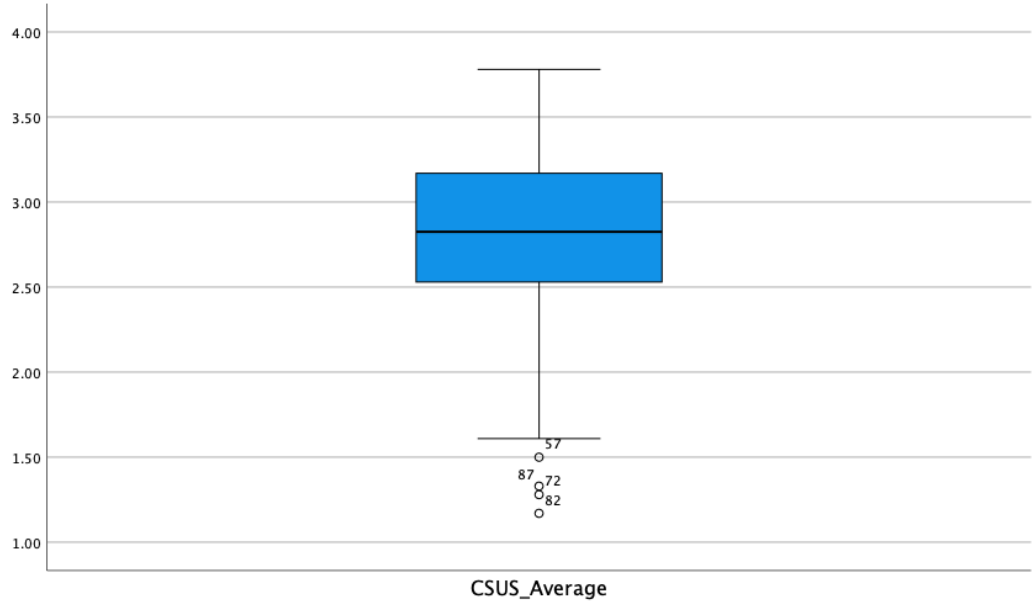
Boxplots for the Four Dimensions in Maternal Mental State Input Inventory (MMSII; Peterson & Slaughter, 2003)



Note. The graph was generated by SPSS 28.

Appendix T

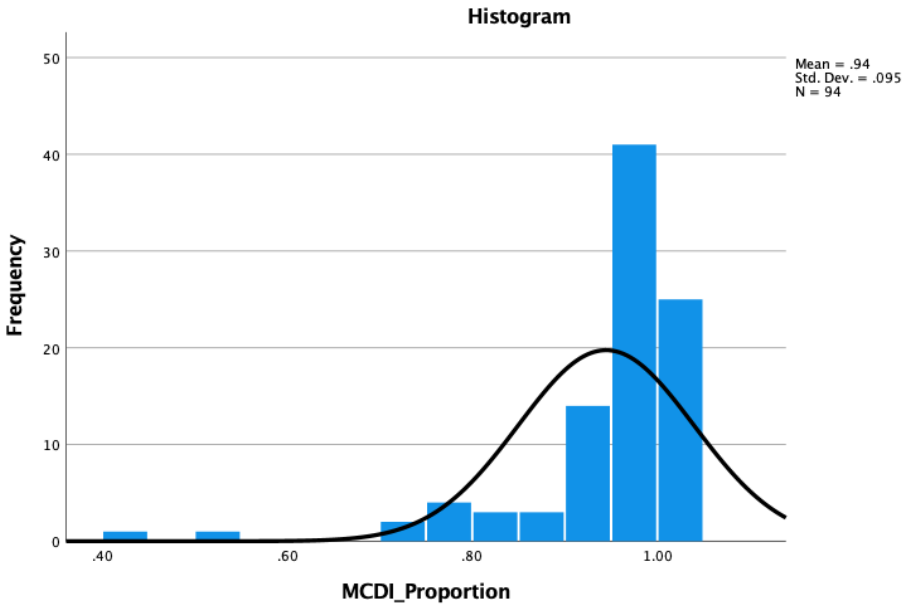
Boxplots for Children's Social Understanding Scale (CSUS; Tahiroglu et al., 2014)



Note. The graph was generated by SPSS 28.

