THE UNIVERSITY OF QUEENSLAND

AUSTRALIA

Developing an Understanding of Mind: A View Across Cultures

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A thesis submitted for the degree of Doctor of Philosophy at

The University of Queensland in 2013

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<u>Abstract</u>

Cross-cultural research in child development is still very young compared to the body of literature in this area. While developmental researchers are trying to understand human development in general, most of the research is limited to studies from Western cultures. Theory of mind (ToM) is a topic in child development which has received considerable research attention in the last 3 decades (for reviews see Flavell & Miller, 1998; Wellman & Liu, 2004). However as with many other developmental questions, the majority of research on children's developing theory of mind has focused on Western cultures. In addition to that, much of the research on theory of mind to date has focused on one aspect of this multi-faceted phenomenon called false belief understanding. While false belief understanding is important to children's understanding of human behaviour, it is not the sole indicator of ToM. And although a mature theory of mind relies on multiple mental state concepts such as desires, intentions, knowledge, belief and emotions, a good deal of the developmental research that has focused on mental states other than false belief, has typically investigated only one subset of the range of mental state concepts. Theory of mind research therefore has come under fire with respect to assessment validity and generalizability across cultures (Bloom & German, 2000; Liu, Wellman, Tardif, & Sabbagh, 2008).

Although much research on theory of mind has traditionally used one or two tasks to assess children's understanding of the mind, Wellman and Liu (2004) developed a multi task scale to assess children's ToM understanding. In several studies carried out in the United States and Australia, researchers have found a robust sequence of ToM scale steps that children go through in gaining an understanding of mind. A first cross cultural study with Chinese children revealed similarities as well as differences among Chinese and American children in developing theory of mind concepts. Based on these findings and a broader recognition that the developmental sequence of ToM understanding is likely to be influenced by the child's cultural context, the purpose of my thesis was to investigate ToM development by (a) using this comprehensive ToM scale as well as individual theory of mind tasks and (b) testing samples of children from a non-Western culture of Iran.

In my first two studies I directly compared ToM conceptual development among 3 to 9 year old Iranian and Australian children. Results showed similarities as well as differences in development of these concepts. Firstly, Iranian children at all ages preceded their Australian peers in understanding knowledge access, while being behind in diverse belief understanding. Also Iranian children outperformed their Australian counterparts in understanding the relatively advanced concept of sarcasm. More importantly there was no difference between the two cultural groups in overall ToM understanding (reflected in composite scores), which shows neither cultural group was disadvantaged in terms of theory of mind understanding. In the third study, I took a more precise look at Iranian children's acquisition of two key ToM concepts: knowledge and belief. Here I found that Iranian children's performance in all knowledge tasks was more advanced than previously published data from American and Canadian children. In the final study, I looked at parental strategies that may be related to children's theory of mind development. With a procedure similar to Ruffman et al (1999) I presented several scenarios to parents which described daily situations that they

may face with their children. I found that Iranian parents reported using two disciplinary strategies not observed in Ruffman et al's sample, which I called *Silence* and *Social Norms*. Correlational analyses of parent reported disciplinary strategies and their children's ToM understanding revealed that parents' use of the *Silence* strategy was negatively associated with their children's understanding of diverse beliefs, a result that may help answer our previous question about why Iranian and Australian children's performance on this task differs. Several other significant associations were found between parental strategies and children's ToM understanding in Iran, in particular, children's ToM understanding was higher amongst those whose parents reported that they tended to *Discuss* issues when disciplining their children,

In general, this thesis contributes two important elements to theory of mind research which have largely been neglected in the literature: a more comprehensive picture of ToM development instead of only false belief, and a cross-cultural perspective.

Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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Publications during candidature

Shahaeian, A., Peterson, C. C., Slaughter, V., & Wellman, H. M. (2011). Culture and the sequence
of steps in theory of mind development. *Developmental Psychology, 47*(5), 1239-1247. doi:
10.1037/a0023899

Publications included in this thesis

Chapter 2 of this thesis is a co-authored publication.

Shahaeian, A., Peterson, C. C., Slaughter, V., & Wellman, H. M. (2011). Culture and the sequence
of steps in theory of mind development. *Developmental Psychology, 47*(5), 1239-1247. doi:
10.1037/a0023899

Contributor	Statement of contribution
Author ASH (Candidate)	Designing and planning, data collection, data analysis and writing (60%)
Author CP	Writing and editing (25%)
Author VS	Writing and editing (10%)
Author HW	Editing and reviewing (5%)

Contributions by others to the thesis

Professor Virginia Slaughter (principal advisor) and Dr Mark Nielsen (associate advisor) and
Professor Candida Peterson (associate advisor) provided advice in designing studies and feedback
in preparing and revising the drafts.

Statement of parts of the thesis submitted to qualify for the award of another degree

None

Acknowledgements

I would like to thank my academic advisors, Professor Virginia Slaughter, Dr Mark Nielsen, and Professor Candida Peterson for their helpful advice, direction and support during my candidature. I especially thank Virginia for her warm reassurance during the first year of my study, and her continuing to be a source of support and guidance for me when I needed, and Mark for his unfailing guidance at different stages of my candidature. Their combined wisdom and experience, and their willingness to share it, has been invaluable to me, and has helped me coming through to become a mature independent researcher.

I would also like to thank a few other people—friends, family and peers—without whom I would not have been able to complete this journey. First of all, my niece Toktam, who was, and continues to be, not only a great source of emotional support, but was also a big help during the testing and data-gathering phases of my research. She is also a creative architect who prepared a beautiful testing package for me, and helped design the figures which have appeared in several places throughout this thesis. I am also grateful to Behnam for drawing up the final figures included in this thesis. I thank my friend Hosein, whose assistance with Guttman analysis and Matlab was especially helpful during my second study. I also give my heartfelt thanks to my friend Tim, who helped me with a considerable amount of last minute editions. And finally, thanks to my students Neda, Natasha and Kim for their help coding the data used to obtain reliability in three studies.

I would like to give special thanks to the children and families who participated in my studies, and who took the trouble to travel to different places for the testing. I am also thankful to the UQ Graduate School for providing me with two Scholarships and a Travel Award to facilitate my work.

Being an international student, I was confronted with special challenges, and were it not for the support of some amazing people in my life, I am not sure I could have survived this difficult journey. I would like to thank Hesam for being there at every stage of my PhD research, and for helping me to grow. The friendship I share with him cannot be forgotten or replaced. I also thank my friend Bill, who was a great support throughout my candidature, and provided calm clarity and wisdom whenever I needed it.

And finally, to Reggie: thank you for making my life happier, more challenging, and for making me feel more special, and more mature.

Above all, I give thanks to my parents, sisters and nephews. They have continued to give me strength, unconditional love and encouragement through all these years that we've been apart. For that, I will always be grateful.

<u>Australian and New Zealand Standard Research Classifications (ANZSRC)</u>

ANZSRC code: 170102 Developmental Psychology and Ageing, 100%

<u>Fields of Research (FoR) Classification</u>

FoR code: 1701, Psychology, 100%

Author's personal note:

I would like to dedicate this work to the children of Iraq and Afghanistan, to all those children brought up amidst war and battle. I grew up with the Iran-Iraq war. I was born just as it was getting started. I spent eight years of my childhood waking up with nightmares of soldiers invading our house and my family having to flee. I have seen my neighbour's house bombed, and her children die. I dedicate this thesis to all of those children who must, unfairly, face such realities, when developing a theory of mind.

I wish for a world in which no child has to wake up in fear...·

DEVELOPING AN UNDERSTANDING OF MIND:

A VIEW ACROSS CULTURES

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Chapter 1

Introduction

Theory of mind and mental states

To explain the behavior of others it is necessary to understand that actions are rooted in internal mental states such as desires, intentions, beliefs, knowledge and emotions. That is, behavior is not simply a matter of events from the outside world but the product of outside events being processed through people's minds. This folk psychology approach to day-to-day interaction is referred to as theory of mind (ToM). It explains why we do what we do and in which process we make sense out of the world around us. Imagine if you go to the fridge to get an apple, this means you *want* an apple (you may be hungry), you *like* apples and also you *think* there is an apple in the fridge. All these inferences come out of one simple behavior. In such a day-to-day psychology we reason about the origins and outcomes of mental states, meaning that we try to provide explanations and predictions for what people do and expect by what they want, think, know and hope for (Wellman, 2007). You go to the fridge to get an apple because you are hungry and you like apples, and you will be disappointed if there aren't any in the fridge. Understanding behavior in this way is a core psychological attitude, which enables us to engage socially and communicate effectively. How and when children gain this understanding has been the matter of considerable research interest.

Research on theory of mind in children goes as far back as the 1980s, when researchers were trying to understand if young children can distinguish reality from pictures, or mental from physical. For example if told about one person who is eating some food and one person who is hungry and thinking of food, can young children distinguish between the food which is real and can be touched or smelled and the food which is unreal? This research showed that children as young as 3 years old know that the image of the food doesn't exist and cannot be touched or smelled (e.g., Harris, 1991; Harris, Brown, Marriott, Whittall, & Harmer, 1991; Watson, Gelman, & Wellman, 1998). But this understanding is only a first step in gaining an understanding of mind and being able to explain behavior by referring to mental states. For more than 25 years theory of mind researchers have been trying to discover how children come to understand mental states and use that understanding for folk psychological reasoning. Also, do children gain an understanding of mind via some universal neurobiological maturation or through learning in day-to-day communication with adults and peers? For this purpose many tasks have been developed to assess theory of mind understanding in young children. These tasks assess children's ability to identify their own and others' mental states and mental processes, such as beliefs and desires, knowledge acquisition and emotion understanding. However the main focus of theory of mind research has been on one aspect called false belief.

False belief understanding

False belief refers to understanding that someone can act in a way that contradicts their intentions because of their incorrect knowledge of a situation. Imagine the apple and fridge example again. You have put an apple in the fridge but after you have left, a second person has taken out the apple and eaten it. Now when coming back, blind to this occurring, will you still go to the fridge to get the apple, even though there is no apple there anymore (Figure 1)? Why? Because you don't know the apple has been eaten (you have a false belief).
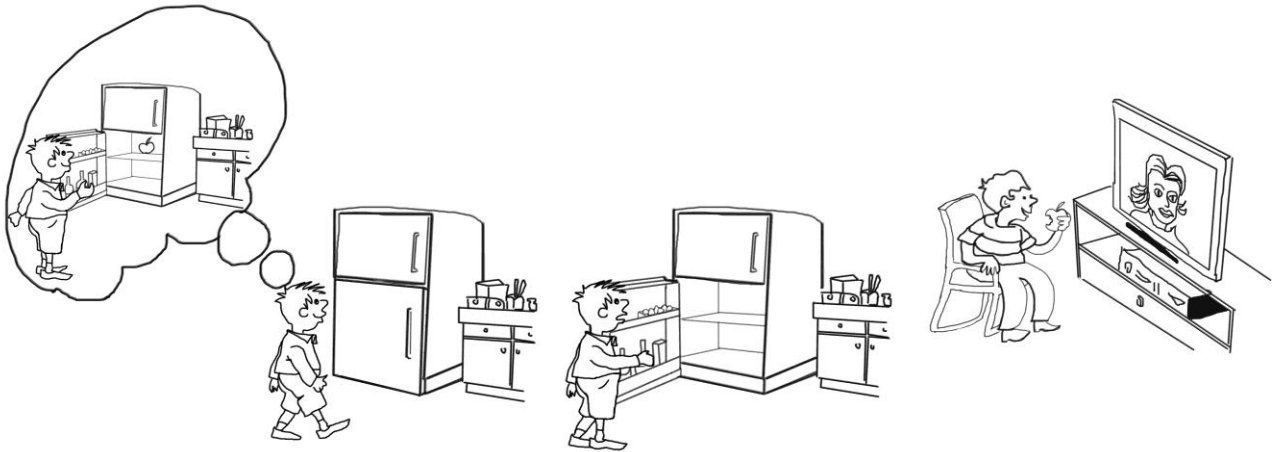

Figure 1- The example of apple and fridge to illustrate false belief understanding

In this example a third observer who wants to understand your behavior needs to distinguish between the reality of the event and your false belief, or lack of proper knowledge. Which means understanding that one acts based on her beliefs, and this knowledge can be different from reality. Numerous studies have investigated at what age children gain false belief understanding. Several tasks of false belief have been developed to assess this understanding. The example of apple is similar to a classical example of a false belief task called "change of location". In this change of location false belief task a doll called Maxi is presented to the child. Maxi puts his chocolate in a cupboard and leaves the room to play. While he is absent his mother comes and moves the chocolate from the cupboard to the drawer. Now the question is where Maxi will look for the chocolate when he comes back (Figure 2). In this task the child needs to realize that his or her new knowledge (that the chocolate is in the drawer) is different from Maxi's knowledge (who hasn't seen chocolate being shifted). So to pass the task the child needs to take Maxi's knowledge into consideration and not reality.

Many studies have shown that 3 year olds systematically fail such tasks by ignoring the protagonist's lack of knowledge and claiming that he or she will look for the object where it actually is, not where he or she has put it first (see Wellman, Cross, & Watson, 2001 for a review).
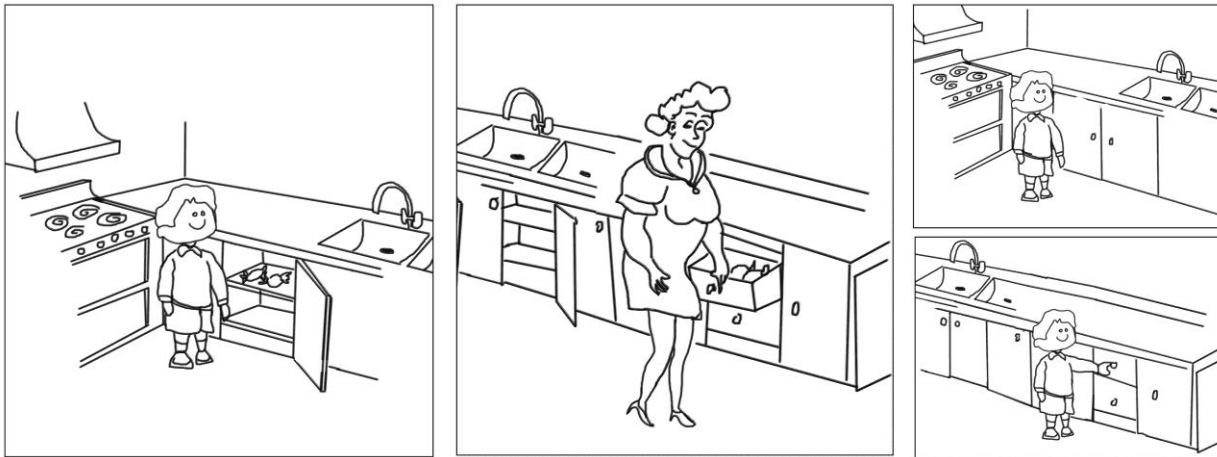

Figure 2- Maxi and chocolate (location false belief task)

A body of literature therefore has been devoted to investigating what factors help young children understand false belief. However false belief is not the only indicator of theory of mind. Indeed criticisms have been made against researchers relying on using a single task as an indicator of a complex developmental phenomenon (Astington, 2001). Theory of mind expands beyond false belief understanding to other mental concepts such as desires, knowledge and emotions. And even though 3 year olds fail tests of false belief understanding it has also been documented that children as young as 2 have some understanding of others' mental states such as desires (Wellman & Woolley, 1990). Therefore some researchers have tried to bring attention to other aspects of theory of mind such as desires and knowledge understanding (see Astington, 2001; Wellman, 2012).

Belief desire reasoning

Remember the example of the apple. You go to the fridge because you *want* an apple and you *believe* there is an apple in the fridge. Understanding both concepts together is important in theory of mind research because to be able to explain and predict behavior we need to consider both mental states together, and neither in isolation can give a complete picture of behaviors (Wellman & Woolley, 1990; Ziv & Frye, 2003). And even though both represent the same propositional attitude, their direction of fit is different. Beliefs show a mind to world direction of fit, meaning that a change in beliefs is needed if they don't fit to the world, but desires have world to mind direction

of fit, meaning the actions need to be changed in order to fit in with desires. If you want the apple and go to the fridge, not finding it there will change your belief from "there is an apple in the fridge" to "there is not an apple in the fridge". But still your desire for an apple is unfulfilled thus the fridge is not your target anymore. You may go to the shops and buy some apples. So to be able to interpret your action from the fridge to the shops one needs to consider your desires and beliefs together. However despite the importance of belief-desire understanding, research has been predominantly dedicated to belief understanding at the expense of desires (see Flavell & Miller, 1998; and Wellman et al., 2001 for reviews).

Going back to false belief acquisition, some researchers have discussed that 3 year olds failing on false belief understanding is the result of their attention to the desire (Wellman & Woolley, 1990). So in our example, young children will answer that you will look for the apple where it actually is, not where you have put it, because there is not an apple in the fridge and you "want" an apple. This attention to desires and intentions misleads young children to ignore your belief that "the apple is in the fridge". They thus say you should look for the apple where you can actually find it, not where you think it is (K. W. Cassidy, 1998; Wellman & Bartsch, 1988; Wellman & Woolley, 1990).

Tests of belief-desire reasoning have shown that children as young as 2 years pass desire reasoning tasks (Wellman & Woolley, 1990). For example Wellman and Woolley (1990) compared a not-own desire with not-own belief task. In the not-own desire task children are presented with two options to play (for example play basketball in the playground or play with a toy inside) and told to choose their favorite. When a choice is made children are told that another child doesn't like to do what they like and rather likes to do the opposite. Children are then asked to predict the other child's action. In the not-own belief, the same situation happens but there is a belief about location of a lost object that a character wants to find. While 3 year olds answer both questions at a level better than chance, they correctly answer the not-own desire task significantly more than the not-own belief one. Other studies have also claimed that understanding of desires is easier than beliefs for young children. For instance Flavell, Flavell, Green, and Moses (1990) compared the children's preferences with another protagonist about a fact belief (a candy box which contained mint) versus a value belief (a yummy or yucky tasting cookie). They compared situations that the protagonist explicitly says he thinks the content of the box is different from what it actually is. In value belief situation the protagonist says that he likes or dislikes a smell or taste. They found that children have less difficulty understanding diversity in value belief compared to fact belief, suggesting that desire understanding happens earlier than belief.

Putting this together, even though belief and desire understanding are both important in understanding actions, research attention has been focused on beliefs and not desires. This has led to calls for research to move away from a focus on false belief to encompass all aspects of theory of mind (Astington, 2001).

Knowledge acquisition

When we talk about beliefs, one needs to consider that they come out of knowledge whether it is current or past, or whether it is false or true. To understand others' beliefs we need to consider their access to the information and the history of their knowledge (what they have seen, or heard). So another aspect of theory of mind that helps us to communicate better is "access to knowledge". It is also important to know how knowledge is gained for example seeing leads to knowing and someone who hasn't seen something happening, doesn't know about it.

In pioneering research Wimmer, Hogrefe, and Perner (1988) investigated whether young children understand that seeing leads to knowing and not seeing to ignorance. Boxes with unknown contents were shown to pairs of children, and only one child in the pair was allowed to open the box. Then children were asked if they knew what was inside the box and if their peer knew what was inside. Three year olds and some 4 year olds did not recognize that their peer only knew about the content of the box if he or she had looked inside. However other studies have not supported this. For instance Pratt and Bryant (1990), in 3 similar experiments presented children with a box, then they were asked whether a third person who had looked or had not looked inside the box knew about the content. According to Pratt and Bryant (1990) even 3 year olds can distinguish between the knowledge and ignorance of someone who has seen and someone who hasn't seen the box. In other research by Gopnik and Graf (1988) children have accessed to one of 3 sources of information to know about contents of a set of drawers: looking, being told and figuring out. And then they are asked how do they know the contents of the drawer. Their findings show that 3 year olds fail in reporting the source of their knowledge, for example they say they have looked inside while they have been told about the content (Gopnik & Graf, 1988). These studies show that in addition to acquiring an understanding that beliefs can be false, young children also go through a developmental process to acquire an understanding of how beliefs are formed in people's minds.

Emotion understanding

So far research is presented showing that by age 3, children have some understanding of mental states. From ages 3 to 5 children recognize that people's interactions with the environment lead to the formation of beliefs, and that people's actions are guided by their intentions, desires and beliefs. Another important aspect of our everyday social life is emotion understanding. In order to fully function and communicate in the social world we need to consider people's emotions and

causes of those emotions: what makes them happy and what makes them sad. Emotions may be the product of behavior. So while desires and beliefs are underlying aspects of behavior, emotions can be outcomes of behavior. In order to be able to communicate effectively, we need to be able to think in terms of, not only people's desires, knowledge, and beliefs, but also emotions (Wellman, 2007).

