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## The role of culture in Theory of Mind

Leslie Linares Pava  
*Edith Cowan University*

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# The Role of Culture in Theory of Mind

Leslie Linares Pava

This thesis is submitted in fulfilment of the requirements for the award of  
**Doctor of Philosophy (Psychology)**

Supervisor: Dr Rodrigo Becerra  
Co-Supervisor: Dr Justine Dandy  
Ass. Supervisor: Dr Guillermo Campitelli  
Submitted: July, 4th 2018

School of Arts and Humanities  
Edith Cowan University  
Western Australia

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## Abstract

Theory of Mind (ToM) is defined as the ability to understand our own and other people's mental representations, characterised by individual perspectives and motives, with potential for directing human behaviour (Kuntoro, Saraswati, Peterson & Slaughter, 2013). Over the past 30 years this concept has captured the attention of cognitive and developmental psychologists and it has been established that typically developed children from individualistic, mainly from Anglo (English-speaking) countries are most likely to acquire this ability at the age of four.

In the past decade, a growing interest in differences between children from individualistic and collectivistic cultural orientations led researchers to question the extent to which ToM is influenced by culture. Many cross-cultural studies that examined the ToM performance have mainly focused on reporting on children from individualistic dominant cultures (mostly from English speaking countries) and countries from predominantly collectivistic dominant cultures, and have found that children from the former are more likely to develop advanced and earlier ToM, fuelling deeper investigation into sociocultural mechanisms influencing ToM performance in collectivistic children.

In the present study, a narrative literature review was conducted to identify the evidence for differences and similarities in ToM performance of children from different cultures; the potential sociocultural factors influencing ToM; and gaps in the current literature that will benefit from future research. The review comprised 131 studies and revealed two main findings. Firstly, little is known about the mechanisms underlying cultural variations in ToM. Secondly, parenting might be an important cultural

transmission mechanism that has only been partially investigated in past cross-cultural ToM research.

These gaps in the literature sparked my interest in advancing our understanding of the sociocultural influences on ToM performance, and ultimately led to this investigation. The main aim of my study was to explore the impact of sociocultural factors on ToM performance in children from Australia and Colombia. To address the main aim of this research, I explored the influence of sociocultural factors (i.e., parent-child relationships and child self-concept dimensions) in ToM in a sample of four- to six-year-old Colombian ( $N = 70$ ) and Anglo-Australian children ( $N = 87$ ).

My results revealed that culture influences ToM performance. Mediation analyses confirmed that children's tendency towards following rules and parents' participation in the child's everyday activities and knowledge about their child are potential influencing mechanisms that can explain ToM variability, although this was confined to the six-year-olds only. Moreover, important cultural differences and similarities in ToM performance emerged from my findings. Similarly to that reported in previous studies, Anglo-Australian children presented more advanced ToM abilities than Colombian children and achieved significantly higher total scores on the ToM scale, as well as above-chance levels on higher-order ToM tasks. However, a novel finding was that the order in the Guttman scalogram for ToM progression was similar between the cultural groups. The latter finding demonstrates there is still more to discover in the field of ToM to shed light on new directions of ToM development in children across cultures.

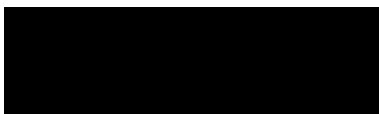
To sum up, this investigation contributed to the growing evidence of the influence of collectivistic and individualistic orientations in parenting involvement styles and children's norm awareness as potential cultural transmission mechanisms in ToM.

Therefore, future investigations might be interested in broadening their scope of investigation to socialization agents like parents and teachers and their influence in children's ToM to consolidate our knowledge about the cultural transmission mechanisms in ToM. This, will to not only advance the field of ToM, but also enrich research in other disciplines, such as education.

## Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

- i. Incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;
- ii. Contain any material previously published or written by another person except where due reference is made in the text of this thesis; or
- iii. Contain any defamatory material;



.....  
Leslie Linares Pava

...July 4th, 2018.....  
Date



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I would like to express my gratitude to all those who supported me throughout this research journey.