Appendix U

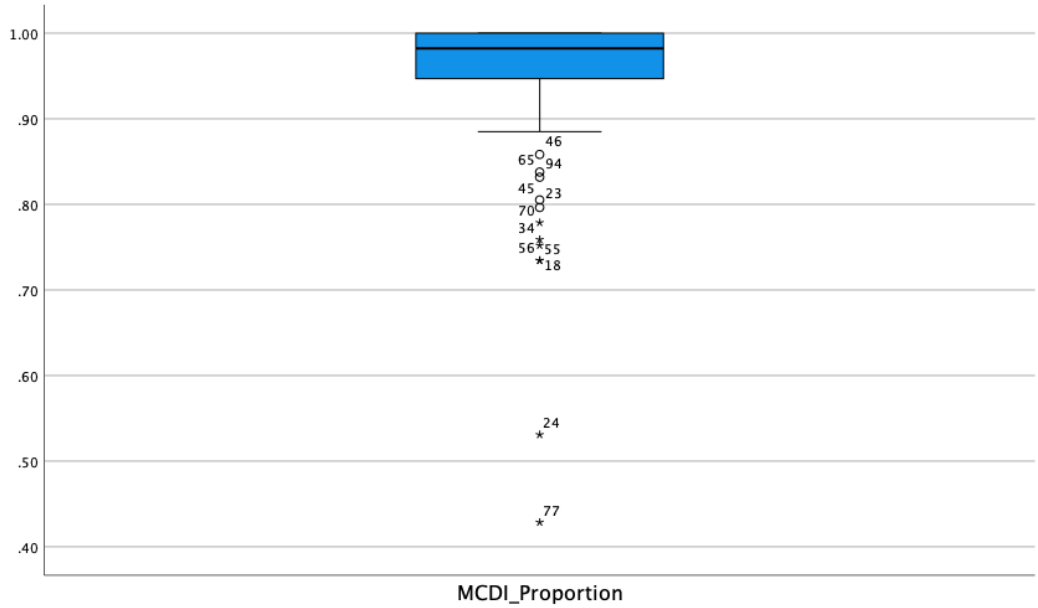
Histogram for Mandarin Communicative Development Inventory (MCDI; Tardif et al., 2008)



Note. The graph was generated by SPSS 28.

Appendix V

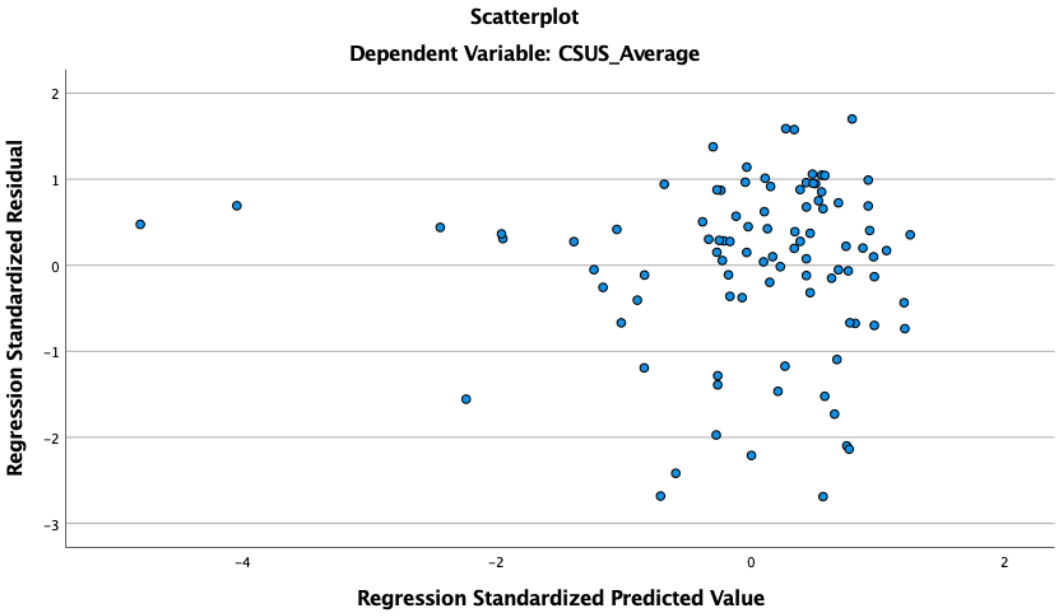
Boxplot for Mandarin Communicative Development Inventory (MCDI; Tardif et al., 2008)



Note. The graph was generated by SPSS 28.

Appendix W

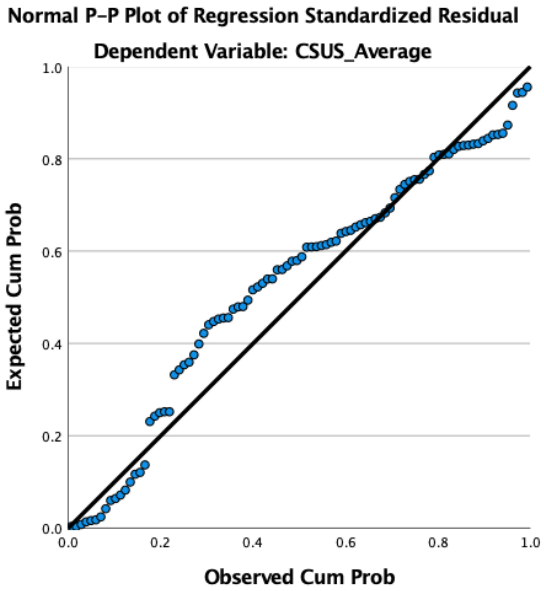
Scatterplot for Regression Standardised Predicted Residual as Having "CSUS_Average" as Predicted Value



Note. The analysis was carried out in SPSS 28.

Appendix X

Normal P-P Plot of Regression Standardised Residual as Having Having "CSUS_Average" as Predicted Value



Note. The analysis was carried out in SPSS 28.