Studies on emotional understanding have shown that this social achievement is an extended process (O'Brien et al., 2011; Pons, Harris, & de Rosnay, 2004). This starts by distinguishing different emotional expressions. By age 3 or 4 children can name different emotional expressions such as happy, sad, angry or neutral (Cutting & Dunn, 1999; Hughes & Dunn, 1998). At a similar time children come to understand that external events cause emotions. For example a toy makes their friend happy, and if the toy breaks she becomes sad (Fabes, Eisenberg, Nyman, & Michealieu, 1991). After this, at around 6 or 7 years children can make a link between false belief and emotion understanding. This can be illustrated by the classical fairy tale of Little Red Riding Hood (Figure 3). For younger children, when they hear the wolf is waiting for Little Red Riding Hood, they can't link between her false belief and her emotions, which is she is looking forward to see her grandma and she is unaware of the wolf. Thus when she knocks on the door, she should be happy (the result of her false belief), but still young children think that she should be afraid; afraid of the wolf she doesn't know about! (example from Harris, de Rosnay, & Pons, 2005).
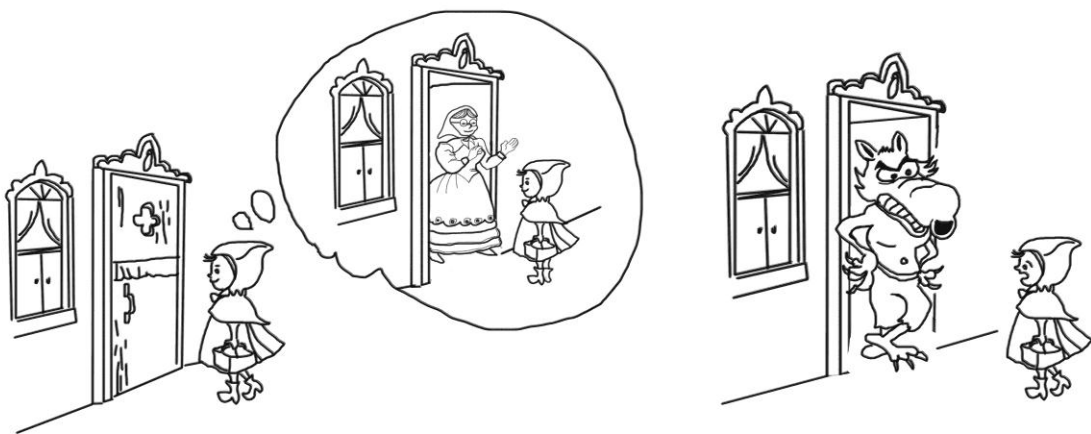

Figure 3: The emotion belief illustration (when Little Red Riding Hood knocks on the door she is waiting for her grandma and not the wolf)

And in a final stage children come to understand that people can hide their emotions. By simply knowing the expression of emotions on one's face you cannot understand how they really feel. People can feel something but show something else. Plus, in social situations people regulate their emotions, it is not always that they show their feelings on their faces. Understanding emotion regulation and the fact that people can deliberately hide their emotions happens later in children's theory of mind development (Gross & Harris, 1988; Harris, 1989; Jones, Abbey, & Cumberland, 1998).

Even though this understanding develops by age, still there is a high level of individual differences in children's understanding of emotions. One of the important factors studied in the literature related to children's understanding of emotions is the role of socialization by parents (J. Cassidy, Parke, Butkovsky, & Braungart, 1992). Parents' expression of emotions and talk about emotional states are important factors related to children's emotional understanding (Denham, Zoller, & Couchoud, 1994). Dunn, Brown, and Beardsall (1991) have found correlations between family factors such as family talks about emotions and siblings' communication, and children's later understanding of emotions. Other evidence comes from a reverse effect on children who are raised in an environment lacking emotional expression or high in expression of negative emotions. These children show lower levels of effective emotional development in social situations such as empathy (Denham et al., 1994; Gottman, Katz, & Hooven, 1996). Similarly, a good deal of research has shown that children whose parents engage them in frequent conversations about mental states such as desires and beliefs, outperform their peers who receive less conversational input about mental states on theory of mind tasks (Ruffman, Slade & Crowe, 2002; Slaughter, Peterson & Mackintosh, 2007).

Culture and theories of mind

As elaborated in previous sections, theory of mind refers to how people explain others' behavior in terms of internal mental states. These can be what people like or dislike, what they think about certain things and how they feel. It might then be reasonable to assume that cultural differences influence this aspect of every day psychology. People in different cultures have different ways of communicating and how these cultural aspects affect psychological phenomena has been documented in various fields. Evidence exists showing cultural differences in the way people perceive their social world (see Nisbett, 2003; Nisbett & Masuda, 2003; Triandis, 1993). For instance, American and Saudi college students were asked to remember a situation in which self or another person (a family member) performed a helpful behavior (for example donating blood) or a harmful behavior. Then they were asked to explain why they think that behavior occurred (for example, he was a bad person, or he forgot about it). Results show that Americans have a great

tendency to explain behavior by referring to internal features, significantly more so than Saudis (Al-Zahrani & Kaplowitz, 1993). These differences in attributing motives to behavior encompasses theory of mind, that is, considerations of how mental states influence behavior. Given that there are documented cultural differences in these attributions, it can be hypothesized that cultural differences may exist in patterns and timing of developing theory of mind concepts. Also different cultures have different emphasis on concepts such as belief, knowledge, learning, and emotions. So it is also reasonable to propose that children may come to understand these mental concepts in different order and at different ages.

Research on theory of mind understanding, to date, is predominately limited to Western American and European cultures (for reviewes see Wellman, 2012; Wellman et al., 2001), and very few studies have been conducted elsewhere (e.g., Avis & Harris, 1991; Callaghan et al., 2005; Tardif & Wellman, 2000). In addition most cross-cultural research has focused on when children in different cultures gain false belief understanding and results are controversial. For example, one study in which children from five different cultures including India, Canada and Peru were tested, suggested universality in acquisition of false belief understanding (Callaghan et al., 2005). However other studies including children from cultures with similar levels of education, economics, cultural practices and geographical proximity such as Italy and Britain (Lecce & Hughes, 2010), Hong Kong and mainland China (Liu, Wellman, Tardif, & Sabbagh, 2008) and Japan and Korea (Oh & Lewis, 2008), show differences of up to two years in the acquisition of false belief understanding. What this suggests is that more diverse samples are needed to be able to get a universal picture of ToM development and also attention to different aspects of ToM and not just false belief understanding (e.g., Lillard, 1998; Liu et al., 2008; Wellman, 2012). Theory of mind research requires reorientation from false belief to multi-aspect theory of mind assessments, and from Western, American and European cultures, to assessment of children from wide variety of cultures around the world.

Other associates

Research in Western cultures shows that individual differences among children can be linked to parental and family factors such as discussions inside a family, presence of sibling and parental strategies (Brown, Donelan-McCall, & Dunn, 1996; Randell & Peterson, 2009; Ruffman, Perner, & Parkin, 1999). It is argued that the more children are encountered with discussion about mind the sooner they develop an understanding of mind. Evidence come from studies showing that number of siblings inside a family helps children gain theory of mind understanding earlier (Peterson, 2000). Also parents who use more mental states language facilitate mental state understanding in children (Adrian, Clemente, Villanueva, & Rieffe, 2005). In addition parents who

use discussion and emotion references have children with better understanding of mind compared to parents who use more of authoritative parenting strategies (Hughes & Dunn, 1998). However almost all these research is carried out in Western cultures and it is not clear if the way family and parental variables interact with children's understanding of mind is similar or different in various cultures. There are questions to be answered such as whether presence or absence of sibling brings a richer environment for understanding of mind for children in all cultures or this association is limited to Western countries. Also it is important to know how parental conversation, communication and strategies are linked to children's understanding of mind in difference cultures. There is evidence showing that how parents interact with their infants varies based on their cultural background (Bornstein, Cote, Haynes, Suwalsky, & Bakeman, 2012; Kärtner, Keller, & Yovsi, 2010; Richman, Miller, & LeVine, 2010). Therefore it is interesting to know whether these differences continue through early childhood and affect theory of mind understanding and how.

Therefore as an additional purpose of this thesis, was investigating sibling and parental influences on theory of mind development for Iranian children. In Studies 1 and 2 I have investigated effect of siblings on ToM development for both Iranian and Australian children. In Study 4 also, I have had a closer investigation of Iranian parent's disciplinary strategies and their children's ToM development. Findings are discussed in chapters 2, 3 and 5.

The current thesis

The aim of the present work is to investigate the universal and culture-specific aspects of theory of mind by studying children from major cities of Iran and Australia and including multiple theory of mind tasks. This research is of particular importance because the majority of cross-cultural research on theory of mind with urban children is limited to China (for a review see Liu et al., 2008). The current thesis comprises several studies of children from middle-class families in a large city in Iran and middle-class children from a large city in Australia. Iran's Muslim/Sufism background, religious practices, traditional costumes, calendar, language and history are very different from Australia and other Western cultures, and also divergent from China's Confucian, Buddhist and communist systems of thoughts and practices. However Iran shares an important feature with China, described as collectivist/interdependent cultural values (Shahaeian, Peterson, Slaughter, & Wellman, 2011), which differ from Western individualistic/independent cultural values. Studying Iranian children will provide the opportunity to look at the development of folk psychology in a culture that differs in several aspects from cultures studied before.

In two direct cross-cultural comparisons, I investigated Iranian and Australian children's theory of mind development using a comprehensive assessment scale. These two studies are

presented in Chapters 2 and 3. In Chapter 4 I extended my research with a detailed examination of the development of several theory of mind concepts among Iranian children from 3 to 5 years of age. In my attempt to understand what accounts for differences between two cultures, Chapter 5 is designed to look at the parenting influences on theory of mind understanding. In the final chapter which is a general discussion, I have elaborately discussed the pattern of findings across my studies and summarized the empirical and theoretical contributions that my research adds to the literature. The ordering of the chapters is based on the order in which the studies were conducted. After each chapter, references of that chapter have been presented for the convenience of the reader. This is a "thesis by publication" which means that each study has been written as a stand-alone journal article with the references for each chapter are listed at the end of the chapter rather than in one comprehensive list at the end of the thesis. As such, there is some repetition across the literature review sections that introduce each chapter/study. Chapter 2 (Study 1) has been published in the journal of *Developmental Psychology*, Chapter 3 (Study 2) has been re-submitted to the *Journal of Cross Cultural Psychology* and Chapter 4 (Study 3) and chapter 5 (Study 4) are ready for submission.

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Chapter 2

Culture and Sequence of Steps

Culture and sequence of steps in theory of mind development

Published in *Developmental Psychology*

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Keywords*:* theory of mind, culture, parenting, siblings, preschoolers

Abstract

To examine cultural contrasts in the ordered sequence of conceptual developments leading to theory of mind (ToM), we compared 135 3-to 6-year-olds (77 Australians; 58 Iranians) on an established 5-step ToM scale (Wellman & Liu, 2004). There was a cross-cultural difference in the sequencing of ToM steps, but not in overall rates of ToM mastery. In line with our predictions, these children from Iran conformed to a distinctive sequence previously observed only in children in China. In contrast to children from Australia (and the U.S.A.), knowledge access was understood earlier than opinion diversity in Iran, consistent with this collectivist culture's widespread emphasis on filial respect, dispute avoidance and acquiring knowledge. Having a sibling was linked with faster overall ToM progress in Australia only, and was not related to scale sequences in either culture.

Culture and the Sequence of Steps in Theory of Mind Development

With the acquisition of a theory of mind (ToM), children come to understand people's behavior as the product of their internal, subjective mental states including desire, emotion and belief. For the last 25 years, most of the research on this crucial development has relied on a single marker of ToM: the inferential false belief test (Dennett, 1978). Children pass this test by accurately predicting the actions or thoughts of protagonists with reality-discrepant beliefs that the child does not share. Most typically-developing children in all cultures so far examined fail at age 3 (Wellman, Cross & Watson, 2001). Yet by age 5 or 6, success on the task is so widespread as to suggest that "understanding of belief and, relatedly, understanding of mind exhibit genuine conceptual change during the preschool period" (Wellman et al., 2001, p. 655). Debate currently surrounds whether this is via the pre-ordained maturational unfolding of a neurobiological mindreading module (e.g., Leslie & Thaiss, 1992) or shaped and nurtured via the uniquely human social and conversational experiences all societies provide for their young (e.g., Astington, 2001).

Cross-cultural comparisons can help address these contrasting accounts. However, cross-cultural research to date has yielded contradictory evidence. Thus, some studies have suggested uniform ages of false belief acquisition in cultural settings as diverse as the contrasts between urban middle-class Europe or North America and either (a) a remote bush community in west Africa (Avis & Harris, 1991), (b) an impoverished Peruvian mountain village (Callaghan et al., 2005), or (c) a Polynesian settlement in Samoa (Callaghan et al., 2005). Yet other studies have shown variations of up to two years in the average age for passing false belief tests even between highly similar industrialized societies like Canada versus the U.K. (Wellman et al., 2001), Japan versus Korea (Oh & Lewis, 2008), or mainland versus Hong Kong China (Liu et al., 2008)).

This inconsistency may partly reflect "the danger in letting a single task become a marker for complex development" (Astington, 2001, p. 687). ToM conceptually encompasses a range of mental states including emotion, intention and desire as well as belief, and recent evidence suggests that false belief mastery is just one step in a coherent developmental progression of folk psychological insights stretching back though toddlerhood and forward into the school years (e.g., Pons, Harris & de Rosnay, 2004; Wellman & Liu, 2004). Both to further clarify the timing of ToM mastery and to shed new light on socio-cultural influences on the acquisition of psychological understanding, ToM must be examined through a wider lens than just false belief.

Pioneering this approach, Wellman, Fang, Liu, Zhu and Liu (2006) used a five-step developmental scale of ToM understanding to compare Chinese-speaking preschoolers in Beijing with English-speaking preschoolers in the U.S.A. The ToM scale (Wellman & Liu, 2004) had previously been well validated and shown, via both Guttman and Rasch analyses, to identify a

reliable developmental sequence of mental state concepts in which progress to any later scale step was contingent on mastery of all earlier ones. Preschoolers in the U.S.A. mastered the steps in the following order: diverse desires (DD), then diverse beliefs (DB), then knowledge access (KA), then false belief (FB) and finally, hidden emotion (HE). The same sequence has been shown to replicate exactly for English-speaking preschoolers in Australia (Peterson & Wellman, 2009; Peterson, Wellman & Liu, 2005) and for preschoolers in Germany (Kristin, Thoermer, Hofer, Aschersleben, & Sodian, 2006).

Yet, in their Chinese sample, Wellman et al. (2006) observed an intriguing cross-cultural difference. Despite passing the same total number of scale steps as U.S. children at equivalent ages, task ordering in China was different. Relative to the above order observed for English-speakers, the Beijing preschoolers reversed the DB and KA steps to reveal a scale sequence that, while just as reliably consistent across children as the original U.S. one, placed expertise with knowledge access (people who perceive an event know about it) reliably ahead of belief diversity (different people have different ideas and opinions about the same thing). Longitudinal evidence (Wellman, Fang & Peterson, in press) supports this cross-cultural contrast by showing that when individual Chinese, U.S. and Australian children are tested repeatedly on the scale as they grow up, their individual orders of progress conform to their own country's specific cross-sectional sequence.

The contrast between U.S. and Chinese children suggests that "culturally shaped differences in input are at work" (Wellman et al. 2006, p. 1080) in ToM's progressive development. On this hypothesis, systematic community variations in parenting philosophies, conversation and socialization practices might draw certain mental state concepts to children's attention before other ones (Astington, 2001).

Any country encompasses multiple cultural communities and varied practices, making global cultural distinctions problematic. Nonetheless qualified generalizations can be appropriate. Thus, many middle-class samples in the U.S.A. (like those in Australia) evidence individualistic, independent views of personhood (Greenfield, Keller, Fulingni & Maynard, 2003; Nisbett, 2007) where children are encouraged to think for themselves, to develop their own ideas, to assert their opinions freely and to engage in reasoned discussion without privileging the traditional wisdom of elders over the creative new ideas of the young. It is conceivable that this style of childrearing leads many children in the U.S. and Australia to form initial conceptualizations of mind in terms of differences of opinion, thus explaining their early mastery of the DB task.

Contemporary, middle-class Chinese samples, by contrast, experience collectivist, interdependent cultural practices (Greenfield et al., 2003; Nisbett, 2007) where many parents teach filial respect, emphasize the acquisition of well-established knowledge, and encourage children's conformity to the cultural models, rules and traditions conveyed by their elders rather than self-

assertive expression of their own independent points of view. Such an approach to childrearing may redirect ToM development in many Chinese children so that key concepts of mind are initially constructed around the insight that people can be knowledgeable versus ignorant, rather than that people are often diverse in their opinions and beliefs.

Underwriting these generalities, research asking parents about their goals and practices has shown that samples of parents in individualistic communities, such as middle-class parents in the U.S.A., often highly value children's self-expression, self-assurance and independence. Thus, in their beliefs and timetables for their child's development, U.S. mothers of Anglo background (e.g., Mosier & Rogoff, 2003) and Australian mothers of similar background (e.g., Goodnow, Cashmore, Cotton & Knight, 1984), often expect and encourage their children's early independence of mind and self- assertive expression of their opinions. Despite important variability among families within the same culture, systematic comparisons between cultural groups often show significant differences between these parenting values and practices in these countries, as compared with those of parents from more collectivist or interdependent cultural backgrounds, who often instead place significantly higher value on young children's obedience, dependency and respect for elders (e.g., Harwood, Schoelmerich, Ventura-Cook, Schulze & Wilson, 1996). Thus in China, parents often discourage children's voicing of their independent views or opinions (Chen, Dong & Zhou, 1997) while striving to facilitate and foster their early mastery of culturally-shared knowledge and practical know-how (e.g., Johnston & Wong, 2002; Stevenson, Lee, Chen, Stigler, Hus, Kitamura & Hatano, 1990).

Wellman et al.'s (2006) findings could reflect these variable socialization practices, but other explanations are also conceivable. One illustrative alternative would instead emphasize the normative presence or absence of siblings. A large body of research shows that preschoolers with siblings in Australia, Canada, the U.K. and the U.S.A. master ToM concepts of false belief significantly ahead of only-children (e.g., Jenkins & Astington, 1996; McAlister & Peterson, 2007; Perner, Ruffman & Leekam, 1994; Ruffman, Perner, Naito, Parkin & Clements, 1998). Possible explanations for these findings include that siblings provide increased opportunities for interaction, for pretend play (Perner, Ruffman & Leekam, 1994), for family discussions of thoughts and feelings (Brown, Donellan-McCall & Dunn, 1996), and/or for disputes and disagreements (Randell & Peterson, 2009), factors which correlate with enhanced understanding of false belief. These same factors seem equally likely to highlight the nature and frequency of differences in belief or belief diversity as assessed by the DB task, although this has been unstudied. From this perspective, when interacting with child siblings at home preschoolers often gain rich and varied exposure to the diversity of people's opinions and beliefs.. Yet these potential stimuli to early mastery of the DB

task were unavailable to the Beijing preschoolers who took part in Wellman et al.'s study owing to their parents' conformance to their nation's one-child-family policy.

Less intriguing, but also worthy of consideration, is a methodological divergence between Wellman et al.'s U. S. versus Chinese DB tasks. The standard U.S. version of the DB task (Wellman and Liu 2004) and the one used for Wellman, et al.'s English- speaking children involves people's differing opinions about a pet's whereabouts. But in order to cope with their Beijing preschoolers' unfamiliarity with household pets, Wellman et al.'s Chinese children received a modified version involving beliefs about possible locations for an inanimate object (a coat that one person thought was in the cupboard and another believed was under the bed). Conceivably, this version might be harder than the original pet scenario (because inanimate objects do not move independently of human agency, and/or because putting coats under beds might seem odd or wrong).

Further cross-cultural research using the ToM scale is therefore needed to examine these possibilities and, more fundamentally, to examine the existence and nature of cultural variation in progressive mastery of interconnected facets of ToM. Furthermore, as others have noted (e.g., Callaghan et al. 2005; Liu et al., 2008) moving ToM research beyond its traditional concentration on middle-class North American, European and Australian preschoolers to include children in rarely-studied nations and cultures throughout the world could uncover new insights into the growth of social cognition. The present study addressed these aims.

We identified Iran as a nation that, like modern China, is collectivist or interdependent in its overall cultural orientation (e.g., Ghorbani, 2003; Greenfield et al., 2003; Rudy & Grusec, 2006). Even though Iran's dominant Muslim religious tradition differs in many ways from the Confucian/Buddhist/communist belief system that dominates contemporary China, there are similarities when it comes to normative Iranian and Chinese approaches to childrearing. Many Iranian parents, like Chinese parents (Chen et al., 1997), endorse collectivist childrearing goals (e.g., by strongly agreeing that children "should consider the needs of his or her family as more important than his or her own" (Rudy & Grusec, 2006, p. 72). In both Iran and China, there is likewise a widely-shared cultural emphasis upon teaching children to (a) to respect their elders, (b) defer their own views and wishes to parental authority, (c) avoid overt disputation with parents and other family members, and (d) curb individual desires when these conflict with family needs (e.g., Chen et al., 1997; Frank, Plunkett & Otten, 2010; Sharifzadeh, 2004; Stevenson et al., 1990). Sharifzadeh (2004) notes that many Iranian parents "prefer to see their children grow as interdependent members of the family rather than as independent individuals" (p. 396).

At the same time middle-class parents in Iran, like Chinese parents, often report placing high value on children's knowledge acquisition, with a willingness to sacrifice their own luxuries to

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improvetheir children's education and training (Chao, 1994; Sharifzadeh, 2004). As preschoolers, children in these cultures are often expected to acquire knowledge and academic skills more quickly, but autonomy and social skills more slowly, than in the West (Goodnow et al., 1984; Chen et al., 1997; Rudy & Grusec, 2001). Research shows that many middle-class Iranians place "high emphasis on academic and occupational achievement" (Frank, Plunkett & Otten, 2010, p. 1) consistent with findings for Chinese parents (Stevenson et al., 1990). Thus, while middle-class urban parents in both countries often score very highly on measures of warmth, affection and child-centeredness (Chao, 1994; Rudy & Grusec, 2006), this typically coincides with strong endorsement of a controlling, didactic and knowledge-oriented approach to their children's development and learning (e.g., Chao, 1994; Chen et al., 1997; Rudy & Grusec, 2006).

In these ways and others, Iran, like China, evidences interdependent, collectivist familial and educational practices that are firmly rooted in longstanding Eastern philosophical traditions that have evolved and endured in relative isolation from Westernizing influences. If these relate to the developmental sequence of preschoolers' ToM mastery, it is possible that Iranian children will follow the distinctive Chinese sequence.

By contrast with parallels between Iran and China, there are often sharp contrasts when samples of Iranian parents are compared with matched groups of parents from North America.Again, within in any particular nation or culture individual differences in parenting are clearly evident (Goodnow & Collins, 1990), however, when normative parenting patterns are considered, Iranian parents are often found to differ in important ways from parents of individualist cultural background in countries like Canada, the U.S.A. or Australia. For example, even after migrating to Canada, Iranian-born parents are found to score higher in collectivist parenting attitudes, and lower in individualism, than Anglo-Canadians (Rudy & Grusec, 2006). When it comes to monitoring children, setting rules, and applying discipline, Alizadeh and Andries (2002) note that in Iran "the dominant style is probably authoritarian" (p. 41) and Rudy and Grusec (2006) report higher authoritarian parenting scores for an Iranian migrant sample of parents in Canada than for a matched group of Anglo-Canadian parents. The reverse was true for these groups' levels of endorsement of authoritative parenting.