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To my dearest friends who became my family, my sisters, while away from home: Alba Rojo, Lizeth Prada, Diana Marin, Alejandra Guevara and Maria Cecilia Salcedo, I will always be thankful for your comfort, support, and the blessings each one of you bestowed on my life.

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To all of you mentioned here and those not mentioned; your immeasurable love, support and prayers were the greatest contribution to this research project. Thank you.

## Dedication

This work is dedicated to:

*The One and Only, who can make all things possible, My Father God in Heaven, the Love of my soul, my everything, my sweet Lord Jesus Christ:*

*“To Him who is able to do immeasurably more than all we ask or imagine, according to his power that is at work within us, to Him be glory in the church and in Christ Jesus throughout all generations, for ever and ever! Amen.” (Ephesians 3: 20 – 21)...to the One whose promises never fail and reminded them to me as I went through this journey: “For I know the plans I have for you... plans to prosper you and not to harm you, plans to give you hope and a future (Jeremiah 29: 11)... Do not fear, for I have redeemed you; I have summoned you by name; you are mine. When you pass through the waters, I will be with you; and when you pass through the rivers, they will not sweep over you. When you walk through the fire, you will not be burned; the flames will not set you ablaze. For I am the Lord your God, the Holy One of Israel, your Saviour (Isaiah 43: 1 - 3)... He gives strength to the weary and increases the power of the weak. Even youths grow tired and weary, and young men stumble and fall; but those who trust in the Lord will renew their strength. They will soar on wings like eagles; they will run and not grow weary, they will walk and not be faint (Isaiah 40: 29 – 31)... So do not fear, for I am with you; do not be dismayed, for I am your God. I will strengthen you and help you; I will uphold you with my righteous right hand (Isaiah 41: 10)... No one will be able to stand against you all the days of your life. As I was with Moses, so I will be with you; I will never leave you nor forsake you... Be strong and courageous. Do not be afraid; do not be discouraged, for the Lord your God will be with you wherever you go (Joshua 1:5 & 9).”*

*... “And we know that in all things God works for the good of those who love him, who have been called according to his purpose.” (Romans 8: 28) ... and, so I believed.*

*Today, July 3<sup>rd</sup> of 2018 when I am finalising the last bits and pieces before thesis submission, I want to share with you that I went through this learning process in the middle of unthinkable difficulties surrounding my life. However, the only thing I was always certain of was that His grace is enough, Jesus is enough. He uses all, the good and the bad, to fulfil His purpose in my life, in my husband’s life, my marriage and my whole family. My future is in His hands. Thank you Lord, everything is yours, victory is yours today.*

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# Chapter 1

## Introduction

### 1.1 Overview

The main purpose of this thesis was to investigate the influence of sociocultural factors on Theory of Mind (ToM). ToM is the capacity to interpret or infer our own and others' behaviour in terms of recognising, attributing and responding to mental states (Fonagy, Target, Steele, & Steele, 1998). These states include desires, intentions, beliefs, emotions, knowledge and other mental representations of the inner world (Flavell, 2004; Flavell, 1999; Fonagy et al., 1998). ToM emerges during early childhood, between the ages of three and six years, and continues to develop until adulthood. Successful acquisition of this ability involves understanding that mental states differ among people, and individual behaviour is based on one's belief of what is true, regardless of whether this belief differs from reality (Kuntoro, Saraswati, Peterson, & Slaughter, 2013). Theorists describe this process as creation of a theory, which means that since individuals cannot access other persons' minds, they must create a theory to infer others' mental representations (Chenari, 2009).

Acquiring ToM does not take place in isolation; social, contextual and environmental factors contribute to shaping children's individual experiences, development and cognitive processes (Astington & Barriault, 2001; Markel, Major, & Pelletier, 2012). This has led researchers to consider the possibility that ToM may be socio-culturally influenced; and since it is a cognitive ability encompassing a broad range of mental states including emotions, desires, knowledge and thoughts, it should be assessed accordingly (Astington & Barriault, 2001; Liskowski, 2013; Shahaeian, Peterson, Slaughter, & Wellman, 2011). To date, on the one hand, there is little evidence regarding the relationship between sociocultural factors and ToM; and, on the other hand, the assessments undertaken in the majority of previous studies

focused predominantly on children's performance of False Belief<sup>1</sup> tasks (FB – see description in Subsection 1.2.2) as the litmus test of ToM (Ghrear, Birch, & Bernstein, 2016).

To address this gap, my research investigated the performance of children from Colombia and Australia between the ages of four and six in a set of ToM tasks and explored potential sociocultural influences on their performance. The ToM tasks assess desires, beliefs, knowledge, content false belief, explicit false belief and mixed emotions. In the present study, I followed Wellman and Liu's model of ToM subcomponents and progression, since it provides an integrative view of ToM by using a progression of subcomponents from easy to advanced and includes children's understanding of ToM subcomponents prior to FB as well as later developments (e.g., FB, misleading emotions). The latter is also known as higher order (or advanced) ToM subcomponents (Cheung, C, 2006; Kuntoro, Peterson, & Slaughter, 2017).

In the next part of this introduction I describe Wellman and Liu's model of ToM development, commencing with a description of ToM subcomponents that children successfully understand before the age of three, prior to acquiring the ability to understand FB tasks. Later ToM subcomponents, misleading emotions and ToM development based on FB are subsequently outlined. Then I will present the potential sociocultural mechanisms influencing ToM, including what we know and the current gaps in the literature. The introduction concludes with an outline of the main aims of this study.

## 1.2 ToM Development and Sequence: Wellman and Liu's Model

In 2004, Wellman and Liu conducted a meta-analysis of 45 studies to compare the performance of typically developed English-speaking children in opposing construct tasks (e.g., desires vs. beliefs). This provided evidence of how Anglo children understood different

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<sup>1</sup> FB task: the child is told a story where the character has a belief (e.g., Peter think his mittens are in the closet) that differs from reality (e.g., the mittens are really in his backpack). The child must recognise that the character has a different belief to his/her own and reality, by correctly acknowledging the character's belief (e.g., test question: where will Peter look for his mittens? - Correct answer: in the closet. –Wellman & Liu, 2004).

ToM constructs and that their acquisition progressed in a sequence from easy to advanced and comprised desires, beliefs, knowledge, false beliefs and misleading emotions. Therefore, in their work, Wellman and Liu (2004) presented ToM development as a sequential order and suggested that “responses formed a consistent developmental progression” (p. 523).

In line with the above perspective of a ToM developmental progression, scholars have stated that ToM begins when children acquire the skills to successfully understand desires, perceptions, intentions and basic emotions at around two years of age (Bartsch & Wellman, 1995; Carlson, Koenig, & Harms, 2013; Ruffman & Taumoepeau, 2017; Wellman, Philips, & Rodriguez, 2000; Wellman & Liu, 2004; Wellman & Woolley, 1990). Evidence shows that children can distinguish between physical and non-physical entities at this age and noticeably understand the use of words such as ‘like’, ‘want’ and ‘feel’ (Astington & Barriault, 2001; Bartsch & Wellman, 1995). Acquiring the skills to understand subjective desires involves predicting that behaviour is driven by desires and expressed through what one wants or likes, and their fulfilment, or lack thereof, makes people feel good or bad (e.g., I like to run; therefore, I feel good about running, so I run). Accordingly, children are capable of understanding that: 1) what one likes or wants could differ between people (e.g., John likes chocolate; Ana likes broccoli.); and 2) that one can inhibit personal preferences to understand others’ differing preferences (e.g., I like broccoli; John likes chocolate.). This first step in the development of ToM was shown by Wellman and Liu’s (2004) meta-analysis which suggested ToM begins with the acquisition of desires: “It is possible to theorize that an initial understanding of the subjectivity of desires, once achieved, could mediate an understanding of the subjectivity of representational mental states such as belief” (p. 536).