More directly related to our research samples, research shows that many Anglo-Australian parents favor an authoritative style of discipline (Leung, Lau & Lam, 1998; Nicholson, Phillips, Peterson & Battistutta, 2002) that encourages discussions of and family rules and imposes fewer constraints and expectations on children than the authoritarian style often favored in Asian cultures (Vinden, 2001) as well as by many Muslim families from the Middle East (Rudy & Grusec, 2006). Anglo-Australian parents likewise typically place greater emphasis than Middle Eastern parents do on the child's autonomy and self confidence (e.g., Goodnow & Collins, 1990; Rudy & Grusec,

2006). In line with a more authoritarian style of parenting (Rudy & Grusec, 2006), many middle-class Iranian parents, like parents in China (Chao, 1994; Chen et al., 1997), have been found to favor their children's suppression of anger and disagreement more strongly than comparable Anglo-North American parents (Diener & Lucas, 2004).

In total, therefore, a middle-class preschooler growing up in Iran or China may well have less chance than one being reared in Australia or the U.S.A. to be exposed to opinion diversity during family conversations or disputes. Nor is he or she as likely as a middle-class Western child to be encouraged by parents and teachers to express personal beliefs that oppose the prevailing adult point of view. Indeed, even after migration exposes them to Westernizing influences, many Iranian young people continue to deem autonomy seeking and the challenging of parental viewpoints to be improper and disrespectful (Frank et al., 2010). Similarly, one comprehensive cross-cultural study of groups of mothers of preschoolers who were either Anglo-Australians or recent migrants to Australia from the Middle East showed, via several converging methodologies, that the latter were significantly less in favor of their child's developing verbal negotiation and self assertion skills so as to be able to "resolve disputes with peers without fighting", "state own preferences when asked", "explain why he/she thinks so" or "get own way by persuading friends" (Goodnow et al., 1984, p. 197).

In sum, the current body of cross-cultural evidence on parental values, cultural models and practices combines to suggest that, on average, a middle-class preschooler growing up in Iran or China may gain less exposure than a middle-class Anglo-Australian or Anglo-North-American peer to people's overt disagreements and differences of opinion (i.e., the theme of the DB task on the ToM scale) and may gain more, rich, and varied exposure to experiences likely to promote an understanding of how knowledge is accessed, acquired and distinguished from ignorance (i.e., the themes of the KA task).

We therefore hypothesized (a) that Farsi-speaking preschoolers native to Iran would follow the developmental sequence of ToM task mastery (KA ahead of DB) that had previously been noted only among Chinese preschoolers in Beijing (Wellman et al., 2006) and (b) that these Iranian children would differ in sequence from a matched sample of Anglo-Australian preschoolers, who were predicted to conform to the standard developmental sequence (DB before KA) that has been observed in much previous research both in Australia (e.g., Peterson et al., 2005) and the U.S.A. (e.g., Wellman & Liu, 2004). If confirmed, this finding would help bolster arguments that cultural variations in parental attitudes and socialization practices exert an influence on the sequence of steps in children's acquisition of ToM. Moreover, our sample of Iranian children could potentially provide strong evidence for such a conclusion, or force revision of it, because unlike the Chinese preschoolers studied by Wellman et al. (2006), many were raised with siblings in the home.

For our research, we used exactly the same ToM tasks in Iran and Australia (see Table 1), presented in the same way in the child's native language (Farsi in Iran and English in Australia). Our complete matching of procedures included retaining Wellman and Liu's (2004) original (pet) scenario for the DB task. In addition, we directly explored the viability of the sibling-based interpretation of Wellman et al.'s (2006) Chinese findings. Indeed, we were able to make comparisons within and between cultures of ToM performance in relation to sibling status and family size, a variable that has not previously been examined in relation to ToM-Scale progressions.

Method

Participants

The sample of 135 preschoolers included 58 Farsi-speaking Iranians (24 boys: 34 girls; mean age: 4.79 years; range: 3.33 to 6.50) in Shiraz, Iran plus 77 English-speaking Australians (36 boys; 41 girls; mean age: 4.55 years; range: 3.00 to 6.42) in Brisbane, Australia. Thirty-one of the Iranian preschoolers were only-children (53%), whereas the rest (46%) had one child sibling (n = 21) or had two child siblings or more (n = 6). Sibling information was available for only 49 (64%) of the Australians. Of these, 8 (16%) were only-children, 27 (55%) had one child sibling, and 14 (29%) had two or more.

The Iranian children were all born in Iran and spoke the local language (Farsi) as their sole or primary language. Similarly, the Australian children we tested were all born in Australia and had English as their sole or primary language. We had no information on parents' birthplaces, but it is safe to assume that the vast majority of the Iranian parents were also born in Iran, since migrants to Iran from foreign countries comprise only .04% of Iran's total adult census population (Statistical Center of Iran, 2006).

To maintain a strong contrast between our two sample groups, we excluded any Australian child whose teacher reported that he or she might have a parent or grandparent of Asian or Middle-Eastern birthplace or ancestry. Although only 74% of the Brisbane adult population is Australian-born (Australian Bureau of Statistics, 2008), the above exclusion criterion made it unlikely that any of our particular Australian participants had migrant parents from non-English-speaking countries since, according to recent census figures, once migrants from Asia are excluded, 90% of Brisbane adults are of Anglo-Celtic background having been born either in Australia or in a similar English-speaking country (e.g., the U.K., New Zealand or Ireland) with a predominantly Anglo-Celtic cultural heritage (Australian Bureau of Statistics, 2008). While not specifically excluded, no indigenous Aboriginal Australian children happened to be included in this study's sample.

As cities, Shiraz and Brisbane share similarities. Shiraz has a population of 1.2 million (Statistical Center of Iran, 2006), and is the sixth largest city in Iran, capital of the Fars province.

Brisbane has a population of 1.7 million (Australian Bureau of Statistics, 2008) and is the third largest city in Australia, capital of the state of Queensland. Both cities offer a range of high quality educational options to preschoolers and many middle-class families in each city avail themselves of these, even though compulsory education begins after preschool in both countries.

In both Iran and Australia, we recruited children from a similar set of public (fully government-funded) and private (fully or partially fee-paying) preschools and education-focused childcare centers that were all located in predominantly middle-class urban and suburban neighborhoods in each city. Precise information on family incomes was not available to us in either country owing to confidentiality constraints. However, indirect evidence based on population figures for each family's neighborhood of residence (e.g., the median rental cost and home purchase price in that neighborhood) suggests that vast majority of participants in both cultural groups in our sample were likely to be of middle-class socioeconomic status.

Parents in both samples were also likely to be highly educated. We had precise parental education information for 30 of our Iranian children (52%) whose parents reported to us the highest level of education that had been completed by the mother and by the father. Most (93%) of these Iranian parents were high school graduates (through the 12th Grade), all had done some high school, and 65% had studied at university. In total, 30% of these Iranian parents (33% of mothers; 27% of fathers) had completed their studies with a Bachelor's degree, while 18% (13% of mothers; 27% of fathers) had earned Masters or Ph.Ds. The 30 children with parental information were a haphazard sample based simply on test scheduling from each of the preschools, genders and age groups we tested in Shiraz. Thus their parents' educational levels likely approximate those for our Iranian group as a whole.

We had no direct data on parental education for our Australian sample, however, we have access to full maternal education data for an earlier cohort of children recruited two years previously from exactly the same set of preschools. This is likely to approximate maternal education for the present Australian group, especially since the preschools' catchments were so stable that a number of the children we tested were the earlier cohort's younger siblings. As reported by Randell and Peterson (2009), 98% of the 54 mothers in the earlier cohort had completed high school (12th Grade), all had done some high school, and 55% had completed university degrees. There was no significant difference in the proportion of mothers with, versus without, university education in the present Iranian sample (47% vs. 53%) versus this earlier Australian cohort (44% vs. 55%), *Chi Square* (1) < 1, N = 84, *p* > .50.

In terms of ethnicity (a variable that can be defined as the conjunction of religious affiliation with native language and country of birth: Australian Bureau of Statistics, 1995), the Iranian children were, as noted above, Farsi speakers from Farsi-speaking Persian families. We did not, for

ethical reasons, ask parents in either culture to state their religion. Nevertheless, for the vast majority of our Iranian group, family religious background was almost certainly Muslim. Not only is Islam the state religion of Iran, but Muslims comprise 98% of Iran's census population (Statistical Center of Iran, 2006) and parents of preschoolers belonging to the 2% non-Muslim minority typically elect to send their children to special denominational (e.g., Christian, Jewish) preschools that we did not recruit from. Population statistics provide less guidance as to the likely religious background of our Australian group but it is very unlikely that any of them were Muslim. Thirty-one percent of the Queensland adult population reports no religious affiliation at all, while 66% identify with various Christian faiths (Australian Bureau of Statistics, 2008).

Families were recruited in both countries via an invitational letter to parents, distributed by the child's preschool teacher and seeking volunteers. No monetary or other tangible incentive was offered or given to participating families. All children who took part had written parental informed consent and gave their own willing verbal assent. The study had ethical approval from all relevant university and school institutional review bodies.

Procedure, Tasks and Scoring

Each child was tested individually at the preschool by an experienced local graduate research assistant who was a native speaker of the child's language (Farsi or English) but was unfamiliar to the children prior to the onset of testing. Table 1 includes brief descriptions of the five ToM tasks we used. All tasks, stimuli, questions and procedures were constructed identically in both cultures. They were administered in the same manner in both Iran and Australia in a single testing session lasting 15 to 20 minutes. Apart from three small changes, the tasks were the same as their original versions described by Wellman and Liu (2004: see Appendix on p. 538-539 for complete details). Our three changes were: (a) we reduced children's memory burdens by substituting "the girl" or "the boy" for all proper names ("Linda", "Matt", etc.), (b) we ensured local familiarity in both Iran and Australia by using a cake instead of a cookie for DD task and a candy box rather than a bandaids box for the FB task, and (c) we added a control question to the HE task, as described below. (To reiterate, we did *not* change the DB task, so that Wellman and Liu's (2004) original pet version was used in both Iran and Australia).

In developing the procedural protocols prior to testing, back-translation from Farsi to English ensured that task narratives and questions were comparable to one another, and had the same focus, in both cultures. In their initial scale development, Wellman and Liu (2004) had carefully matched and counterbalanced all procedures, stimuli and formats across tasks so as to reduce the likelihood that any differential executive, memory or linguistic demands could plausibly account for observed differences in the relative difficulty of individual scale tasks. Each task had a

focal ToM test question and comprehension control question and we required accuracy on both of these before counting a child as having passed that task. A total ToM score (ranging from 0 to 5) summed these passes.

Following procedures established in Peterson, et al. (2005) the comprehension control question for the Hidden Emotion task asked children to explain their test question responses (e.g., "Why did the boy make his face look sad?"). Transcripts of these "Why" justifications from all children in each sample were independently scored by pairs of coders as either correct or incorrect. Initial agreement was 97% for the Iranian sample and 94% for the Australian sample, indicating that the scoring scheme was a reliable one for both cultures.

********* Insert Table 1 about here **********

Results

Table 1 shows the numbers and percentages Iranian and Australian children who passed each ToM Scale task. There were no significant differences between cultural groups in age, t (133) = 1.52, $p > .10$, or gender, *Chi-Square* < 1, nor in performance on the DD task, *Chi-Square* (1) = 2.05, N = 135, $p > .10$; or the HE task, *Chi-Square* (1) < 1, N = 135, $p > .50$. As predicted, however, the Iranians found the KA task significantly easier than the Australians did, *Chi-Square* (1) = 6.52, N = 135, $p < .02$, and the opposite held for DB, *Chi-Square* (1) = 11.67, N = 135, $p < .01$. Australians also passed FB more often than Iranians, *Chi-Square* (1) = 6.22, N = 135, $p < .02$. However, importantly, there was no significant cultural difference in the mean total of scale steps passed (ToM total: see Table 1), t (133) = 1.81, $p > .07$, consistent with previous evidence of similar rates of development in these two countries using false belief as the sole ToM index (Yazdi, German, Defeyter & Siegal, 2006).

To test our main predictions that the scale sequences for the Iranian preschoolers would evidence understanding knowledge access before belief diversity whereas the Australian preschoolers' sequences would reverse these steps, we selected all the children who passed either KA or DB but not both. Of the 28 such Iranian children, 26 (93%) passed KA only, whereas 18 of the 23 Australians (65%) passed DB only, statistically confirming the predicted cross-over pattern, *Chi-Square* (1) = 16.64, N = 51, $p < .001$. (Comparatively, in Wellman et al.'s (2006) sample, 18 of 28 (64%) Chinese children passed KA only and 15 of 22 (68%) Americans passed DB only).

As a further test, we examined the Iranian and Australian children's 5-step Guttman scale sequences. Guttman scaling techniques (Green, 1956) are strict, requiring an exact match between observed data and a perfectly ordered scale pattern in which no task is passed after the first one in

the sequence is failed. We tested our Iranian group's conformity to the China sequence, namely: (easiest to hardest) DD > KA > DB > FB > HE. Forty-three of the 58 children (74%) matched this sequence perfectly across all five steps (compared with 68% in China: Wellman et al., 2006). Conversely, 62 of 77 Australians (80%) matched the original U.S. scale sequence (DD > DB > KA > FB > HE), in line with previous Australian data (e.g. 87% of a previous Australian preschool sample: Peterson & Wellman, 2009). There was no significant difference between proportions of Iranian and Australian children conforming perfectly to their country's sequence, *Chi-Square* (1) <1, N = 135, *p* >.35.

Green's (1956) coefficient of replicability (Rep) assesses observed data's goodness of fit to a predicted Guttman sequence and achieves statistical significance at Rep = .90. The Iranian sample's Rep was a significant .94, similar to the earlier Chinese Rep of .93 for the same distinctive sequence. The present Australian group had a Rep of .95 that was equally highly significant, despite matching the original U.S. rather than the Iranian children's task ordering. In short, based on Green's (1956) primary[1] statistical scale index, both Iranian and Australian sequences were significantly scalable as well as being different from one another in exactly the manner we had predicted. That is, the vast majority of children in each culture progressed through all five steps of the ToM scale in the sequence that we had predicted based on our cross-cultural contrast hypothesis. Furthermore, the close match of the Iranian preschoolers' patterns to the ToM sequence observed for the Chinese children (Wellman et al., 2006), together with the clear contrast we found between our Iranian group's pattern from that for our Anglo-Australian preschoolers, was confirmed by scaling statistics as well as by the individual task comparisons reported above.

While potentially reflecting children's exposure to culturally-distinctive parenting, it was important to rule out possible alternative explanations. As outlined above, one of these was sibling status. In fact, there were more Iranian than Australian only-children (53% versus 16%). Nevertheless, when we compared the proportions of scale-consistent versus inconsistent only-children in Iran versus Australia, no significant difference emerged, *Chi Square* (1) = 3.32, N = 39, *p* > .06, and the same was true for sibling children, *Chi Square* (1) = 2.17, N = 68, *p* > .10. Nor were Iranian only-children more likely than Iranians with siblings to pass KA while failing DB

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[1] Green (1956) also offers a computational formula for an additional "optional" (p. 81) scale statistic, *I*, indexing the match of observed data to patterns arising, for any given set of marginal totals (i.e., success rates), purely by chance. This highly conservative measure (Festinger, 1947) can prove unduly strict when a broadly developmental scale is given to a homogenous age group, since their expected uniformity in (a) failing "too hard" items (aimed at older ages) and (b) passing "too easy" items (aimed at younger children) will distort marginal estimation of chance probabilities. Nevertheless, the present Iranian group's *I* = .25, *ns,* was identical to Wellman et al.'s *I* = .25 for their Chinese sample. Furthermore, Wellman et al. (2006) showed separately, using probabilistic Rasch analysis, that that this reflected significantly above-chance scale consistency. Our Australian sample's *I* = .45 was also closely similar to previous studies (e.g., Peterson & Wellman, 2009).

instead of the converse, *Chi Square* (1) = 1.17, N = 28, $p > .20$. Thus the Iranian children's match to the predicted sequence previously observed only in China (Wellman et al., 2006) could not plausibly be explained by disproportionate numbers of only-children in this non-Western sample.

As a subsidiary comparison, we used a 2 (cultural sample) x 2 (sibling/only-child) ANCOVA (with age covaried) to see if sibling status influenced total ToM steps passed. The age covariate was significant, $F (1, 102) = 40.05$, $p < .001$, $\eta^2 = .28$. Neither the main effect for cultural sample, $F (1, 102) = 3.73$, $p > .05$, $\eta^2 = .03$, and nor the main effect for sibling status, $F (1, 102) = 1.54$, $p > .20$, $\eta^2 = .02$, was statistically significant. However sibling status interacted significantly with cultural sample, $F (1, 102) = 5.62$, $p < .025$, $\eta^2 = .05$. In the Iranian group, only-children (M = 2.45) equaled those with siblings (M = 2.63) in scale progress, but in the Australian group only-children lagged significantly behind (M = 2.38) those who had siblings (M = 3.24) in total numbers of scale steps passed. This latter finding extends to the five-step ToM scale a result that had been found s previously for the false belief task alone among English-speaking preschoolers in Western cultures such as Canada (e.g., Jenkins & Astington, 1996), the U.K. (e.g., Perner et al., 1994) and Australia (e.g., McAlister & Peterson, 2007).

Our data also effectively rule out concerns about the formats of the DB task. Had Wellman et al.'s (2006) use of an inanimate object (coat) with their Chinese group accounted for that group's task sequencing, our Iranian group (exposed to the original pet version) should have conformed to the U.S./Australian pattern instead. But this was clearly not the case. Thus our predicted result, based on inferences about differences in culturally-based childrearing practices, held up robustly against each of these non-culture-related alternatives.

Discussion

The present study documented a reliable cross-cultural difference in the sequential development of theory of mind in children. We found that 3- to 6-year-old Farsi-speaking Iranian children in Shiraz, Iran understood knowledge access (people can be knowledgeable or ignorant) before they understood diverse beliefs (different people can have different opinions). By contrast, the present sample of English-speaking Australian preschoolers in Brisbane (who resembled the Iranian group in terms of age, gender, type of preschool attended, parental education level and neighborhood socioeconomic status) mastered these two core cognitive concepts in the reverse order, replicating the same developmental sequence of ToM performance observed in previous samples of U.S. (Wellman & Liu, 2004) and Anglo-Australian (Peterson & Wellman, 2009; Peterson, et al., 2005) preschoolers. The developmental sequences that emerged in Iran and

Australia were each robust and reliable: most children in each country conformed perfectly to their country's sequence across all five of its steps.

Importantly, there was no significant difference between these Iranian and Australian children in their overall rates of ToM development, as indexed by both groups having passed the same mean total number of scale steps as one another. Thus the key difference between Iranian and Australian children's scale sequences emerged against a background of their overall equivalent rates of ToM progress. This pattern of findings enables a more nuanced and complete picture of group developmental similarities and differences in ToM growth than would have been possible using false belief tasks alone. False belief is either understood or it is not. Thus only one of two broad conclusions is usually possible from this kind of cross-cultural comparison: Either one cultural group is more advanced than the other or the two groups do not differ.

Yet neither of these situations accurately depicts our results. We obtained an important cultural group difference, even though these Iranian and Australian children were developing just as rapidly as one another in their progress through all five ToM Scale tasks. Cross-cultural difference in this case reflected not rates or extent of ToM mastery but rather the fact that the Iranian children were taking a different developmental route than the Australian children towards eventual mastery of all these tasks. Thus our data are consistent with theoretical models proposing that important cross-cultural variations exist within broadly culturally consistent, if not universal, patterns (e.g., Wellman, in press).

The particular cultural contrast we observed between these Iranian and Australian preschoolers was consistent with our hypothesis as to the likely relevance of collectivist versus individualistic cultural environments (Greenfield et al., 2003) for ToM development. The sequence of ToM performance that these Iranian preschoolers displayed was the same one that Wellman et al. (2006) had observed for preschoolers in Beijing. Iran and China are often both characterized as collectivist, or interdependent, in overall cultural orientation (Greenfield et al., 2003). Furthermore, as described in detail in the Introduction, there are numerous studies empirically documenting key similarities, on average, between these two countries in terms of parental attitudes and childrearing patterns. Notwithstanding the existence, in any culture, of important variability between any one individual family and the next (Goodnow & Collins, 1990), in both China and Iran, many parents emphasize intellectual apprenticeship and family harmony over the child's self-confident assertion of divergent opinions or use of reasoned debate to resolve disputes.

Thus the proposal we favor for these data is that middle-class urban children in both China and Iran may be socialized quite early to strongly value becoming knowledgeable rather than ignorant. Furthermore their understanding of how people acquire knowledge may well profit from exposure to the distinctively training-oriented, warm, yet authority-directed childrearing styles that

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Chinese parents (Chao, 1994) and Iranian parents (Rudy & Grusec, 2006) are frequently seen to employ. Hence, we propose that in both these groups, their dominant culture's collectivist orientation in general, along with particular childrearing practices that China and Iran appear to share, creates a climate especially favorable to children's early understanding of knowledge (as reflected in success the KA scale task). At the same time, these preschoolers in Iran or China very likely gain less exposure than their counterparts growing up in Anglo-Australian or Anglo-North-American settings to other kinds of early experiences more characteristic of cultures with an individualist, independent orientation (Greenfield et al., 2003). As one example, noted earlier, Anglo-Australian and Anglo-North American parents are found, in general, to be more encouraging of their children asserting themselves and learning the skills of reasoned argument (e.g., Goodnow et al., 1984). These approaches, by exposing children to the diversity of people's beliefs, might conceivably favor early mastery the DB task. To be clear, we did not directly measure the parental attitudes and childrearing styles of these children's parents, nor their subscription to their culture's collectivist versus individualist orientations, nor the nature and extent of their children's actual exposure to others' varied opinions. It will be important for future research to directly examine such links, but our findings provide ample justification and direction for such future research.