Belief reasoning develops around the age of three, when children demonstrate abilities to understand that people can have opposing thoughts, intentions and beliefs, and such mental representations may or may not be a true reflection of the world (Bartsch & Wellman, 1995).

At this stage of ToM development, children understand the relationship between desires and beliefs, and recognise that both these mental states can drive behaviour, also known as belief-desire psychology (Bartsch & Wellman, 1995). Bartsch and Wellman (1995) nominated these two constructs – desires and beliefs – as core subcomponents of ToM. For example, children can understand that, if a person wants (desire) to eat a chocolate bar and thinks (belief) the chocolate bar is in the fridge, he/she will look for it in the fridge (action or behaviour). Hence, “theory of mind reasoning is organized around three large categories of mind and behaviour: beliefs-desires-actions” (Wellman, 2017, p. 2).

Furthermore, understanding what others believe, think or desire requires access to information or previous knowledge to help draw conclusions and make predictions (Shahaeian, 2013). According to Wellman and Liu’s model, children acquire the skills to understand beliefs before knowledge. That is, to understand knowledge, children must be capable of comprehending that people need access to information in order to judge whether someone is knowledgeable or ignorant about the true state of affairs (Miller, 2000). For example, if Amy has looked inside the container (access to information), she knows its contents (she is knowledgeable). Therefore, the ToM subcomponent of knowledge or knowledge acquisition (i.e., what people have or have not seen or heard) makes reference to the evidence that leads children to understand the contents of the mind in oneself and others.

In the later stages of ToM development, children’s noticeable advances in their ToM abilities are reflected in a “significant conceptual change in their views about the mind... moving from a mechanistic-behavioral understanding to one that fully appreciates the mind as a representational device that sometimes gets things wrong” (Carlson et al., 2013, p. 392). Therefore, higher-order ToM subcomponents require children to have more sophisticated cognitive abilities to “think about mental states from the perspective of others” (Cheung, C., 2006, p. 14). Therefore, children need to: a) have the capacity to understand that other people

act consistently with their own beliefs or mental representations, despite being wrong (Astington & Barriault, 2001; Blijd-Hoogewys, Van Geert, Serra, & Minderaa, 2008; Hala & Carpendale 1997); and b) recognise that reality is changeable through manipulation and; c) fully comprehend subjectivity of the mind in addition to objective perception (Dennett, 1978; Keçeli Kaysili & Acarlar, 2011; Wimmer & Perner, 1983). The described process is what children need to acquire when performing in ToM subcomponents tasks like complex or misleading emotions, false beliefs and other advanced constructs (e.g., guilt, embarrassment, morality; Baron-Cohen, 2001; Pons, Harris, & de Rosnay, 2004). However, in alignment with Wellman and Liu's model, only misleading emotions and false belief are described here.

According to Gnepp (1983) and Gosselin, Warren, and Diotte (2002), the ability to successfully recognise misleading or hidden emotions requires children to develop advanced cognitive skills and sophisticated understanding of mental subjectivity. Proper emotional modulation (e.g., expressions of happiness despite feeling sad) requires children to understand that: a) other people can have a false belief; b) emotions can remain private and emotional modulation can create a FB; that is, expression of the emotion (e.g., looking happy to mask sadness) can create an incorrect belief in another person; c) masking emotions is aided by FB abilities; and d) emotional modulation can be used to protect others (prosocial display rules) as well as oneself (e.g., if one masks an emotion, another person may not feel bad). In other words, evaluating misleading or hidden emotions requires children to comprehend not only the reference to the emotions, but also the circumstances around them and their consequences (Gnepp, 1983). For example, children should be able to evaluate situations (e.g., Max wants a car but is given a book), understand manipulation of information (e.g., Max expresses happiness instead of sadness), examine possible consequences (e.g., if Max expressed sadness, he would not have been given gifts), and differentiate between the mental states of oneself and others (e.g., if Max does not express sadness, his aunt will feel happy). Some children are able