In our Australian sample, children who had at least one sibling outperformed only-children in their overall rates of progress through the five-step ToM scale, in line with results of other studies cited earlier from Australia and other Western countries that used false belief as their sole ToM criterion. We add to such prior findings both by documenting that the Australian children with siblings proceeded through exactly the same scale sequence as did their singleton peers, and by at the same time showing that their rate of ToM progress through the scale was significantly faster.

In comparison, no sibling effect of any kind was observed in our Iranian sample. A possible explanation for this pattern, consistent with our general argument, is that even when they have siblings, Iranian children may not gain as much conversational exposure as Australians with siblings to clashes among different people's points of view or differences of opinion with siblings or between siblings and parents. If so, then the presence of siblings for an Iranian child would not necessarily provide the rich conversational access to diverse perspectives that may benefit ToM growth (Harris, 2005; Perner et al., 1994) in more individualist cultures like Australia, (where parents frequently expect siblings to voice and attend to one another's varied mental perspectives and to resolve rather than avoid sibling conflict; Foote & Holmes-Lonergan, 2003; Randell & Peterson, 2009). In other words, having a sibling at home may only make a difference to ToM development in particular cultures and (within these) particular families where children are actively encouraged to think for themselves, stand up for their beliefs and opinions, and speak their own minds. While concordant with our data, these suggestions are speculative. Future research, could

usefully examine them directly both via observation of sibling-sibling interaction in Iran and Australia, as well as by interviewing parents in the two cultures about how they deal with sibling disagreements.

In total, our results illuminate crucial cultural differences in ToM development, as well as variability within each culture in how advanced individual children are in their sequential progressions of ToM development. But, importantly, the differences we observed took place against a background of commonality and consistency across cultures. In these Iranian and Australian groups, as well as those in China and the U.S.A. (Wellman et al., 2006; Wellman, et al., in press), preschoolers make dramatic progress in discovering a set of key theory of mind insights, and they do so at an overall rate that is effectively identical in all four cultural groups. This research, stemming from detailed examination of sequences of ToM acquisition, emphasizes both cross-cultural differences in some aspects of the development of theory of mind, as well as wide cultural uniformity (at least among cultural groups so far studied) in other aspects of the acquisition of social-cognitive understanding during childhood (Wellman, in press). Examining developmental sequences in theory of mind achievement reveals an intriguing, and specifiable, interplay between these forces.

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Table 1

Summary of ToM Scale Tasks and Percentages (and Numbers) of Iranian and Australian Preschoolers Who Passed

Task:	Iran (n = 58)	Australia (n = 77)	ToM concept tested / Task scenario
Diverse desires[2] (DD)	86% (50)	95% (73)	Different people like and want different things / After choosing his/her own preferred food (cake or carrot), child must predict the snack choice of someone else with opposite preferences.
Diverse beliefs (DB)	47% (27)	77% (59)	Different people can hold different beliefs about the same thing when both opinions are potentially true / The child states his/her belief that a pet is hiding in the garage and must predict the search behavior of someone who believes the pet is hiding in the bushes.
Knowledge access (KA)	88% (51)	68% (52)	Seeing leads to knowing and not seeing leads to ignorance / The child, having seen a toy in a nondescript container, must judge (yes/no) if someone who has not looked inside will know what is in the closed container.
False belief[3] (FB)	16% (9)	36% (28)	People can have invalid beliefs / The child is shown that a distinctively marked candy box actually contains a toy and then must predict the belief of someone who has not seen inside the closed box.
Hidden emotion[4] (HE)	17% (10)	16% (12)	People may choose to hide what they really feel inside by altering their facial expressions and/or behavior / A boy being teased does not want his friends to call him a cry baby: the child must point to and emotion face picture and/or say how the boy really feels (sad) and how he makes his face look (happy or OK).
Mean total ToM	2.53	2.90	Sum of tasks passed (out of 5)

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[2] To ensure local familiarity, a cake (rather than a cookie) was used in both Australia and Iran.

[3] To ensure local familiarity, a candy box was substituted for the original bandaid box in both Australia and Iran.

[4] As in Peterson et al (2005) we added a more stringent comprehension control question. When children pointed at the neutral face on Wellman and Liu's (2004) sad-neutral-happy facial expression scale, they were asked to justify their response. Correct answers indicated that the protagonist tried to hide his true feelings or wanted others not to know them; incorrect answers reiterated that he looked like he felt (sad or angry). Two raters each separately coding 100% of the justifications reached 97% agreement for the Iranian sample and 94% for the Australian sample (see the text).

Chapter 3

Sequence of Steps in School age Period

Cultural and family influences on children's theory of mind development: A comparison of Australian and Iranian school-age children

Invited to resubmit: *Cross-Cultural Psychology*

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Abstract

Over the past three decades considerable research effort has been expended charting how and when children develop an understanding of others' minds. Multicultural studies allow us to determine what features of this important cognitive developmental achievement might be universal and what aspects are culturally specific. However, the body of literature in this area is slim and unsystematic. The current study therefore aimed to contrast and compare the sequence through which Western and non-Western children develop a theory of mind. One hundred and sixty four 3-9 year old children from Australia and Iran were assessed using an expanded theory of mind scale. While children from both cultures had equivalent overall theory of mind scores, more Australian children showed an understanding of diversity of beliefs and desires whereas more Iranian children understood knowledge access and sarcasm. This study is the first to compare Western and Non-western children's theory of mind development with a battery of ToM Scale tasks extended to include sarcasm. The cross-cultural similarities and differences revealed allow a deeper understanding of both universal and culturally specific aspects of social-cognitive development.

Cultural and Family Influences on Children's Theory of Mind Development: A Comparison of
Australian and Iranian School-Age Children

To understand others' behavior children need to discover that human actions are rooted in subjective, internal mental states such as desires, beliefs and emotions. Achieving this understanding, referred to as theory of mind (ToM), is a critical developmental milestone (Flavell & Miller, 1998). Researchers have used a variety of tasks to investigate different aspects of this multi-faceted phenomenon (for reviews see Wellman, 2012; Wellman & Liu, 2004). These include the false belief test, as well as tasks assessing children's understanding of other's desires, emotions and intentions. Research shows that in Western cultures the vast majority of typically developing children acquire a theory of mind sometime during early childhood. At the same time, there is a general consensus that acquiring a theory of mind is a universal developmental milestone that all typically developing children pass (Avis & Harris, 1991; Scholl & Leslie, 2001). However, the extent to which the developmental unfolding of theory of mind understanding is universal is a topic of ongoing debate.

A primary reason for continued debate over the universal nature of theory of mind development is that cross-cultural studies have returned contradictory findings. For instance, despite their distinct cultural backgrounds, children from Peru, Canada, India, Samoa and Thailand acquire the concept of false belief at similar ages (Callaghan et al., 2005). Similarly, unschooled children in remote Cameroon pass the false belief task at a similar age to Western children (Avis & Harris, 1991). However other research has indicated that Junin Quenchua children in Peru acquire the false belief concept later than Western children (Vinden, 1996). Furthermore, recent studies comparing cultures more similar in terms of education, cultural practices and economic circumstances such as Britain and Italy (Lecce & Hughes, 2010) and mainland versus Hong Kong China (Liu, Wellman, Tardif, & Sabbagh, 2008), have shown different developmental timetables for theory of mind understanding. There is hence evidence for significant cross-cultural differences in the pace (Oh & Lewis, 2008) and pattern of theory of mind development (Shahaeian, Peterson, Slaughter, & Wellman, 2011; Wellman, Fang, Liu, Zhu, & Liu, 2006).

Individual differences research also shows that while children gain an understanding of mind during early childhood, the developmental timetable for ToM depends on several environmental factors related to family and sibling interactions. For example, parenting strategies (Ruffman, Perner, & Parkin, 1999; Vinden, 2001), conversations referring to feeling and emotions in the family (Dunn, Brown, & Beardsall, 1991), parents' use of mental state language (Peterson & Slaughter, 2003; Ruffman, Slade, Devitt, & Crowe, 2006) and the presence of siblings (Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 2008; McAlister & Peterson, 2012) have all

been shown to affect how ToM understanding matures. These findings highlight the importance of everyday interaction in developing a theory of mind.

A number of studies have shown that having siblings is associated with more rapid development of false belief understanding (Perner, Ruffman, & Leekam, 1994; Ruffman, Perner, Naito, Parkin, & Clements, 1998; Ruffman et al., 1999). Some researchers qualify this by suggesting that older siblings yield more benefit than younger siblings (Ruffman et al., 1998), that children do not benefit from having siblings younger than 3 years (Perner et al., 1994), or that the main effect is for children with language delays (Jenkins & Astington, 1996). However Peterson (2000) showed that having either a younger or older sibling leads to better false belief understanding compared to children without siblings, provided the sibling is aged one to 12 years (no longer an infant and not yet a teenager). She explained this through the "sibling variety hypothesis" which suggests that to benefit each other's ToM development siblings must be capable of distinctive kinds of playful and conversational interaction with one another and, when this is true the more varied the siblings' cognitive perspectives the better. Thus, children without siblings fail to benefit and those with both older and younger siblings gain most. Peterson further suggested that siblings sharing of varied perspectives through pretend play or via sibling conflict (Randell & Peterson, 2009), when children argue their independent perspectives, supplies a rich insight into the mind and others' true and false beliefs. Recent studies of families with twins provide support to this argument (Cassidy, Fineberg, Brown, & Perkins, 2005; Deneault et al., 2008).

In a previous attempt to evaluate the role of siblings in ToM development for children from Western versus non-Western cultures, Shahaeian et al. (2011) compared preschool children in Iran and Australia. The Australian children developed ToM understanding (as assessed both via false belief tests and via a developmental ToM scale) more rapidly when they had a child-aged sibling (i.e., 1-12 years of age) than if they were only children. However no evidence of a beneficial effect from having a sibling emerged for the Iranian children. A possible explanation for this is that in Iranian families, siblings are less often granted opportunities to exchange their varied points of view than in Australian households. In Iran, harmony and agreeable family interactions are emphasized and children are not encouraged to speak their minds. Having a sibling might therefore not bring a rich conversational environment for Iranian children. More research is now needed if we are to better understand how siblings specifically and children's cultural heritage more generally might interact with family structure to influence ToM development.

Further, issues of assessment have been the cause of much controversy: What is the best task that assesses ToM development? The most widely used test to assess theory of mind understanding is the false belief task. In a classic version (Baron-Cohen, Leslie, & Frith, 1985), known as a change-of-location false belief test, children are shown a doll who has hidden her

marble in a box. When she leaves the room and is not present another doll enters and hides the marble in the basket. Then children are asked where the doll will look first for the marble when she comes back. Younger children struggle to separate what they know now from what they used to know and from what others should know, stating the doll will look in the basket (the true current location). In contrast, from around 4 years children typically begin to show an understanding that since the doll originally put the bread inside the box, and had no subsequent chance to look inside, she will think that the bread is still in the box. While false belief understanding captures children's transition towards having a mature understanding of others' minds, such understanding does not emerge without developmental preparation. That is, children do not suddenly go from having no theory of mind understanding to having a fully-fledged understanding, as is sometimes implied in suggestion that children go from failing to passing theory of mind tests (Astington, 2001). Research in the last decade (e.g., Shahaeian, et al., 2011; Wellman & Liu, 2004) has shown that the development toward gaining an understanding of mind progresses through a series of distinct preliminary stages leading up to false belief and continuing beyond it.

Based on a meta-analysis, Wellman and Liu (2004) developed a scale to assess the sequential progression of ToM. This research indicates that Western children begin by understanding that people can like or dislike similar things (known as Diverse Desires) and then to appreciating that people can have different opinions and beliefs about the same situation (Diverse Beliefs). After this children can understand that others might not have access to the right information (Knowledge Access) before recognizing how people's behavior is based on what they think they know even if their supposed knowledge is wrong (False Belief), and that they can deliberately hide how they feel (Hidden Emotions). This hypothetical sequence was then supported in experimental research with American, Australian and German children (Kristen, Thoermer, Hofer, Aschersleben, & Sodian, 2006; Peterson, Wellman, & Liu, 2005; Peterson & Wellman, 2009).

This sequence allows us to evaluate patterns of ToM progression and to more systematically probe this understanding among different groups of children. Using the ToM scale with Iranian and Chinese children (Shahaeian et al., 2011; Wellman et al., 2006) has shown that although children in these two very different cultures generally progress through the ToM sequence proposed by Wellman and Liu (2004) in similar ways to Western children (diverse desires before diverse beliefs, knowledge access before false belief and hidden emotions after false belief) intriguing differences are also evident. In contrast to their Western peers, children in Iran and China develop understanding of knowledge access earlier and diversity of beliefs later. This suggests that aspects of the proposed ToM sequence are culturally specific. However, before firm conclusions can be

drawn on the cultural specificity of ToM development, more direct cross-cultural comparisons with different age groups and alternative tasks are required.

Further, understanding of sarcasm has been identified as an additional, later step in the development of ToM concepts (Peterson, Wellman, & Slaughter, 2012). This work built on previous studies of school age children (Banerjee, 2000; Filippova & Astington, 2008), finding that only approximately half of a group of 10- to 11-year- old children passed a sarcasm task. To the best of our knowledge no published study has yet investigated sarcasm cross-culturally as an aspect of ToM. As per Peterson and colleagues (2012), in the current study we used an expanded ToM scale that included sarcasm. Our aim was to identify where sarcasm fits in the development of ToM among Iranian children and to compare this to children from a typical Western culture (Australia). Iran, as a nation, overall conforms to Triandis (1993) definition of a collectivist culture, placing more emphasis on interpersonal relationships and group harmony than Western individualistic cultures. Compared to Western parents, Iranian parents are more prone to teach children to respect their elders, avoid direct expression of their disagreement with family members, and grow as members dependent on family values, ways of doing things and a global life style (Frank, Plunkett, & Otten, 2010; Ghorbani, Bing, Watson, Kristl Davison, & LeBreton, 2003; Rudy & Grusec, 2001; Sharifzadeh, 2004). Iranian children may thus be more sensitive to distinctions between what others say and what they mean than Western children. This cultural emphasis on interpersonal sensitivity and avoidance of outright disagreement might result in Iranians using more subtle ways of expressing their divergent points of view, such as sarcasm. Thus greater everyday exposure might enable Iranian children to acquire a relative sophisticated understanding of sarcasm at an early age. Based on this reasoning we hypothesized that Iranian children would be more able to pass a ToM test based on sarcasm than their Australian peers.

In addition to exploring cross-cultural differences in preschool and school-aged children's understanding of ToM concepts, up to and including sarcasm, the current study had two further aims. Also, previous research has shown that Iranian children lag behind their Western peers in understanding diverse beliefs while being comparatively advanced in their understanding of knowledge access (Shahaeian et al., 2011). Our second aim was to confirm this finding in a new sample of children from a wider age range. Finally, as already noted, the role of siblings in ToM development has been extensively documented in research with Western children, mostly from English-speaking countries. However there has been much less research on siblings and ToM in non-Western cultures. Our third aim was therefore to continue evaluating the extent to which having siblings facilitates development of theory of mind for Iranian children.

Method

Participants

A sample of 164 3- to 9-year-old children participated in this study. Eighty children (47 girls, 33 boys; M (age) = 74.8 months, SD = 21.3) were from the city of Shiraz in Iran and 84 children (43 girls, 41 boys, M (age) = 73.5, SD = 21.9) were from Brisbane, Australia. All Iranian children were born in Iran and the only language they spoke was Farsi. All Australian children were born in Australia and English was the sole language they spoke.

Shiraz is the capital of Fars province with a population of 1.2 million (Statistical Centre of Iran, 2006) and is the sixth largest city in Iran. Brisbane, with a population of 1.7 million, (Australian Bureau of Statistics, 2008) is the third largest city in Australia and is the capital of the state Queensland. Both cities offer a range of high quality education to preschool children. In both Australia and Iran, compulsory education starts one year before primary school and all children have to attend one year of preschool education, although most middle class families send their children to preschool two or three years before primary school.

In both countries children were recruited by sending invitation letters to parents through a range of different sources. All families were targeted from middle to upper class regions of both cities. Some letters were sent through children's preschools and schools, others through informal access to parents such as email lists. All parents provided consent for their children to participate in the study. Parents' education as well as sibling information for the sample is presented in Table 1. Education is reported for either parent who has completed the questionnaire (mostly mothers except one father for Iranian sample and 4 fathers for Australian children). Following Peterson (2000), siblings older than 12 years or younger than 1 year were not included in the analyses. For the Iranian sample, 4 children had one sibling over the age of 12 and 2 children had one sibling younger than 1. In Australia, 3 children had one and one child had two siblings older than 12, and 3 children had an infant sibling younger than 1. The mean age of siblings for Iranian children was 6.6 years and for Australian children 6.2 years.

**************** Insert table 1 here ****************

Procedure, Tasks, and Scoring

In Iran, children were tested individually in a quiet room of their preschool in the presence of their teacher or someone from the preschool familiar with the child. In Australia, all children were tested in dedicated child development test rooms of a large university in the presence of one parent. The first author tested all children. All tasks were from Shahaeian et al. (2011) with the exception of the false belief task. Shahaeian et al. assessed false belief understanding using a surprise contents task where children were shown a box of chocolate and asked what was inside –

only to discover that the box actually contained a toy bear. However, in Iran chocolate does not commonly come in boxes and it is possible that for this task no belief was established upon presentation of the box. Children were nevertheless encouraged to guess the box's contents and hence upon opening it had established some belief about what might be inside, so the basic premise of the task was not compromised. With a view to avoiding added complication in interpreting children's responses, and also to bolster confidence in the robustness of our findings with regard to the positioning of false belief in the ToM Scale, we decided here to use a change of location false belief test instead of a surprise contents task. We also added an advanced ToM test, the sarcasm understanding task (Sarcasm) from Peterson et al. (2012). The task was translated to Farsi by the first author, and then back translated by an official Farsi translator to ensure the comparability with the English version. The back translation matched the English version with minor differences in tenses of the verbs used. Disagreements were solved by discussion. The order of the tasks presented to children in each country was based on the order of difficulty previously reported for their country, with the Sarcasm task appearing last for both groups.

Notably, the original version of the Diverse Beliefs task involved a boy who had lost his cat. However, having a pet cat is not something most Iranian children are familiar with. We thus ran a pilot study to see if more culturally familiar versions of this task would yield different responses. In one version we used a story of a man who came home and his wife was absent (she could have been at the neighbours or in the shops). In the second version a boy lost his shoes and they could be in a wardrobe or chest of drawers. Results from 42 4- to 5-year-old children showed no difference between the three versions (51% of children provided correct answers in wife version, 55% in cat version and 58% in shoes version; Cochran's Q test, $p = .102$). Thus the original version of the Diverse Beliefs task (the boy and the lost cat) from Wellman and Liu (2004) was used for both cultural groups. To summarize, the Diverse Desires, Diverse Beliefs and Knowledge Access tasks are identical to Wellman and Liu (2004), the Hidden Emotion task is also similar with the addition of a "why" question followed by the test question, as used in both Peterson et al. (2012) and (2005). False Belief is assessed by a change of location False Belief task and Sarcasm is derived from Peterson et al. (2012). Appendix includes the description of all 6 ToM tasks. All tasks were similarly administered in both countries. Testing took around 15-20 minutes for each child.

Coding

For each task children were given a score of 1 for providing a correct response and 0 for an incorrect response. They could therefore gain an overall ToM score ranging between 0 (none correct) and 6 (all correct). For the Hidden Emotion task we also asked the question of "why" (previously used by Peterson et al., 2005) to ensure children who passed had really understood the

question. This question is initially added because some children do not clearly distinguish between the "neutral" and "sad" faces; hence it is unclear if when pointing to the neutral face they mean "happy" or "OK". As Peterson et al. (2012) have reported: "the work with a separate sample of children and adults showed that the supposedly neutral (middle) picture was often spontaneously labelled as "angry", so pointing at this face could (incorrectly) indicate negative rather than neutral emotion" (see Peterson et al., 2005, p.517). The additional question of "why" disambiguates this. Also after asking this additional question it was apparent that some children chose the correct picture (happy face) but their justification showed their misunderstanding (e.g., responding "because it was a joke and it was funny"). Therefore we also adopted a coding scheme to avoid this error. For an answer to be considered correct the child needed to either clearly mention the discrepancy between how he really felt and tried to look, with answers like "he doesn't want them to call him baby" or " he doesn't want them to see he is sad", or some other comprehensive response showing the same meaning. In the Sarcasm task two answers were accepted: (a) if the child directly mentioned that "she was being sarcastic" or (b) if the child mentioned that she meant the boy was wrong and she was saying the opposite (e.g., "she means look this is a very bad day, but you said it will be sunny"; or "she meant he is wrong"). The first author coded all answers and to ensure reliability, a second coder familiar with both languages coded all children's answers to the "why" questions separately. Cohen's Kappa was found to be .89 for responses to Hidden Emotion "why" questions and .97 for responses to Sarcasm "why" questions, showing high inter-rater agreement.

Results

Cross-cultural comparisons by task

Table 2 shows the number and percentages of children who passed each test. There was no difference in *overall ToM scores* between the Iranian ($M = 3.63$, $SD = 1.5$) and Australian ($M = 3.83$, $SD = 1.3$) children, $t(161) = 0.38$, $p = .38$. However at the single task level more Australian children passed the Diverse Desires, $\chi2$ (1, N=164) = 7.25, $p = .007$, *Cramer's V* = .21, and Diverse Beliefs tasks, $\chi2$ (1, N=164) = 32.28, $p < .001$, Cramer's V = .44. In contrast, on the Knowledge Access task significantly more Iranian children passed, $\chi2$ (1, N=164) = 5.15, $p = .02$, Cramer's V = .17. On the False Belief and Hidden Emotion tasks children in both cultures passed at similar rates, $\chi2$ (1, N=163) = .113, $p = .74$ and $\chi2$ (1, N=164) = 1.13, $p = .182$ respectively. Thus, consistent with previous research, more Iranian children tested here passed the task of Knowledge Access while less of them passed Diverse Desires and Diverse Beliefs tasks. As predicted, Iranian children were also more likely to pass the Sarcasm task, $\chi2$ (1, N=164) = 7.87, $p < .005$, *Cramer's V = .22*. There were no gender differences in task performance and total ToM scores for either cultural group.

Because the age range of the sample is broad, to provide a more detailed assessment of age-related patterns of difference between the two cultures, we divided the sample into three age groups: 3-5 years, 5-7 years and 7-9 years. Table 3 presents the percentages of children who passed each task based by age group. This age split divided the sample based on transition-to-school milestones, which is similar for children in both countries (e.g., 3–5 years most children are in preschool, 5–7 years equates to early school age and at 7–9 years children are settled in school). This three-way split provides a relatively fine-grained picture of development while keeping group sizes even. As is evident here, for the youngest group (3-5 years), more Australian children than Iranians passed Diverse Beliefs ($\chi2$ (1, N=47) = 13.16, p < .001, Cramer's V = .52) and more Iranian children than Australians passed Knowledge Access ($\chi2$ (1, N=47) = 7.67, p = .006, Cramer's V = .40). For this age group, none of the other tasks differed significantly across cultural group.

At ages 5-7 years, the Australian children continued to outperform their Iranian counterparts on the Diverse Beliefs task ($\chi2$ (1, N=69) = 10.52, p < .001, Cramer's V = .39), while significantly more Iranian children than Australians passed the Sarcasm task ($\chi2$ (1, N=69) = 4.10, p = .047, Cramer's V = .24). Cross-cultural differences on all other tasks were not significant for this age group.

For the oldest group of children, the culture difference in understanding Diverse Beliefs remained significant (all Australian children passed the task while just above half of Iranians passed, $\chi2$ (1, N=48) = 12.07, p < .001, Cramer's V = .50), while performance in all other tasks is similar.

As seen in the complete samples for each culture, there were no gender differences at any age groups across the two countries. And performance in ToM score was similar for both cultures at all age groups.

ToM task scaling in Iran and Australia

Next we investigated the extent to which the developmental progressions of ToM suggested by overall task pass rates were scalable for children in both countries. For this purpose Guttman's coefficient (Green, 1956) was calculated using the Matlab program. Guttman's scaling is a strict analysis that looks at the pattern of passing the items from easiest to hardest for each child in the sample. The index requires an exact match between the patterns of pass and fail and a perfect hypothetical pattern from easiest to hardest whereby no child should pass a harder task if he or she has failed the easier ones.

Before conducting statistical analyses, simple inspection of individual children's patterns of passing or failing in each task was examined. Consistent with previous work, in the present study

83% (70) of the Australian children matched the sequence of their country Diverse Desires>Diverse Beliefs>Knowledge Access>False Belief>Hidden Emotion>Sarcasm (steps from easiest to hardest). Amongst Iranian children, the sequence of the first five steps was the same as what was found by Shahaeian et al. (2011) and different from the Australian sequence: Diverse Desires>Knowledge Access>Diverse Beliefs>False Belief>Hidden Emotion>Sarcasm. We found that 62% (50) of Iranian children matched this sequence of steps (with Knowledge Access before Diverse Beliefs). Only one of the Iranian children passed the Diverse Beliefs task while failing Knowledge Access, and 8 Australian children passed Knowledge Access while failing Diverse Beliefs (opposite to the proposed sequence of their country). Using Green's (1956) statistical formulae, we found that coefficient of reproducibility (Rep) for the Iranian children was .92 and for the Australian sample Rep was .97 (scores higher than .90 are considered to be statistically significant). Rep .91 for Iranian children and .94 for Australians are obtained, only looking at the 5 steps scale for both countries.

As a further step, Green's Index of Consistency (or I index) was calculated. This is a more conservative indicator of an observed pattern's conformity to a Guttman scale and I scores higher than .50 are considered to be statistically significant. For the full 6-step ToM scale (Peterson et al., 2012) we found $I = .42$ for Iranian children and $I = .56$ for Australian children. If Green's Index of Consistency is calculated with sarcasm excluded, $I = .32$ for Iranian and $I = .48$ for Australian children are observed (For a comparison, $I = .25$ for both Iranian and Chinese children and $I = .45$ for Australians were reported in Shahaeian et al. (2011) and Wellman et al. (2006) both using shorter 5-step ToM scale not including sarcasm). Thus, the present scaling results suggest that an understanding of sarcasm is a reliable sixth step in ToM development among children of both cultures, in line with Peterson et al.'s (2012) earlier findings. All children found sarcasm understanding the most difficult step in gaining an understanding of others' minds. Shahaeian et al.'s (2011) previous findings of scale divergence between Iran and Australia were also supported for this new sample. As previously, Iranian children reached Knowledge Access sooner and Diverse Beliefs later than Australian children.

Correlates of ToM understanding, by culture

In order to investigate possible sources of the differences identified above we looked at the effects of age, parents' education, and presence of child age siblings on the total ToM scores for each group. Samples were carefully matched for age and SES but the range number of siblings varied between cultures. This limits the conclusions that can be drawn regarding the influence of siblings on Iranian children's theory of mind. Nonetheless, we started by looking at correlations between age, number of siblings, parents' education and total theory of mind scores. Spearman correlations showed a significant effect of age for both groups ($r = .59$, $p < .001$ for Iranian and $r =$

.85, $p < .001$ for Australian). However, parents' education was not significantly correlated for either of the groups ($r = .05$, $p = .67$ for Iranian and $r = .14$, $p = .18$ for Australian). The number of child age siblings (i.e., 1-12 years old) was associated with theory of mind development for Australian ($r = .25$, $p < .01$) but not Iranian children ($r = .11$, $p = .35$). Further a linear multiple regression analysis, using forced entry (i.e., entering all variables at the same time) was conducted with child's age and the number of child age siblings as predictors and total ToM score as the dependent variable. There was a significant effect of age, with older children achieving higher scores (*Beta* = .37, $t(3) = 4.79$, $p < .001$, Part correlation = .53 for Iranian children and *Beta* = .48, $t(3) = 12.4$, $p < .001$ for Australian children, Part correlation = .78). Having a child age sibling significantly influenced the performance of the Australian children, *Beta* = .42, $t(3) = 2.3$, $p < .05$, Part correlation = .147, but not the Iranian children, *Beta* = .11, $t(3) = .36$, $p = .72$, Part correlation = .04. However, as already alluded to, the latter may be due to the restricted range characteristic of our sample.

Discussion

The current study found clear differences among Iranian and Australian children in their development of theory of mind concepts. As hypothesized, Iranian children showed a greater understanding of sarcasm than their Australian peers, with Iranian children passing this task at almost three times the rate of Australian children. This might be a reflection of the importance of interpersonal relationships in a collective culture. It has been argued that Western cultures emphasize individuality and independence while Asian cultures emphasize interdependence and sharing group values (Nisbett, 2003; Nisbett & Masuda, 2003). We refer to Iran as a culture with overall interdependent collectivist shared values (e.g., Ghorbani et al., 2003; Greenfield, Keller, Fuligni, & Maynard, 2003). Maintaining group harmony and emphasis for considering group and family needs and preferences in such a culture is of significant importance (Rudy & Grusec, 2001) and children learn from early in life to be sensitive about how others feel. In Iran, there is great concern about maintaining relationships and sacrificing individual needs for group purposes. Thus to maintain relationships one needs to be highly sensitive to others' communicative intentions, as well as their language (Harb & Smith, 2008). Understanding sarcasm is about understanding the hidden meaning in communication. Iranian culture's emphasis on interpersonal harmony and cooperation may socialize children to a high level of sensitivity to such subtleties (Behzadi, 1994). However, it is important to keep in mind our interpretation of culture is based on two different countries and we did not assess the degree to which our participants conform to their broader cultural practices. Therefore, while we refer to group differences as cultural ones, caution needs to be exercised in drawing conclusions. As we have previously argued: "Any country encompass

multiple communities and varied practices, making global cultural distinctions problematic" (Shahaeian et al. 2011, p.1240). Nonetheless, there is a place for generalizations which can present the first steps towards greater understanding of cultural differences and how such differences may affect children's development.

The complexity of cultural norms is evident in the finding that Iranian children passed the tests of Diverse Desires and Diverse Beliefs at lower rates than their Australian counterparts. It is notable that at the oldest age (7-9 years) only a little more than half of the Iranian children passed the Diverse Beliefs task, whereas all Australian children did so at this age. At first glance this seems to contradict the claim that Iranian children are socialised to be sensitive to others' communication. However, the interpretation we favour is that for these tasks collectivist motivations, which bring more attention to "what is best to do" are given priority over sensitivity to personal choices. That is, Iranian children respond in ways that reflect their collectivist concern with everyone acting in accordance with one another. Also exposure to daily life experiences in which children are invited to express their own personal choices (reflecting diversity of desires and beliefs) would seem to be a feature of Australian families more so than Iranian ones. Iranian families, for example, may be more concerned about what is "healthier" for the child to eat than what the child "wants" to eat, and therefore the question of "what do you want?" may be asked of children less frequently in Iran than Australia. Of course more research is required to assess this hypothesis, but this could explain why Iranian children are more likely than their Australian counterparts to fail tasks that ask about people's diverse desires and diverse beliefs. On the other hand, in Australia, speaking one's mind is encouraged and people, including children, are expected to express what they want. Conversely, in Iran it often happens that utterances and actions are not in line with what one person wants or feels. This may lead to Iranian children being more sensitive to the concept of sarcasm. Targeted research is now needed to: (1) empirically explore these hypotheses about socio-cultural foundations for the cultural differences evident in this study; and (2) extend this research to other collectivist cultures with a view to identifying the cultural specificity of these developmental patterns.

We also observed a cultural difference in the extent to which having a sibling relates to the child's developing ToM. Specifically, the total number of child-aged siblings was related to ToM understanding in Australian but not Iranian children. This is in line with Shahaeian et al. (2011) who also failed to find any sibling effect on ToM with a sample of younger Iranian children (3-6 years old).

Western parents often encourage their children to assert themselves by stating and debating their opposing points of view. They may also tolerate or even encourage sibling conflict, provided it is engaged in amicably and within reason. Therefore under such socialization conditions, having child-aged siblings at home is likely to result in children gaining regular exposure to others'

opinions and points of view, that is, to others' minds. Unfortunately we were unable to obtain a sample of Iranian children that had wider range of siblings, which limits the conclusions we can draw about their influence in Iranian families. However if it is the case that the presence of siblings has little effect on ToM development for Iranian children, this would be consistent with observations about Iranian socialization processes and family expectations. Iranian families value similarity, conformity and harmony more than challenging beliefs and this leads siblings to be encouraged to play peacefully with each other without arguing (Behzadi, 1994). The role of an older sibling is to "teach" the young ones how to do things and younger children are encouraged to look at their older siblings and "learn" from them. Thus compared to their Western counterparts, these children may have more experience of didactic sibling interactions than of ones characterized by conflict. Additional research is required to clarify the effect of siblings on ToM development in Iranian children, and also to evaluate cross-cultural differences in sibling interaction across Australia and Iran. There of course exist individual differences among families in each culture and identifying differences in daily interactions is to be investigated in future research.

It is worth mentioning that in Iran a parental questionnaire, including demographic information, was sent to the family home with the child's consent form. Unfortunately some of parents did not return the parental questionnaire when providing consent. In Australia the questionnaire was given to parents during the test session, thereby allowing them opportunity during the warm up phase to complete it. Demographic information was therefore provided by more Australian families than Iranian ones. Regardless, considering the large sample size and the lack of significant effect for parental education in both samples, we are confident that the lack of demographic information from the remaining Iranian families does not overly compromise our findings.

Overall this study showed clear differences in the pace and order in which Iranian and Australian children acquire theory of mind concepts. Children predominantly gain a comprehensive ToM understanding in a pattern suitable to their own country's epistemology and cultural preferences. This draws attention to recent calls for psychology to incorporate data collection from participants who are not of Western origin (Arnett, 2008; Henrich, Heine, & Norenzayan, 2010) and how failure to do so can result in cultural norms of development being interpreted as universal norms. For instance while past studies have shown that understanding of knowledge access happens later than diversity of beliefs, if such research had only ever been carried out in an Iranian context the developmental story would be viewed very differently. Without ongoing cross-cultural data collection, our understanding of universal patterns of theory of mind development will be incomplete.

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Table 1

Parents' Education and Number of Child Age Siblings (i.e., 1-12 years old) for Both Countries

	Sibling				
	0	1	2	3 and more	Missing
Iran	30 (39%)	29 (36%)	2 (2%)	0 (0%)	19 (24%)
Au	6 (7%)	48 (58%)	23 (28%)	5 (6%)	2 (2.3%)

		Parents' Education			
Less than 12 years	12 years	Some university	Bachelors	Postgrad	Missing
4 (5%)	18 (22%)	4 (5%)	24 (30%)	11 (13.8%)	19 (23.8%)
1 (1.2%)	4 (4.8%)	11 (13.1%)	37 (44%)	30 (35.7%)	1 (1.2%)

Table 2

Number and Percentages of Children Who Passed Each Task in Both Countries

Task:	Total	
	Iran ($N = 80$)	Au ($N = 84$)
Diverse Desires	69 (86%)	82 (98%)
Diverse Beliefs	36 (45%)	73 (87%)
Knowledge Access	75 (94%)	69 (82%)
False Belief	46 (57%)	48 (57%)
Hidden Emotion	39 (49%)	34 (40%)
Sarcasm	21 (26%)	8 (9%)
Mean total ToM	3.63	3.83

Table 3

Number and Percentages of Children Who Passed Each Task in Both Countries Based on Age Groups

Task:	3-5 Year Olds		5-7 Year Olds		7-9 Year olds	
	Iran (*n* = 22) *M* (age) = 50.95 *SD* = 6.58	Au (*n* = 25) *M* (age) = 47.32 *SD* = 7.24	Iran (*n* = 32) *M* (age) = 69.93 *SD* = 5.33	Au (*n* = 37) *M* (age) = 73.27 *SD* = 6.83	Iran (*n* = 26) *M* (age) = 101.19 *SD* = 10.21	AU (*n* = 22) *M* (age) = 102.18 *SD* = 9.41
DD	19 (86%)	24 (96%)	27 (84%)	36 (97%)	23 (88%)	22 (100%)
DB	6 (27%)	20 (80%)	15 (47%)	31(84%)	15 (57%)	22 (100%)
KA	19 (86%)	12 (48%)	31 (97%)	35 (95%)	25 (96%)	22 (100%)
FB	4 (18%)	10 (40%)	24 (75%)	24 (65%)	23 (88%)	22 (100%)
HE	3 (14%)	1 (4.2%)	16 (50%)	13 (35%)	20 (77%)	20 (90.9%)
SARC	2 (9%)	0 (0%)	7 (22%)	2 (5%)	12 (47%)	6 (27.3%)
ToM: M(SD)	2.45 (.73)	2.37(.82)	3.47 (1.32)	3.83 (.92)	4.53 (1.55)	5.00 (.61)

DD (Diverse Desires), DB (Diverse Beliefs), KA (Knowledge Access), FB (False Belief), HE (Hidden Emotions), SARC (Sarcasm)

Appendix

Description of Each Theory of Mind Task

Diverse Desires	The child is presented with pictures of two foods: cake and carrot and then is asked which food she likes best. After the child has indicated her/his preference, a lady doll enters, and the child is told that the lady doesn't like the food that the child likes, she likes "the other food". Now the experimenter says: "Now it is snack time and this lady is going to eat something, which food will she eat?".
Diverse Beliefs	This task is similar to the Diverse Desires task, but the child is presented with a boy doll who has lost his cat. Two pictures are presented, indicating that the cat might be in garage or in the bushes. Now the child is asked where she/he thinks the cat is. After giving his or her answer, the child is then told that the boy thinks the cat is in the opposite place (to that indicated by the child). Now the child is asked where the boy will look to find that cat.
Knowledge Access	A box is presented and the content of the box is shown to the child and then the examiner closes the lid. A doll boy enters and the child is told that this boy has never seen the box before. Then the test question is whether the boy doll knows what is inside the box. The child's "yes" or "no" answer is scored.
False Belief	A lady doll enters and puts her ball in a basket and leaves the room. When she is not present a boy (doll) comes in and moves the ball from the basket to a box. Then the test question is: where will the lady look for the ball when she comes back?
Hidden Emotion	After introducing 3 pictures showing emotions of "sad", "neutral or OK", and "happy" and making sure the child can name the pictures correctly, the child is presented with the picture of a boy whose back is facing us (that is, the child can't see the boy's face). He or she is told that this boy was playing with his friends when a girl came and teased him (the boy), and everyone laughed as they thought it is funny. But not the boy, he doesn't think it is funny, but he doesn't want to show them how he feels or they will call him a baby. Now the child is asked how does the boy feel, and how does he try to look on his face when his friends teased him (the child can either verbally respond or to point to the emotion faces). After this the child is asked *why* the boy tries to look like that.
Sarcasm	In this task the child is told the story of a girl and a boy who are going on a picnic. The picnic, the child is told, was the boy's idea, who said it is going to be a lovely day. But when they get their food out, a big storm came and the food got all wet. Now the girl says: "It's a lovely day for a picnic!". Then the child is asked why the girl said this.

Chapter 4

Knowledge and belief understanding and the Role of Language

Development of knowledge and belief understanding and effect of language among Iranian preschool children

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Keywords: theory of mind; knowledge acquisition; belief understanding, culture, language

Abstract

For over 3 decades there has been considerable emphasis on how and when children recognize that people's behavior is determined by their mental states, called theory of mind (ToM) understanding. Associated with this literature are studies comparing different cultures that has highlighted differences and similarities in timing and patterns of development. However to date most of this research has focused on false belief understanding as the lone index of ToM. This is despite the importance of other aspects of ToM, such as knowledge acquisition in children's understanding of mind. Studies comparing Western (American and Australian) with Eastern (China and Iran) cultures have shown differences in patterns of development in various theory of mind tasks. Past research has found that Iranian children are delayed in understanding diverse beliefs compared with Australian children while being advanced in understanding knowledge access. In the current study our aim was to extend this finding by evaluating Iranian children's performance on diverse belief tests altered to reflect culturally familiar situations. We also assessed children's knowledge understanding across a range of distinct tasks. There were no significant differences in children's answers to different tests of diverse belief, suggesting that the cultural appropriateness of task content doesn't alter performance. The Iranian children we tested nonetheless responded to the tests of knowledge understanding at rates greater than expected based on past literature.

Development of Knowledge and Belief Understanding and Effect of Language Among
Iranian Preschool Children

During preschool years, children go through a transition in understanding that the behavior
of others is rooted in their internal mental states. This capacity, referred to as theory of mind, has
been the matter of considerable research interest in the last 3 decades. Theory of mind is a multi-
faceted phenomenon, including desires, beliefs, knowledge and emotions (Gopnik & Astington,
1988). By mastering a theory of mind children understand that behavior is the result of people's
beliefs, intentions and desires (Wellman, 2007). To gain a comprehensive theory of mind a child
needs to understand that people's mental states can be different from their own, from others and
from reality. That is, the mental states of others are partly derived from their knowledge of events
and this knowledge is gained through different sources. For instance people who have seen
something happen are likely to know more about what took place than people who haven't. But
while theory of mind is a broad understanding of folk psychology, research has predominantly
focused on one aspect of this phenomenon called false belief (Bloom & German, 2000).

By gaining false belief understanding children learn that if one possesses a false knowledge
about something their action will be wrong. Therefore a false belief task involves a deceptive
situation when a story character holds a false belief and the child is trying to predict the character's
behavior. For example, in a "surprise contents" false belief task, children are shown a Band-Aid
box and asked what they think is inside. After responding they are shown the contents to actually be
a toy pig. Children are then asked what they thought was inside the box when they first saw it, and
what they think someone who had never seen the box before would think was inside. Children from
around 4 years of age show an appreciation of the other person's false belief based on their access
to the wrong information. For this, children need to consider the source of information (what does
the box look like).

The use of false belief task as a measure of theory of mind in the last 3 decades is so
widespread that some researchers have warned against making a single task the marker of a
complex concept (Astington, 2001; Bloom & German, 2000; Wellman & Liu, 2004). In a paper
discussing the directions for the future of theory of mind research Astington (2001) argues the
importance of distinguishing between theory of mind and false belief and criticizes generalizing
false belief research to theory of mind: "one still hears people say that children have "got" the
theory of mind when they pass the false-belief task" (p. 685). In line with this concern, some have
argued that to gain a comprehensive understanding of mind children go through a developmental
progression, mastering different mental state concepts via a sequence of predicable steps (Wellman
& Liu, 2004). Therefore to gain a more accurate picture on theory of mind development it is

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important to take into consideration theory of mind concepts other than false belief, such as knowledge acquisition and emotion understanding.

Moreover, the majority of participants in theory of mind research come from Western cultural backgrounds (Wellman, Cross, & Watson, 2001). Therefore it is unknown if developmental issues found are specific to children in Western cultures or are universal developmental phenomenon. There are very few studies using samples from various cultures and there are controversies in the literature that does so. While research on highly similar cultures (in terms of geographical proximity, economical and educational background and cultural practices), such as US and Canada, Hong Kong versus Mainland China and Italy versus Britain (Lecce & Hughes, 2010; Liu, Wellman, Tardif, & Sabbagh, 2008; Oh & Lewis, 2008), shows some significant differences in timing of children's acquisition of some theory of mind concepts, other studies show similarities across highly different cultures such as Canada, Peru, Samoa and India (Callaghan et al., 2005). In addition to timing of development, when various theory of mind concepts have been looked at across cultures, differences in patterns of development have been documented. For example Shahaeian, Peterson, Slaughter, and Wellman (2011) found that Iranian children outperform their Australian peers in knowledge access understanding while lagging in their understanding of diverse belief, a pattern similar to Chinese versus American children (Wellman, Fang, Liu, Zhu, & Liu, 2006). In another study Iranian children were found to understand sarcasm earlier than their Australian peers (Shahaeian, Nielsen, Peterson & Slaughter, under review).

In the current study our aim was to investigate the development of belief and knowledge understanding in Iranian children using multiple tasks. It is important to confirm that children's previously found problems with diverse belief are not confounded by familiarity with elements of the task, initially developed by Wellman and Liu (2004) and tested on American children. In this task, the protagonist is a boy who is looking for his cat. Previous researchers (Wellman et al., 2006) developed a different version of the diverse belief task for Chinese children, noting that having a pet is not common in China so children might not be familiar with the situation. The same reasoning may apply for Iranian children and therefore it is important to make sure that the nature of the task does not mislead children to fail to understand the diverse belief story. We therefore used different tests of diverse belief using culturally familiar situations for Iranian children.

It is also important to determine if Iranian children's previously demonstrated advanced performance in knowledge access relative to Australian children (Shahaeian et al., 2011) extends to other tasks assessing children's understanding of learning and knowledge. To be able to distinguish how and when we have acquired knowledge is important. By knowing how we have gained a belief we will be able to evaluate the validity of that belief (Gopnik & Graf, 1988). For instance in

forensic situations it is critical to establish if a witness has directly seen a particular event or if he/she heard about it from someone else (Robinson, 2009). Therefore the ability to remember the source of one's knowledge and belief is of major importance in our social life. Several studies, all with children from Western cultures, have reported that the ability to distinguish sources of information develops during childhood. For instance some studies have investigated children's understanding of how and when their knowledge is acquired (Sodian & Wimmer, 1987; Tang & Bartsch, 2012; Tang, Bartsch, & Nunez, 2007; Wimmer, Hogrefe, & Perner, 1988). These studies show that 3 year olds have difficulty in understanding sources of knowledge. When children have learnt about the contents of a drawer or a toy tunnel through different sources (seeing, being told by the experimenter and figuring out from a clue) 3 year olds have a bias to say they have seen it, even when the information was given to them by an experimenter (Gopnik & Astington, 1988; O'Neill & Gopnik, 1991). It has also been reported that 4 year olds have difficulty understanding when they have learnt a novel fact, so they declare that they have always known something they have just learnt (Taylor, Esbensen, & Bennett, 1994). Therefore evidence suggests that understanding when and how knowledge is gained is difficult for 3 and 4 year old children. But, as already alluded to, these studies were all conducted in Western cultures. Because previous research has shown Iranian children are quicker than their Australian counterparts in understanding the concept of knowledge access (Shahaeian et al., 2011), it is important to see if children's understanding of other facets of acquiring knowledge—such as recognizing sources of knowledge, and the learning process—is similarly advanced.

To explain previously-documented cultural differences in Iranian versus Australian children's acquisition of theory of mind concepts, Shahaeian et al. (2011) referred to the importance of knowledge acquisition in Iranian culture compared to diversity of belief. They argued that Iranian children are encouraged to learn proper ways of doing and thinking, compared to children in Western cultures who are more encouraged to challenge ideas and develop their own independent beliefs. However this argument is based on data from one knowledge access and one diverse belief task, from Wellman and Liu (2004) theory of mind scale. In order to draw firmer conclusions about cross-cultural differences in the development of theory of mind reasoning, we need to see if Iranian children's advanced understanding of knowledge access is also evident in other elements of knowledge understanding. If this advanced understanding of knowledge access task can also be seen in other analogous tasks it will provide greater confidence that the ways different cultures emphasize knowledge acquisition impacts on this aspect of theory of mind development. Thus by including two tasks of "When Did You Learn" and "How Did You Learn" our aim was to establish if children's understanding of other knowledge related tasks is as good as that of knowledge access.

Finally previous research has documented the effect of language on false belief understanding showing that children with more advanced language abilities have better understanding of mental states such as false beliefs, or emotions (Harris, de Rosnay, & Pons, 2005; Hughes & Dunn, 1997; Jenkins & Astington, 1996). This association has been well documented with Western English language speaking children and is evident for general language measures, as well as for the separate elements of vocabulary and grammatical development (for a review see Milligan, Astington, & Dack, 2007).

Again, most of the evidence linking language to ToM comes from Western English-speaking countries. If language enables children to understand representational states, evidence should be found in other languages. However, there are reasons to suspect that this association might be specific to the English language. Studies in German (Perner, Sprung, Zauner, and Haider (2003) and Cantonese (Cheung et al., 2004) failed to find links between grammatical and complement knowledge and false belief. Therefore more evidence from different cultures and languages is desirable to provide a comprehensive account of the relations between language and theory of mind development. Thus our third aim was to investigate the association between language abilities and theory of mind in Farsi speaking children.

Method

Participants

A sample of 115 3 to 5 year old children (58 girls, 57 boys; mean age=53.7 months, SD=9.8) participated in this study. Thirty eight were 3 years old (Mean=42.6, SD= 3.3), 41 were 4 years old (Mean=54.2 , SD= 4.2) and 36 were 5 years old (Mean=64.8 , SD= 4.3). Children were recruited from a number of middle class day care centers in two cities of Shiraz and Isfahan. Both are major cities in Iran and capitals of their respective provinces. All parents were contacted by a letter through day care centers and children whose parents provided consent were tested.

Procedure, Tasks, and Scoring

Each child was tested in a quiet room of his/her preschool in the presence of a teacher or someone from the preschool familiar with the child. The Peabody Picture Vocabulary Test (PPVT), followed by different theory of mind tasks were then administered to the child. Vocabulary items in the PPVT were translated to Farsi by the first author, a native Farsi speaker. Wherever a word had several compatible vocabularies in Farsi, different vocabularies were discussed between authors and an expert in translation and the most agreed word was then decided. The first author also tested all children.

Theory of mind Measures

Diverse belief tasks: Three versions of Wellman and Liu's (2004) diverse belief task were used. We included Wellman and Liu's (2004) version verbatim, in which children were presented with two pictures of a garage door and some bushes. A boy doll enters and the child is told that this boy has lost his cat and the cat might be in the garage or the bushes. The child is then asked: "where do you think the cat is hiding?", When the child makes a choice the examiner says: "well this boy thinks the cat is hiding in the [opposite place]. Now he wants to look for his cat" and then the test question which is: "where will he look?". The child can either verbally answer or point to the picture. Two other more culturally familiar versions were used besides this task, with the same procedure. One involved a husband who comes home and his wife is not home; she might be in the shops or at the neighbors. Another involved a boy who lost his shoes which might be in the cupboard or under the bed. Children received a score of 1 (pass) or 0 (fail) for each task and hence a total score ranging between 0 and 3.

False Belief tasks: Three standard false belief tasks were used in this study. First, a surprise contents false belief task, where a crayon box containing a toy car was presented to the child. After this a doll enters and the child is told "this doll has never seen the box before, she has never opened it, what will she think is inside the box before opening it up?". Second a change-of-location false belief task with a lady who puts her keys in a box and leaves the room. The keys are moved to a basket in her absence and then the child is asked where the lady will look for the keys when she comes back. This is followed by control questions of: "where did she put the keys first" and "where are the keys now". The child needs to answer all 3 questions correct in order to get a pass score. And third, an emotion belief task which presents the child with a scenario of a girl who loves candies and a candy box which contains stones (but the girl doesn't know that). The child needs to answer how the girl feels when she first sees the box. Children were scored 1 for passing or 0 for failing each task and hence received a score out of 3 for false belief.

How Did You Learn task: This task was derived from Gopnik and Graf (1988). In this task a set of drawers are shown to the child with an object in each drawer. In the Looking condition the child is told: "there is something in here, let's have a look", in the Being Told condition the child is told: "we cannot look in this one but I will tell you what is inside". In the Clue condition the child is given a clue (e.g. an eggs box and told whatever inside the drawer goes in here) to determine what is inside the drawer: "we cannot look in this one either, but here is a clue for you". After each drawer, children are asked: "Ok so now what is in the box?" Following by the test question: "How do you know, did you look inside, or did I tell you or did you figure out from a clue?" Each

condition is presented twice with two different objects and children get a score out of 2 for each condition (summing to 6 points in total).

When Did You Learn task: In the task of When Did You Learn (from Taylor et al., 1994) a little bear is introduced to teach the child the name of a novel tool. The child is first presented with a novel tool (a special cutter used in sewing) and then asked whether she knows what this tool is. If the child answers no then the experimenter says "I don't know it either, let's ask this bear, he wants to teach us". Then the bear says the name of the tool: "this is called a cutter", and the child is asked "so what is the name of this tool?" Then children are presented with a set of test questions: "did you know the cutter yesterday; did you know it when you were very little, and did you always know the cutter?" And then a final question of "when did you learn the name of the cutter". Children got a passing score of 1 for each question and a total summed score out of 4. Two of the children knew the name of the tool and were excluded from the data for this task.

Results

Differences between diverse belief tasks

In order to see if differences previously reported in the literature on diverse belief task were affected by the cultural appropriateness of the task, we compared these Iranian children's performance on the 3 different diverse belief tasks. Recall that one was Wellman and Liu's (2004) version involving a lost pet, whereas the other two involved scenarios designed to be familiar to Iranian children. Table 1 provides the passing rates for each version of diverse belief. Cochran's Q test showed that the distribution of answers to the three different versions of the task were not significantly different (*p*=.124) suggesting that differences previously observed between Iranian and Australian children on diverse belief understanding (Shahaeian et al., 2011) are not a matter of cultural unfamiliarity with the task content.

**************** Insert table 1 here ****************

Understanding how knowledge is gained

Table 1 presents percentages of children who correctly answered the different test questions of the How Did You Learn task. For each task (Looked, Told, Clue) the table shows the number of children who answered both test questions correctly in that condition. As we can see children's performance on the Looking and Being Told conditions for all age groups is close to ceiling (above 85% of children in all age groups answered correctly to both test questions in the Looking and

Being Told conditions). In the Clue condition correct responses are 63% for 3 year olds and 83% for 4 and 5 year olds. All children who made a mistake in the Clue condition replied by saying, "you told me", except two who didn't reply. Means for the different source of knowledge questions for each age group are presented in Table 3. Again as we can see means for the first two conditions (Looking and Being Told) are close to ceiling. Table 3 also includes means from past research and shows that in current data means for Iranian children are higher than previous for Canadian ones.

*************** Insert table 2 here ***************

*************** Insert table 3 here ***************

Understanding when a novel fact is learnt

Table 1 presents the percentages of correct responses to the When Did You Learn tasks. It can be seen that children's correct responses to the When Did You Learn tasks overall is lower than for the How Did You Learn tasks (passing rate for When Did You Learn tasks ranges from 34% to 52% compare to passing rate of 76% to 98% for How Did You Learn tasks). Further, significantly more children passed the question of "did you know it when you were little" than "did you know it yesterday" or "did you always know it" (two non-parametric tests of Cochran Q and McNemar show significant differences, $p = .000$, comparing both latter questions to the question of did you know when you were little). However there was no significant difference between proportions of correct responses for the "did you always know" and "did you know yesterday" test questions ($p = .52$ for McNemar test and $p = .39$ for Cochran Q). At 4 years more than half of children (60%) admit that they didn't know the fact when they were little, while still replying poorly to other conditions (around 30% correct answers). To compare with published data (Taylor et al., 1994) in Western countries looking at 4 year olds performance 34 % of Iranian children pass the question of yesterday (compared to 14% American children; $z=3.31$, $p<.000$), 63% the questions of when you were a baby (28% Americans; $z=4.96$, $p<.000$) and 37% answered no to the question of did you always know it (compare to 28% Americans; $z=1.35$, $p=.08$). At 5 years however the performance of Iranian children is similar to the published data for 5 year old American children (close to 57% to 64% correct answers for American children and 50% to 69% for Iranian children).

Language and ToM scores

Finally, to assess the impact of language we looked at the correlation between language and different theory of mind tasks. Table 4 presents data on zero order and partial correlations between measures of theory of mind and language scores. Controlling for age, false belief understanding was

significantly correlated with children's scores on the PPVT, (r=.42, p<.001). Partial correlations with age controlled also showed that language was correlated with total When Did You Learn scores (r=.40, p<001), but not with total How Did You Learn scores (r=.05, p=.69) or diverse belief total (r=.17, p=.15).

*************** Insert table 4 here ***************

Discussion

This study demonstrates that using culturally familiar tasks does not alter Iranian children's pass rates in tests of diverse belief. This is important because Shahaeian and colleagues (2011) reported that Iranian children had difficulty with this construct compared to Western children. However, this was based on the use of a vignette involving a pet, something most Iranian children are not familiar with. Wellman et al. (2006) argued that the lost pet diverse belief task was not culturally appropriate for Chinese children leading them to use new versions of this task (e.g., featuring a boy who has lost his shoes, instead of cat), however they did not compare different versions of the task as was done in the current study. Our findings suggest that Iranian children's level of diverse belief understanding is unrelated to the specific content of the task and this in turn supports the hypothesis that their relatively slow mastery of diverse beliefs compared to Western children could be due to family and cultural differences that exist between two cultures in considering diversity of beliefs.

Shahaeian et al., (2011) have argued that Western cultures are known to be more forward and to encourage people to speak their minds; children in such cultures are encouraged to argue their opinions and do have regular exposure to and consequently an earlier recognition of, diverse beliefs. While in Eastern cultures such as Iran, harmony and similarity is emphasized more strongly than are interpersonal differences. Speaking one's mind and being outward sometimes is considered to be rude or aggressive (Behzadi, 1994). Agreement in Eastern, collectivist cultures is more appreciated than disagreement. This emphasis may limit exposure to diverse beliefs, and could also result in Iranian children finding the diverse belief task, in which they are asked to identify differing opinions, to be unnatural or uncomfortable.

The results reported here also suggest that Iranian children might have a more advanced understanding of how and when knowledge is gained than Western children. This reinforces previous research demonstrating that Iranian children pass the knowledge access task at higher rates than Australian children (Shahaeian et al., 2011). Indeed, it is argued that Iranian parents place more emphasis on knowledge acquisition and doing things in proper ways than Western parents

(Shahaeian et al., 2011). Our results provide support for such a claim, by showing that across a variety of knowledge-related tasks, including understanding where knowledge comes from, and understanding when knowledge was acquired, Iranian children tend to outperform Western children of the same age. For example, compared to published data Iranian children pass tasks of how and when knowledge is gained with higher rates than American and Canadian children (Gopnik & Graf, 1988; Taylor et al., 1994). We can see that Iranian 3 year olds show a better understanding acquiring knowledge via looking and being told compared to the published data from Canadian children (1.92 for Iranians compared to 1.04 for Americans in Looking condition, and 1.84 compare to 1.38 respectively in Being Told condition- In published data SD is not reported so that we will be able to run a t-test statistically comparing two samples). And total scores for both 3 and 4 year old Iranian children are better than American ones (5.07 compared to 3.96 for younger children and 5.51 versus 5.12 for older ones). In order to compare results to Gopnik and Graf (1988) we also looked at the percentages of children who made no errors in any of the tasks in each age groups, for 3 year olds this number is 55% for Iranians compare to 32% for American children ($z=3.28$, $p<.000$) , in 4 years of age 74% of Iranian compare to 54% of Americans ($z=2.94$, $p<.001$) and in 5 years 77% of Iranian and 73% of American's answer all questions correct ($z=.65$, $p=.27$). Perhaps whereas Iranian parents might not have high tolerance for challenging beliefs and discussing opinions, they do appreciate knowledge understanding.

Iran as a collective interdependent culture is expected to have some cultural differences with Australia as individualistic independent culture. An important aspect of collective cultures is respecting age as a sign of wisdom. In a collective culture children are encouraged and asked to respect their older siblings, older adults and elders in the family (Ghorbani, Bing, Watson, Kristl Davison, & LeBreton, 2003; Rudy & Grusec, 2001). This respecting age is often referred to by sayings like "they have more experience and they know better". Therefore there is great emphasis on "learning from experience" and "knowing". Previous research has suggested that, for instance, Chinese mothers use mental terms related to "know" more than "belief" compared to American parents (Wellman et al., 2006). The results of the current study provide support for claiming that Iranian children have a more advanced understanding of various knowledge tasks, and can provide support for claims saying in Iranian culture there is more emphasis on learning and knowledge acquisition and this leads children to have a better understanding of how and when knowledge is gained.

The current study adds to past research showing that receptive language abilities are correlated with several theory of mind concepts such as false beliefs, and when knowledge is gained in a culture previously untested on this. We have found an association of $r=.40$ ($p<.000$) between

language skills and false belief understanding which shows a relatively strong correlation (compared to the means effect of .34 (*p*<.001) for 53 studies reported in Milligan and Astington's (2007) meta-analysis). Results also show that knowledge of receptive vocabulary is associated with theory of mind understanding for Iranian children. It is nevertheless important to consider that for instance the knowledge tasks here require a high level of semantics. The child is replying to questions such as: "did you always know", "did you know yesterday" or "did you figure out from a clue". In all these questions children need to know words of "yesterday" and its conceptual reference in terms of time or figuring out things from a clue. This caution against the use of such a task to reference children's understanding of their timing of learning. It might be that children are simply not sure about when "yesterday" was, and therefore they respond that they knew the fact yesterday.

The current study provides deeper insight into cultural differences in knowledge and belief understanding. Our results support claims that Iranian children pass diverse belief understanding in lower rate compared to Western children even if the task is culturally familiar, while having advanced performance on several knowledge acquisition tasks. This could be taken further by studying how parental beliefs, attitudes, strategies and cultural values lead to these differences. Future research might look at which parental factors lead to these differences in children's performance compare to Western cultures. This study also documented how language abilities are associated with a range of theory of mind tasks in young children. In sum, here we show how children's ToM understanding can be as rich and diverse as the cultures in which they develop. If we are to gain a true understanding of the ways children come to understand the minds of others we need to continue pursuing data collection in as many environments as possible.

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Table 1

Number and Percentages of Children Who Passed Knowledge and False Belief Tasks

	3 year olds (N=38)	4 year olds (N= 41)	5 year olds (N=36)	Total (115)
When Learn (Yesterday)	18% (7)	34% (14)	50% (18)	34 % (39)
When Learn (Baby)	23% (9)	63% (26)	69% (25)	52 % (60)
When Learn (Always)	16% (6)	37% (15)	58% (21)	36 % (42)
When Learn (When)	12% (5)	39% (16)	42% (15)	35 % (40)
How Learn (Looked)	94% (36)	100% (39)	100% (35)	98% (110)
How Learn (Told)	84 % (32)	87% (34)	91% (32)	87% (98)
How Learn (Clue)	63% (24)	82% (32)	83% (29)	76% (85)
Content false belief	10% (4)	19% (8)	61% (22)	30 % (34)
Location false belief	8% (3)	31 % (13)	67 % (24)	35 % (40)
Emotion false belief	5% (2)	14% (6)	53% (19)	36 % (42)
Diverse belief wife	34% (13)	27 % (11)	72% (26)	43% (50)
Diverse belief cat	34% (13)	29 % (12)	75% (27)	45% (52)
Diverse belief boy	34 % (13)	34 % (14)	75% (27)	46% (53)
FB Total	M=.24, SD=.75	M=.66, SD=.99	M=1.80, SD=1.24	M=.88, SD=1.21
When Learn	M=.74, SD=1.1	M=1.79, SD=1.50	M=2.14, SD=1.71	M=1.63, SD=1.61

Table 2

Percentages of Children Who Passed Each When Did You Learn Tasks

	4 years **Current data** **(N=41)**	4 years from Taylor et al. (N=14)	**5 years** **Current data** **(N=36)**	5 years from Taylor et al. (N=14)
Yesterday	**34% (14)**	14% (2)	**50% (18)**	57% (8)
Baby	**63% (26)**	28% (4)	**69% (25)**	57% (8)
Always	**37% (15)**	28% (4)	**58% (21)**	64% (9)

Table 3

Mean Scores for the Task of How Did You Learn

	3 years **Current** **data (N=38)**	3 years from Gopnik & Graf (N=22)	**4 years** **Current** **data (N=41)**	4 years from Gopnik & Graf (N=17)	**5 years** **Current** **data (N=36)**	5 years from Gopnik & Graf (N=20)
Look	**1.92**	1.04	**2.00**	1.72	**2.00**	1.88
Told	**1.84**	1.38	**1.84**	1.88	**1.88**	1.94
Clue	**1.31**	1.54	**1.66**	1.52	**1.77**	1.84
Total	**5.07**	3.96	**5.51**	5.12	**5.66**	5.66

Table 4

Zero Order and Partial Correlations of ToM measures and Language Skills

	DB Total	FB Total	When Did You Learn	How Did You Learn
Raw correlation	.34**	.54**	.46**	.20
Partial Correlations	.11	.42**	.40**	.09

** $p < .001$

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Chapter 5

Parenting and Theory of Mind

Parenting strategies and theory of mind development: what accounts for cultural differences in belief understanding?

Invited to resubmit: *Cross-Cultural Psychology*

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Abstract

Developing an understanding of others' minds has been a topic of considerable research effort in the last few decades. Literature on Western cultures has documented that children's understanding of mind is related to parental and family factors such as the number of siblings, discussion about emotions inside the family and parenting styles. However research looking at parental and family factors and theory of mind development in non-Western cultures is scarce, despite culture playing an important role in shaping parenting practices and family atmosphere. The current study therefore investigated links between parenting strategies and children's theory of mind understanding in Iran. Parents of 40 4- to 6-year-old children (20 girls, 20 boys) responded to 6 parenting disciplinary situations derived from Ruffman et al. (1999). In each situation parents were presented with a challenging scenario which they might face with their child and were asked what they would do if their child behaved liked that. Parents' answers were coded based on a variety of disciplinary strategies. Children were tested with a battery of theory of mind tasks including false belief, diverse belief and a theory of mind scale. Results showed that the disciplinary strategy of *Silence* or avoiding direct encounter with the child was negatively correlated with children's total ToM scores as well as false belief and diverse beliefs understanding. In contrast, the disciplinary strategy focused on *Discussion* was positively correlated to ToM scores. This study provides important implications for understanding theory of mind development and its associates in a culture different from previously studied samples.

Parenting Strategies and Theory of Mind Development: What Accounts for Cultural Differences in Belief Understanding?

Understanding that people have internal mental states that drive their behavior, or a 'theory of mind', is an extensively studied developmental phenomenon. While it is widely accepted that by ages 4 or 5 children develop an understanding of mind, individual and cultural differences exist in the timing of development in this domain (see Wellman, 2012 for a review). The foundation for these differences include the presence or absence of siblings (McAlister & Peterson, 2007; Peterson, 2000), parents' use of mental state language (Peterson & Slaughter, 2003; Ruffman, Slade, & Crowe, 2002), parenting style (Hughes, Deater-Deckard, & Cutting, 2001; Ruffman, Perner, & Parkin, 1999; Vinden, 2001) and specifically parents' disciplinary strategies (Ruffman et al., 1999). That is, literature on the development of theory of mind suggests that individual differences in children's understanding of mind are associated with family factors.

A number of studies has identified early measures of parenting such as parental sensitivity and attachment during infancy as predictors of children's theory of mind, (McElwain & Volling, 2004; Meins, Fernyhough, Fradley, & Tuckey, 2003). A consistent finding has been that parental sensitivity, defined as the ability of mothers to perceive their infants' signals and to respond to them promptly and properly (Ainsworth, Bell, & Stayton, 1974), during infancy is related to an earlier acquisition of theory of mind in the preschool period. It can be say that more sensitive parents are more responsive to their children and in particular, their children's unique mental and emotional experiences. Sensitive parents thus provide a rich context of communication about the mind that helps children to understand their own and others' minds. More responsive parents listen to their children and refer to their internal motives and mental states (Symons, Fossum, & Collins, 2006) which may help children to gain a better understanding of mental states in general.

Other evidence suggests that parental mental talk and the nature of discussions inside the family facilitate children's understanding of mind. Dunn et al. (1991) observed the interaction of 3-year-old children with their parents and siblings at home. They found that the quality of family discussions, such as talk about feelings, was associated with children's theory of mind understanding as reflected in false belief task scores 7 months later. Other longitudinal research also supports claims that discourse about mental states predicts children's false belief understanding (Hughes & Dunn, 1998; Ruffman et al., 2002). However, some studies have shown that only certain types of mental state language is associated with children's developing false belief understanding. For instance Bartsch and Wellman (1995) found that parents' use of desire related terms is a stronger predictor of false belief understanding in children than belief- and knowledge-related language. Other studies indicate that parental conversation which includes elaborated and

explanatory mental state talk is associated with children's theory of mind, whereas parental talk that touches on mental concepts without explaining or elaborating them, is not related to children's understanding (Adrian, Clemente, Villanueva, & Rieffe, 2005; Slaughter, Peterson, & Mackintosh, 2007; Taumoepeau & Ruffman, 2006).

Parenting style, in particular disciplinary style, is also associated with children's false belief and theory of mind understanding. Parental control and power assertion, for instance, are negatively linked to children's theory of mind development. Vinden (2001) developed a Parental Attitude Inventory assessing three parenting dimensions of conformity, freedom and autonomy. She found that a parenting attitude of high control was negatively correlated with false belief understanding amongst American parents. Similarly, Pears and Moses (2003) assessed parental strategies using a parent daily report of child positive and negative behaviors. Parents were asked to report how they responded to those behaviors. This study found that mothers' use of power assertion was negatively correlated with their children's false belief understanding, however mothers' references to victims' feelings was not associated with children's performance on false belief tasks. This is contrary to findings of Ruffman et al. (1999) who asked parents to describe how they would respond to their child's transgressions. Ruffman et al. found that after controlling for several key variables (such as number of older and younger siblings, time spent with mothers and child's mental age), mothers' references to a victim's feelings uniquely predicted false belief understanding. However their study failed to find a significant correlation between mothers' general discussion responses and reprimand strategies and children's false belief scores. Ruffman et al. suggested that their coding of general discussion responses might be too broad and thus may have failed to capture the mothers' relevant discussion patterns related to false belief understanding.

While there are numerous studies on how parenting relates to theory of mind in Western cultures, we know of only one study involving non-Western families. Vinden (2001) tested a sample of Korean-American parents with her Parenting Attitude Inventory and, contrary to her findings with the American sample, found no correlation between parents' disciplinary style and children's false belief understanding for the Korean mothers. She argued that use of an authoritarian parenting style has a different effect on children growing up in an Asian as opposed to Western cultural context. Indeed, many studies suggest that Asian parents use more authoritarian parenting strategies; however still their children rate them as warm and supportive (E. Kim, 2005; K. Kim & Rohner, 2002; Rohner & Pettengill, 1985). Even though authoritarian parenting in Western cultures predicts lower school performance, Asian children who report their parents higher in authoritarian and controlling parenting strategies still perform well at school (Steinberg, Lamborn, Dornbusch, & Darling, 1992). However we need to consider that Vinden's Parenting Attitude Inventory was used

in only one study and no further published research has tested the reliability or validity of the questionnaire with different samples. In three unpublished studies we administered Vinden's attitude inventory to more than 200 Iranian parents and found not only that the inventory had extremely low internal consistency (alphas change from .25, .37 to .51 across 3 different studies and different sub-scales) but also that there was no correlation between parents' attitudes as measured by the inventory and their children's theory of mind. Amongst Iranian parents, the mean across all inventory questions for the whole sample was 4.6 out of 5. Most parents 'extremely agreed' with all of the items in the questionnaire (i.e. I let my child ask me why I want him to do something). This highlights the difficulties involved in directly translating measures in cross-cultural research.

In the current study therefore we adopted an open-ended assessment of parental disciplinary strategies, in order to investigate links between parenting and children's theory of mind in Iranian families. The focus on Iran is particularly important because previous research comparing Iranian and Australian children has shown cross-cultural differences in patterns of theory of mind development. Shahaeian, Peterson, Slaughter, and Wellman (2011) found that Iranian children, compared to age-matched Australian children, were more likely to pass a knowledge access task and to fail a diverse belief task. These differences were confirmed in a second study using similar methodology (Shahaeian, Nielsen, Peterson & Slaughter, under review). Both of these studies also failed to find any association between Iranian children's theory of mind understanding and having siblings, a pattern that contrasts results from similar studies conducted in England, Canada and Australia (for examples see: Cassidy, Fineberg, Brown, & Perkins, 2005; Hughes & Leekam, 2004; Jenkins & Astington, 1996; Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 2008; Pears & Moses, 2003; Perner, Ruffman, & Leekam, 1994; Peterson, 2000; Ruffman, Perner, Naito, Parkin, & Clements, 1998). This can be explained by collectivistic and individualistic cultural differences that exist between typical Iranian and Australian families: That is Iranian culture values interpersonal similarities more than individual differences and children are encouraged to be obedient, respectful and accepting rather than challenging adults by asserting their individual opinions (Frank, Plunkett, & Otten, 2010; Ghorbani, Bing, Watson, Kristl Davison, & LeBreton, 2003; Shahaeian et al., 2011). It also may be that Iranian parents have less tolerance for sibling disagreement and argument, with maintaining a level of harmony inside the family being highly encouraged (Shahaeian et al., 2011). While such claims can explain differences in children's performance, no empirical evidence has yet been provided to support these hypotheses. Therefore in the current study we explored parenting strategies and theory of mind performance in an Iranian sample of parents and children. If we can find links between parental strategies and children's

theory of mind understanding, this will be a valuable addition to the existing literature and may help to explain cultural differences in Iranian versus Western children's theory of mind development.

Method

Participants:

Forty 4- to 5-year-old children (Mean age=60.5 months, SD=5.6 months; 20 girls, 20 boys) and their mothers participated in this study. All families were chosen from 2 preschools located in a middle class region in city of Shiraz. Shiraz is the capital of Fars province with a population of 1.2 million (Statistical Centre of Iran, 2006) and is the sixth largest city in Iran. Researchers first contacted the preschools and by agreement of the principal, parents' questionnaires and child participation consent forms were sent to the parents. If the completed questionnaire and consent form were returned, then the child was tested. All children were tested one-on-one in a quiet room in the preschool by a native Farsi-speaker who was trained for testing children on the scale, in the presence of the child's teacher or someone familiar to the child.

All questionnaires were completed by mothers whose ages ranged from 26 to 41 years (Mean age=32 years). Five percent of mothers had less than 12 years education, 20% had a high school diploma equivalent to year 12, 35% had some university degree, 30% had completed an undergraduate degree and 10% had higher degrees.

Materials:

Theory of mind scale: A Farsi version of the theory of mind scale from Wellman and Liu (2004) with 5 tasks of Diverse Desires, Diverse Beliefs, Knowledge Access, False Belief and Hidden Emotions was used. All tasks were identical to those previously used tasks with Iranian children (Shahaeian et al., 2011), with the exception of the False Belief task, where we used a color pen box instead of candy box owing to the fact that candy rarely comes in boxes in Iran. The theory of mind scale tasks were scored on a pass-fail basis and summed so that children received a total score out of 5 for theory of mind. The score from this scale is referred to as ToM Scores.

Diverse Belief tasks: We added two additional versions of Diverse Belief because our previous research indicated that Iranian children pass this task in lower rates compared to Australian children (Shahaeian, et al., 2011). Therefore in addition to Wellman and Liu's (2004) scale version of Diverse Beliefs task about a boy who lost his cat, two other culturally familiar versions of the task were administered. In one a man comes home and finds that his wife is not there: She may be at the shops or visiting neighbors. In the other a boy has lost his shoes and they

might be in a drawer or under a bed. For each task children received a score of 1 for each correct response and hence could receive a total score out of 3 for Diverse Belief understanding.

False Belief tasks: Three tests were used to assess false belief understanding. One was a Change of Location task wherein a lady puts her keys in a box and leaves the room, and the keys are moved to a bag in her absence. The child is then asked where she will look for the keys when she comes back (test question), along with two memory questions of where she put them first and where they are 'now'. Children received a passing score for answering all three questions correctly. We also included a Surprise Contents task (also included in the ToM scale described above) in which a box of color pens is shown to the child. The child first makes a guess about the contents of the box that is subsequently opened to reveal it actually contains a toy car. Then a boy doll enters and the child is asked what the boy would think is inside the box. The child received a passing score of 1 for answering 'color pens'. Finally, we also included an Emotion False Belief task, in which children are shown a candy box which contains stones. A doll who loves candies enters the room, and the child is told that this girl has never seen the box before. Children are then asked the test questions of how the doll will feel when she sees the box first (happy) and how does she feel when she opens it up (sad). Children were given a score of 1 for answering both questions correct. In addition to the individual false belief task scores, each child received a score out of 3 for total false belief understanding.

Parenting Questionnaire: We created a questionnaire describing 6 disciplinary scenarios derived from Ruffman et al. (1999). The six scenarios are presented in the Appendix. Each scenario describes a child's challenging behavior and parents are asked to write answers describing (1) what happened in the situation, (2) "how did you feel?" and (3) "what did you do or say?" Responses to the latter question were coded for this study. Parents were told that if the situation had never happened, to write about what they would do if it were to happen.

Coding was derived from Ruffman et al. (1999) with adaptations based on the variety and frequency of answers we received from Iranian parents. Ruffman et al. used three categories of answers: *General Discussion* which is when parents reported that they explained to the child or discussed the situation with her/him; *Reprimand* which is when parents use punishment as a strategy or ignore the child; and *How Feel* in which the parent made reference to a victim's feeling.

We noticed that Iranian parents reported using reference to *Social Norms* (e.g., "this is not very polite" or "you should respect your older brother") in ways that do not directly translate into any of the afore-mentioned categories. Also we believe parents' use of emotional displays *(Parent Emotions)* such as: "I got mad", or "I become very upset" differ from reference to how a victim might feel in terms of the level of insight into mental state understanding that can be gained. We

thus also coded Parent Emotion responses into a separate category. Further, ignoring a child may have different consequence for his/her development that disciplining the child with power assertive strategies, so we elaborated on Ruffman's *Reprimand* strategy and added another category (*Silence)* to cover instances where parents ignore the child or don't talk to him/her. Finally, some parents reported that they let their child decide, and these were also coded separately. This is particularly important as in our previous unpublished studies we found that the majority of Iranian parents responded to the single item (from Vinden, 2000) of "I let my child decide for herself or himself" by extremely agreeing; it is therefore of interest to see how often they claim to act this way in real-life situations. Listed below are detailed descriptions and examples of each disciplinary strategy coding category.

Coding:

Discuss, Explain, Consequence (Discuss): This is when mothers tried to discuss the situation with the child, explaining why a behavior is not appropriate or telling him/her about the consequences of a behavior. Examples are: "I explained to him that he shouldn't touch other people's belonging without them knowing", "I tried to talk to them and see why they have started fighting" or "I told her she can wear this shirt but then she might catch a cold".

Let The Child Decide: When parents said that in such situations they let the child decide or left it to the child to choose: "I try to let him choose what he wants".

How Feel: This category includes responses that refer to the feelings of someone involved in the scenario. This is when a mother is referring to the feelings of the victim for instance "what would you feel if it were you instead of her/him".

Not talking, silence or being passive (Silence): In this category come responses that show a passive approach where the parent is not directly involved or does not encounter the child. This is when parents said they don't talk to the child, they ignored the child or they asked someone else to talk to the child. Sometimes they responded: "I looked at him and didn't say anything, he knows from my look that he has done something wrong" or "I said I am going not to talk to him for half an hour", or "I told his older sister to talk to him about it". Any response which does not actively involve the parent in the situation is included in this category.

Deciding for the child, punishing or getting angry (Boss): This category of responses refers to situations when parents don't discuss things with the child. This situation is a "parent to child" decision making situation, when parents try to control the child without any further explanation or discussion. Examples are: "I told him what to do", "She should do what I ask her to", "I told him he can't watch TV tonight"or "I told her she is a bad girl".

Social Norms: This is when parents refer to importance of social norms such as the proper behavior in public or appropriate behavior in front of adults. Examples are: "I told him people will laugh at him if he wears that", "so what would others think if you talk to your dad like this?", "you should respect your older sister", and "this is not how a polite child should talk to her grandparents".

Parent Emotions: This category includes responses referring to any sort of feelings that mothers were dealing with, for instance: "I would be very unhappy and told her I am very upset of what you did", or "I got mad at him".

Coding procedure:

Mothers' responses were not mutually exclusive. If a mother gave just one response, her answer was coded for that response, but if a mother said she uses different strategies (e.g. I talk to him first and try to explain him why I ask him to wear jacket, but if he doesn't accept, I tell him he can't come to the party with us"), her answers were coded for each relevant strategy. At the end, in line with Ruffman et al. (1999), each parent received a score based on the proportion of her responses in each category of coding. For instance if a parent had a total of 4 responses for all 6 situations including one *How Feel* response and 3 *Boss* responses she got a score of ¼ for *How Feel* and ¾ for *Boss*.

The first author scored all answers and a second coder, blind to the study aims and hypotheses, scored half. Coders agreed on 122 cases, Cohen Kappa=.84. Disagreements were resolved by discussion.

<div align="center">

Results

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Parenting strategies:

Frist we started by looking at the parenting strategies used by Iranian mothers. Most parents (87%) responded to all 6 disciplinary situations, 9% didn't answer one and the rest left two situations blank or said that it has never happened. A total of 306 responses were recorded for 40 parents across all 6 situations. Descriptive data relate to percentages of people who have used at least once any specific strategy and means and standard deviations for each disciplinary strategy by situation are presented in Table 1. Here it can be seen that the most frequently reported strategy is *Boss*, which is used by almost all parents (92%). However 75% also reported using the *Discuss* strategy at least once. The least used strategy was *How Feel*. It is also evident that more than half of the parents used the *Silence* approach as a disciplinary strategy and one third referred to *Social Norms* in disciplining their children.

<div align="center">

*****************Insert Table 1 here*****************

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Table 2 shows the associations between the different parental disciplinary approaches. Frequencies of *Explain*, *Let The Child Decide* and *Social Norms* were negatively correlated with frequencies of *Boss* and *Silence*. While other correlations do not appear significant.

******************Insert Table 2 here*******************

Associations between parenting strategies and children's theory of mind scores:

We calculated Pearson correlations between individual parents' reported frequencies of using the different disciplinary approaches (*Discuss*, *Let The Child Decide*, *How Feel*, *Silence*, *Boss*, *Social Norms* and *Parent Emotion*) and their children's theory of mind scores. Results show that the *Discuss* strategy is a significant positive correlate of children's ToM Scores (r=.54, *p*<.001), total False Belief (r=.48 , *p*<.001) and total Diverse Belief (r=.46, *p*<.001). Also *Silence* is a significant negative correlate of all three theory of mind measures (r=-.46, *p*<.001 for ToM Scores; r=-.36, *p*<.01, for False Belief, and r=-.48, *p*<.001 for Diverse Beliefs). Reported frequency of using *How Feel* and *Boss* strategies are correlated with children's false belief scores in a positive (r=.37, *p*<.01) and negative direction (r=-.43, *p*<.001), respectively (Table 3 presents the full set of zero-order correlations).

To evaluate whether or not these effects were influenced by child age or parental education we controlled for these variables in a further analysis. Pearson correlation between mother's education and children's different theory of mind scores, and also parent's disciplinary strategies are reported in Table 4. Partial correlations were calculated between frequency of each disciplinary strategy and children's theory of mind, controlling for child age and maternal education (see Table 5). The afore-noted correlations remained significant save for the negative correlations between children's false belief scores and parents' *Passive* and *Boss* strategies which were no longer significant.

******************Insert Table 3 here*******************
******************Insert Table 4 here*******************
******************Insert Table 5 here*******************

Discussion

This study has brought insight into parenting approaches in a sample of parents rarely studied before. Results showed that Iranian mothers use *Silence* and reference to *Social Norms* in disciplining their children, both of which are strategies not previously identified in the literature on

Western parents' disciplinary styles. Results however, confirmed that, in line with previous findings with Western parents, Iranian mothers' disciplinary strategies are predictors of children's theory of mind understanding. While mothers' positive approaches such as discussing issues with the child and talking about a victim's feelings positively associates with children's theory of mind, opposite strategies such as ordering (*Boss*) and not talking to the child (*Silence*) are on the other hand negative associates.

We found that of the seven disciplinary strategies coded, the *Boss* strategy, in which parents described using an authoritarian approach, was most common, whereas *How Feel* in which children were encouraged to consider another's emotions, was least common. In terms of one approach dominating, this pattern reflects but is distinct from Ruffman et al (1999) whose sample of British parents reported using a Reprimand strategy most frequently, followed by How Feel and General Discussion. However there are some procedural differences across the two studies that preclude direct comparison. The six scenarios we used were adapted from, and therefore slightly different to, the five scenarios used by Ruffman and colleagues. Also our disciplinary strategy coding scheme included seven categories, based on the content of responses from our Iranian parents whereas Ruffman et al coded their parents' responses into four categories.

There were significant inter-correlations amongst the different disciplinary strategies mothers reported using, suggesting that individual mothers tended to be consistent in their approach across diverse disciplinary scenarios. The use of *Boss* and *Silence* strategies were significantly negatively associated with *Discuss* and *Let The Child Decide* strategies. This suggests that parents who tend to discuss things with their children tend to do so no matter what the nature of the child's transgression, and they generally avoid reprimand or silence approaches. This may reflect parents' underlying beliefs about effective parenting behaviors, since the two strategies of silence and discuss are opposite in nature. Similarly the parental strategy of using Boss behavior is conceptually opposite to letting the child decide, again suggesting individual consistency in mothers' choice and use of disciplinary strategies.

Our results showed that mothers' use of a Discuss strategy is the strongest associate of their children's theory of mind understanding, correlating significantly with ToM Scale scores and also false belief and diverse belief. When mothers use this strategy with their children they are more likely to consider the child's perspective, in turn preparing children to better understand others' perspectives. Similarly, mothers who reported that they refer to the victim's feelings if their child misbehaves (*How Feel*) encourage their children to explicitly consider another's perspective. Interestingly, the use of this strategy was related specifically to children's false belief task performance, but not to performance on the full theory of mind scale. This finding is in line with

Ruffman et al. who found a positive association between British parents' references to other people's feelings and their children's false belief understanding. Notably, the use of authoritarian parenting (Boss) was negatively correlated with false belief understanding, although this did not remain significant after parent education and child age were partialled out. Silence, in this content, appears to be a more robust strategy.

The pattern of full and partial correlations suggests a robust association between Iranian mothers' disciplinary strategies and their child's ToM. In particular, positive association between mothers' self-reported use of the *Discuss* strategy, and their children's ToM as measured by each indicator of ToM: the total ToM scale, FB and DB independently. These correlations all remained significant when maternal education and child age were controlled. This is important, as one would think more educated mothers have children with better theory of mind understanding, and also older children get higher scores in theory of mind tasks. These results show that the association found here cannot be explained by these alternative explanations. Also positive correlation between the *How Feel* strategy and children's FB task performance still remained significant when the control variables were included in the analysis. This finding is consistent with Ruffman et al who also reported a zero-order correlation of .28 (p < .06) between parent's use of How Feel discipline and their children's FB scores.

Consistent with Ruffman et al, we found a negative association between use of the *Boss* strategy (similar to "Reprimand" by Ruffman et al) and children's FB score, although this correlation did not survive inclusion of the control variables. This suggests that more educated mothers may use less of authoritarian or passive strategies and are more tented to discuss things with their children. Similarly as children get older, mothers tend to use less of *Boss* and *Silence* strategies and tend to discuss more as they may think their older children are better able to understand the discussion while younger children need to be approached differently. More convincing, we found a robust negative association between Iranian mothers' use of the *Silence* strategy and their children's ToM; when control variables were entered in the partial correlation this association remained significant for children's ToM Scores and the DB scores. This suggests that theory of mind understanding develops more slowly amongst Iranian children whose mothers avoid or withhold communication in disciplinary situations.

Furthermore, our results suggest that Iranian parents' use of *Silence* strategies may be related to cross-cultural differences previously observed between Iranian and Australian children's understanding of diverse beliefs. Argument and speaking one's mind in Iranian culture is not highly valued and this may lead to the avoidance of challenges inside a family. Previous research also failed to find a sibling effect on theory of mind for Iranian children, with speculation being offered

this is an outcome of parents being less tolerant for siblings' arguments and encouraging family harmony (Shahaeian et al., 2011; under review). The current study provides support for these claims by showing that Iranian parents' use of the *Silence* strategy is negatively correlated with children's diverse belief understanding.

The findings of this study add to the body of research demonstrating links between family factors and children's developing theory of mind. We found that Iranian mothers reported using disciplinary strategies that echoed strategies reported by Ruffman et al's British parents (Discuss, How Feel, Boss/Reprimand) and that use of those strategies was related, as predicted, to their child's theory of mind development. Iranian mothers also reported using strategies not previously identified (Silence, Social Norms), which may reflect aspects of the Iranian collectivist cultural context and which were also correlated with their children's theory of mind development. These results bring new insights into aspects of family experiences, as influenced by cultural context which shape children's understanding of others' minds. This suggests that research in child development needs more data from various cultures to bring a better and more comprehensive picture of development and child and family interaction.

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Table 1

Percentages of Parents Who Have Used Each Strategy at Least One Time and Mean and Standard Deviation of Total Strategies Used by Parents in all 6 Situations

	Percentages	Mean *100	SD *100
Discuss	75	20.51	18.66
Let The Child Decide	33	5.5	9.92
How Feel	15	1.82	4.42
Silence	55	14.21	15.68
Boss	92	46.11	21.19
Social Norms	35	7.06	13.01
Parent Emotion	28	4.78	8.46

Table 2

Correlations Between Different Parental Disciplinary Strategies

	LHD	HF	Silence	Boss	SN	PE
Discuss	.23	.15	-.54**	-.57**	-.01	-.10
Let The Child Decide		.03	-.34*	-.49**	.02	.12
How Feel			-.21	-.23	.11	-.09
Silence				.19	-.33*	-.12
Boss					-.41**	-.27
Social Norms (SN)						.05

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

Table 3

Correlation of Parental Disciplinary Strategies and Children's Theory of mind Scores

	ToM Score	FB	DB
Discuss	.54**	.48**	.46**
Let The Child Decide	.12	.14	.17
How Feel	.21	.37*	.00
Silence	-.46**	-.31*	-.48**
Boss	-.13	-.43**	-.07
Social Norms	-.12	.13	-.05
Parent Emotions	-.12	-.05	.04

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

Table 4

Correlations Between Mother's Education and

Different Parental Disciplinary Strategies and ToM scores

	Education
Discuss	.65**
Let The Child Decide	.37*
How Feel	.064
Silence	-.42**
Boss	-.62**
Social Norms (SN)	.218
ToM	.40**
FB	.36*
DB	.45**

**p<.001   *p<.01*

Table 5

Partial Correlations of Parental Disciplinary Strategies and Children's Theory of Mind Scores Controlling for

Child's Age and Mother's Education

	ToM	FB	DB
Discuss	.46***	.48***	.39**
Let The Child Decide	.10	.14	.06
How Feel	.15	.35*	.09
Silence	-.37*	-.21	-.42**
Boss	-.03	-.23	-.03
Social Norms	-.08	.11	-.03
Parent Emotions	-.11	-.03	.00

**p<.001   *p<.01*

Appendix

Scenarios Presented to Parents

1   Can you remember a time recently that your child teased or hit another child?

2   Can you remember a time recently when your child shouted at you or your husband, made fun of either of you, or referred to you or your husband in some unflattering way?

3   Can you remember a time recently when your child damaged something that didn't belong to him?

4   Imagine you are going to a party and your child doesn't want to get dressed as you want him to do.

5   Can you think of the last time your child disagreed with you?

6   Can you remember the last time your child acted impolitely?

Chapter 6

Discussion

General discussion

The purpose of the current research was to investigate theory of mind development among Iranian children. By using a sample of Iranian children I was trying to address gaps in the literature created through lack of diverse samples. By assessing ToM via a systematic set of tasks, a second aim was to provide a more comprehensive picture of the development of this phenomenon. In Study 1 testing children aged 3 to 6 years from Iran and Australia revealed cross-cultural differences as well as similarities. In Study 2, thus I used an expanded ToM scale and broadened the age group to 9 years. Doing so enabled assessment of whether or not the differences documented in Study 1 would fade with age. In Study 3 I investigated, at a deeper level, the development of knowledge and belief concepts in children from 3 to 5 years. And finally Study 4 was designed to see whether parental strategies are related to theory of mind performance for Iranian children.

Summary of findings

Study 1

Study 1 aimed to compare and contrast ToM development of Iranian and Australian 3 to 6 year olds. The major purpose of this study was to evaluate whether Iranian children go through a sequence of steps in understanding of mind, similar to American and Australian children. Previous research has shown that American children progress through the following sequence: (1) diverse desires; (2) diverse beliefs; (3) knowledge access; (4) false belief; and (5) hidden emotions to gain an understanding of mind (Wellman & Liu, 2004). This study showed that Iranian children go through a similar sequence but that it is slightly different to the order taken by their Western peers. In line with previous research I found that Australian children's understanding of diverse beliefs occurs as the second step in the sequence, and before gaining knowledge access, whereas for Iranian children knowledge access happens first and diverse beliefs after. That is Iranian children pass test of knowledge access in higher rates compared to diverse belief and for Australians the opposite pattern occurs. Critically no difference was found between Iranian and Australian children in total ToM scores, meaning both groups develop a total theory of mind understanding at a similar pace.

These results were explained by referring to the cultural differences in Iran and Australia. Iran as a collective culture places more emphasis on family harmony and acceptance of others' beliefs, than on challenging others and diversity of their opinions. Group members are more encouraged to build on similarities, and being the same as others is more valued than speaking one's mind and expressing disagreement. Indeed, the Western concept of self-assertion may be viewed as rude and inappropriate in Iran. In such a culture there is great importance for the concept of respect, which is referred to accepting age as a sign for wisdom and learning the proper ways of doing things from older people. Children in Iran are not encouraged to speak their minds, particularly towards adults. These cultural aspects of encouraging wisdom and discouraging challenges and diversity may then explain why Iranian children generally pass tests of knowledge access before they pass tasks that tap diverse beliefs.

Study 1 also documented that having a sibling does not appear to have an impact in theory of mind development for Iranian children. This is in contrast to the effect of siblings for Western children, which has been well documented. One explanation is that within Western families having a sibling brings a rich environment for children to argue and discuss (McAlister & Peterson, 2007). Siblings are encouraged to speak their minds and parents let them fight and solve their problems. In contrast, in Iranian families playing peacefully is more desirable and parents expect their children to be more respectful towards each other. This also can help to explain why Iranian children take longer to understand diverse beliefs compared to their Australia counterparts.

Study 2

Study 2 was designed to evaluate if the results of Study 1could be replicated and extended with a new sample including a wider age range of children. Also an expanded version of the ToM scale with the inclusion of a sarcasm task was used. Sarcasm understanding was included as it has been shown to be an advanced measure of ToM understanding in Australian children, and is passed as a final scale step after false belief and hidden emotion (Peterson, Wellman, & Slaughter, 2012). In line with this, Study 2 showed that sarcasm understanding was the most difficult ToM task for both Australian and Iranian children, although Iranian children passed the sarcasm task at a rate as almost three times higher than Australian children. Consistent with Study 1, Study 2 showed that Iranian children pass the diverse belief task at lower rates compared to Australians while passing the knowledge access task at significantly higher rates.

The novel and intriguing finding of this study was that Iranian children outperformed Australians in understanding sarcasm. While less than 10 percent of Australian children up to age 9 passed the sarcasm task, slightly more than 25 percent of Iranians of the same age passed this measure of higher order theory of mind understanding. Understanding sarcasm needs sensitivity to the meaning in people's communication (Filippova & Astington, 2008). We argue that in a collective culture, where interpersonal relationships have a major importance (Triandis, 1993) people might be more sensitive to interaction and the meaning of language during a conversation. And this might be practiced from early in life.

Study 3

The first two studies documented that Iranian children consistently pass Wellman and Liu's (2004) diverse belief task at lower rates and the knowledge access task at higher rates than their Australian counterparts. What is important then, is to ensure these differences are not limited to just one diverse belief and knowledge access task. This is particularly relevant as previously Wellman, Fang, Liu, Zhu, and Liu (2006) in their study of ToM scaling with Chinese children, used a different version of diverse belief task claiming that the context of the original task was not familiar to Chinese children. In Study 3 I thus used 3 different diverse belief tasks with more culturally familiar stories. In addition, it was worthwhile asking if Iranian children's performance in knowledge access task generalized to other related tasks assessing knowledge understanding. So by including two sets of knowledge tasks: "When Did You Learn" from Taylor, Esbensen, and Bennett (1994) and "How Did You Learn" from Gopnik and Graf (1988) I was able to more thoroughly investigate Iranian children's understanding of how and when knowledge is gained.

There were no significant differences in the pass rates of the three different tasks, suggesting that Iranian children's relatively poor performance on the test of diverse belief was not attributable to cultural familiarity. Further, Iranian children's relatively high performance on the knowledge task can be generalized to other aspects of knowledge acquisition. I found that children's performance on tasks related to how knowledge is gained was at ceiling. For when knowledge is gained, compared to the published data with Western children, the children tested in Iran were performing better at 3 and 4 years of age. I suggested that this pattern could be related to broad cultural differences in the way family and culture emphasize concepts of learning and challenging of beliefs.

Study 3 also investigated the effect of language on theory of mind development in Iran. The association between language development and false belief understanding is well documented with Western English speaking children (see Milligan, Astington, & Dack, 2007 for a review). However it can be questioned whether this association is limited to some features of English language or if there is a broader link between language skills and theory of mind understanding. For example, language presents children with a tool to imagine mental representations of beliefs. Thus it was important to see if this finding is also the case for Iranian Farsi speaking children and theory of mind is related with language abilities. Consistent with previous findings in Western cultures, the language abilities of Iranian children were associated significantly with their theory of mind scores.

Study 4

Finally, study 4 was designed to see if associations could be found between parenting strategies and children's theory of mind scores. To the best of my knowledge, at the time of writing there is only one published study looking at this association in non-western communities – Korean American parents (Vinden, 2001). This study failed to find any significant association between parenting attitude and children's false belief scores (Vinden, 2001). In Study 4, by using open ended questions I tried to capture parental behaviors which might lead to children's theory of mind understanding. By presenting parents with scenarios of everyday life and asking them how they would react if their child misbehaves I became able to more accurately understand parents behaviors and attitudes. Interestingly I found that Iranian parents' use of *Silence* strategies, which means avoiding direct encounters with children is negatively associated with their children's diverse belief understanding as well as total theory of mind and total false belief. Similarly, use of power assertive strategies (e.g. punishing, ordering the child what to do, or deciding for the child) is a negative predictor of theory of mind understanding. In addition, parents who discuss the situation with their children facilitate theory of mind understanding. These findings are important as it outlines a feature of Iranian culture which is rooted in collective values. And this is what we have found in children's diverse belief understanding. Understanding diversity from early ages requires being prone to challenges and differences. In a collective culture people are encouraged more to hide their disagreement and try to stay in harmony with others. They avoid disagreeing and directly talking about what they want or think. And as we can see many parents use *Silence* as a strategy to "teach their children what is best to do". In this strategy a parent has told: "I don't talk to him for few minutes and thus he realizes he has done something inappropriate". This is very important as it provides explanation for why Iranian children develop understanding of diverse beliefs later than Australian children.

From false belief to theory of mind

False belief refers to an understanding that people's knowledge about a situation might be different from reality. In this situation their behavior is guided by their false belief. For the last 3 decades different false belief tasks have been used as a means tapping children's emerging understanding of mind. For decades, assessing false belief understanding has been used pervasively as indicator of theory of mind (Wellman, Cross, & Watson, 2001). However theory of mind is a multi-faceted phenomenon. It includes understanding of desires, intentions and emotions as well as knowledge and beliefs (Astington, 2001; Wellman, 2007; Wellman & Woolley, 1990). Despite this important fact, the vast majority of research has either used false belief tasks and referred to it as theory of mind or used one or two other aspects beside false belief in theory of mind research (Astington, 2001).

I have documented children's development in several theory of mind concepts. If it was only false belief understanding, after Study 1 I could have mistakenly made the conclusion that Iranian children gain understanding of mind later than Australian children. However using a comprehensive scale showed that pace of progression for both countries is similar, even though differences exist. Following by that in Study 2 and 3 I found intriguing cultural specific domains of theory of mind development. Understanding the concept of knowledge acquisition happens earlier for Iranian children compared to Australians, similarly a complete understanding of sarcasm presents earlier amongst Iranian children than Australian children. These findings show the importance of testing multiple theory of mind concepts. False belief understanding, even though critical, is not the only, nor the most important feature of understanding of mind. To gain a comprehensive developmental picture of theory of mind, researchers need to shift from false belief to multi-aspect assessments including desires, intentions, knowledge, emotions and beyond.

Universality versus cultural specificity

The second issue I found through 3 studies is not something new, but is nevertheless neglected in the child development literature: That is, culture matters, if we are to study human development. Henrich, Heine, and Norenzayan (2010) in an exhaustive review of the literature have argued that while more than 98 percent of samples in behavioral science come from Western cultures, still researchers insist in making conclusions about human universal psychology. In theory

of mind research, we can see that the cross-cultural literature compared to studies of Western children is slim. For over 30 years of research on theory of mind only a handful of studies have included samples from non-Western cultures. A portion of this literature focuses on urban Chinese children (for a review see Liu, Wellman, Tardif, & Sabbagh, 2008), with a few looking at other cultures such as Korea and Japan (Oh & Lewis, 2008) and Italy and Britain (Lecce & Hughes, 2010). False belief acquisition also, in small samples of non-urban children has been documented for Pygmies in Central Africa, Peruvian children living in a mountain village, Polynesian children in Samoa and Junín Quechua children (Avis & Harris, 1991; Callaghan et al., 2005; Vinden, 1996). These are children with different lifestyles, education systems, and upbringings to urban children in any culture. But does that give us the universal picture of development that we need?

Vinden (1996) by using a battery of false belief tasks has found differences among Junín Quenchua children in the pattern of theory of mind understanding compared to reports with Western children. While the majority of children in her sample could distinguish between appearance and reality, they had difficulty in false belief and representational change in surprise object and deceptive container tasks, meaning that even though they understood the difference between reality and appearance they could not generalize it to the false belief situations. Their false belief understading also did not improve by age, a pattern which is different from previous research with Western children. Obviously this variablity makes it difficult to come to conclusions about universal and cutlurally specific aspects of ToM development. It also highlights the need for more cross-cultural studies, using different theory of mind tasks that move beyond the implementation of a single false belief task.

The present research was unique because a scale with multiple theory of mind concepts was employed and two direct cross-cultural comparisons involving relatively large samples of children from Iran and Australia were made. Research on theory of mind needs considerable moves toward using different samples from different cultures. What we know so far is not sufficient to understand *children*'s understanding of mind.

Family influences

In two decades of research in Western countries a series of studies have documented the effect of family size, conversation inside a family and parent-child communication, on false belief understanding. A body of literature shows that in Western cultures children with more siblings are ahead of their peers in understanding of mind (Jenkins & Astington, 1996; Perner, Ruffman, &

Leekam, 1994; Ruffman, Perner, Naito, Parkin, & Clements, 1998). However, it has been argued that having sibling by itself cannot lead to better false belief understanding, rather it is the environment siblings create that helps children to gain understanding of mind quicker than children without siblings (McAlister & Peterson, 2007). Support for this argument comes from studies showing that it is only child-age siblings that are associated with theory of mind understanding and having an infant, teenaged or adult sibling does not have the similar effect (Peterson, 2000). Peterson (2000) has explained that having a sibling brings a rich environment to argue and exchange beliefs and ideas, as well as talk about emotions. And that challenging environment helps children to develop theory of mind understanding faster. It is therefore reasonable to assume the role of parents in how siblings interact may be a moderator to the association between having a sibling and developing a theory of mind. One may then ask does having siblings bring such an opportunity for children in all cultures?

In the only study with a non-Western sample, Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, and Berridge (2008) found associations between having siblings and theory of mind in Greek children. In two experiments they investigated the effect of family size and the time that children spend with siblings or their extended family members. In the first study, they found a hierarchy of four factors related to false belief development: the number of adults living in close proximity, the number of older siblings, the number of younger siblings and age. In their second study however they found the amount of time spent with the siblings and family members to be the best predictor of false belief understanding.

In two studies I investigated the impact of having a sibling in ToM development for Iranian children. Both studies failed to find any association between theory of mind and the number of siblings for Iranian preschool and school-aged children. It is notable that in my samples, the Iranian families were typically smaller than the comparison Australian families. Nevertheless, this may help us to understand why Iranian children's understanding of diverse belief is acquired later compared to Australians. It may be that in Iranian families having a sibling does not bring a challenging environment to argue and exchange ideas. As previously explained family harmony is more emphasized in collective cultures than diversity, differences and challenges. This could explain why we failed to find a positive effect of siblings for Iranian children's theory of mind understanding.

In an attempt to understand this pattern, I investigated parental attitudes and children's theory of mind understanding. First I started by using Vinden's (2001) Parenting Attitudes Inventory (PAI). Close to 250 Iranian and Australian mothers responded to the PAI items in the

course of my data collection. Unfortunately I found that there was not enough variability in responses to allow meaningful measurement of parental attitudes. There appeared to be high desirability in strongly agreeing with the PAI items, which made it impossible to capture individual differences between parents, so the PAI data was not reported in this thesis. In a last study (Study 4) I decided to use an open-ended disciplinary questionnaire derived from Ruffman, Perner, and Parkin (1999). I presented Iranian parents with scenarios that they may face with their children in daily life and asked what they would do if this situation happened. I received a broad range of responses from parents and indeed coding of these responses brought valuable insight into our understanding of Iranian parents' disciplinary styles. Study 4 showed that parents' use of *Silence* strategies (where parents said they don't talk to their child as a disciplinary strategy) had a negative association with children's total ToM scores, as well as their total false belief and total diverse belief scores. Also the use of authoritative parenting disciplines (labeled *Boss*) similarly was negatively correlated with children's false belief scores, but not total theory of mind or diverse beliefs. In contrast parents who use discussion as an strategy (where parents said they talk to the child and explain to him/her why should/ should not do the behavior) with children had a positive association with their children's of theory of mind understanding. This latter finding is consistent with previous studies involving Western parents (e.g. Ruffman et al, 1999).

My study is rare in its use of a sample of non-Western mothers and their children to investigate ToM and parenting strategies (we know of only the one study published in English language journals doing this) and indeed the results are important and telling. What I have found can also help explain why Iranian children pass the diverse belief task at lower rates than their Australian peers. Although a cross-cultural comparison will be essential to clarify this issue, these reports from Iranian parents may suggest that use of *Silence* strategies or avoiding direct encounters is more accepted in Iranian culture than challenging one's beliefs and speaking one's mind. Importantly this feature of Iranian culture does not bring about a hostile or neglecting environment which generally slows theory of mind development, since children have similar rates of progression in total theory of mind in both cultures.

In sum, the findings reported in this thesis provide new insights and suggest important directions for future research in this domain. I have shown that there are reliable cross-cultural differences in Iranian versus Australian children's theory of mind development, which are broadly consistent with these cultures' accepted modes of interaction. I have further found that, whereas the presence of siblings in the family is positively associated with children's mind understanding in Western cultures, that association is not evident amongst Iranian families. Finally, I have begun to

investigate in more detail, how family context, specifically parents' disciplinary strategies, are related to their children's theory of mind development. All together, my thesis moves forward the view that culture shapes and affects interactions inside the family and this is an important pathway to be further studied in order to fully understand children's social-cognitive development.

Limitations and directions for future research

Research across cultures is not only extremely difficult, but also has it's own unique difficulties. Perhaps one of the most important pitfalls of cross-cultural work is the question of adaptability. One can never be completely sure if the questions, instructions or concepts have the same "meaning" or "interpretations" for both cultures and languages. During translating children's tasks in this thesis, I was very careful in terms of translation, length of sentences and simplicity of the words used. Fortunately the tasks are very simple stories or instructions and therefore I can confidently say the differences observed are not likely to be a matter of linguistic differences. Also having similar differences for older (6-8 years old) children, who have gained better mastery in language, brings more confidence in the results. However, it still will remain a question whether both cultures had similar interpretations of, for example the question of diverse beliefs. It is possible that for Iranian children the concern they have over "doing the right thing" and therefore looking at the right place, becomes so strong that they answer in a way which directs to the correct behavior. Therefore, despite my attempt to use different versions of the task I may have been unable to capture such interpretations. Having said that, this doesn't disqualify the findings after all, as by itself, this potential difference in interpretation shows a cross-cultural difference. However to go into more depth in such topics, there needs to be more future research dedicated to a) linguistic details of tasks and b) interpretations of children on the tasks.

Of other limitations of current study was not matching samples based on the cognitive factors related to ToM such as verbal ability and executive functioning. Even though in one study I tried to include verbal ability as a measure, this did not get more in depth considering the difficulty of sampling. Testing close to 400 children and the times spent on this testing to capture the initial differences made it impossible to get into more details on language and cognitive abilities in the timeframe for this thesis. This also opens directions for future research to consider.

Finally, an important limitation I faced during writing this work was lack of enough literature on parenting in Iran. Unfortunately despite all my effort, I was unable to detect references from Farsi language journals that can help me build stronger arguments about Iranian parents disciplinary strategies which are unique to Iran and different from what is already being studied in Western

literature. This sort of research is scarce and I believe my attempt to detect a part of these strategies is a valuable addition to the literature on parenting and culture. However the lack of references in this area show the importance of call for future research investigating cultural aspects of parenting and family interactions.

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