to identify that real emotions can be masked at around the age of four, but it is only at the age of six or older that they are likely to understand and master misleading emotions and explain why masking an emotion is necessary in a particular social situation (Harris, Donnelly, Guz, & Pitt-Watson, 1986; Gnepp, 1983; Gosselin, et al., 2002; Gross & Harris, 1988; Pons et al., 2004; Wellman & Liu, 2004). Previous studies involving Anglo children have shown that some children between the ages of four and six are able to perform hidden-emotion tasks at above-chance levels (Banerjee, 1997; Gosselin, et al., 2002). Some researchers have linked Anglo children's success in this task to prior acquisition or consolidation of FB abilities (Banerjee, 1997; Gosselin et al., 2002; Gross & Harris, 1988; Harris et al., 1986), encouraging scholars to focus on FB tasks as the litmus test of ToM.

Successful performance of FB tasks reflects children's ability to understand that another person's mental representation or belief differs from one's own after information about the task has been manipulated (Baron-Cohen, Leslie, & Frith, 1985; Perner, Leekam, & Wimmer, 1987). For example, the Change Location FB task consists of moving the targeted object (the chocolate bar) from its original location A (the fridge) to a new location B (the drawer) without the story's protagonist (Max) being aware of this change. To correctly perform this task, the child must be able to differentiate between his or her own knowledge or mental representation of the new information B (the drawer) and the other person's belief (Max thinks the chocolate is in the fridge – location A), because the latter is unaware of the change of location (or manipulation of information). Successful performance of FB tasks indicates that children have the ability to understand that people's behaviour is driven by their own (correct or incorrect) beliefs or mental representations.

Performance of FB tasks has been used as the main marker of ToM emergence and mastery. Emergence refers to the initial grasp of the FB concept at around three years of age, while mastery indicates proficiency in FB at around five or six years of age. Typically, children



recognise their own and others' mental representations at around the age of three, but have difficulties differentiating between them, hence succeeding in only 20% of FB tasks (Keçeli Kaysili & Acarlar, 2011; Wellman, 2017; Wellman, Cross, & Watson, 2001). At this age, children normally perform at below-chance levels or achieve very low success rates (Wellman et al., 2001). FB performance improves to 50% (chance level) at around the age of 3.6 years (44 months) and to 75% (above-chance level) at around the age of 4.6 years (56 months; Keçeli Kaysili & Acarlar, 2011; Wellman et al., 2001). Mastery of ToM is considered when a 100% success rate is obtained in FB tasks at around the age of five or six, and children are able to correctly justify and explain the task (Miller, 2012, Peterson & Slaughter, 2017; Wellman, 2017). This means that children are able to explicitly recognise that reality is changeable through manipulation and can fully comprehend subjectivity of the mind in addition to objective perception (Dennett, 1978; Keçeli Kaysili & Acarlar, 2011; Wimmer & Perner, 1983).

Therefore, ToM development through FB performance has been investigated for over 30 years, primarily in children from English-speaking countries like the USA and the UK, with the result that FB performance of Anglo<sup>2</sup> children has predominantly set universal age markers for ToM (Astington & Barriault, 2001; Keçeli Kaysili & Acarlar, 2011; Liskowski, 2013; Miller, 2012; Slaughter & Perez-Zapata, 2014; Wellman et al., 2001). These universal age markers have also set the bar for researchers' assessments and comparisons of ToM performance between Anglo children and those from other cultures. However, understanding ToM through children's performance only on FB tasks has been criticised for being simplistic and limited (Blijd-Hoogewys et al., 2008; de Rosnay, 2017; Liskowski, 2013; Peterson & Slaughter, 2017). Hence, examination through a wider lens was necessary to provide a more

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<sup>2</sup> "Anglo" refers to English-speaking children born in and descendant from forebears from a mainly English-speaking country, like Australia, New Zealand, the USA, Canada and the UK (but excludes Indigenous populations like Aboriginal Australians).

comprehensive view and new insights into ToM development, and to clarify the influence of sociocultural factors (Astington & Barriault, 2001; Liskowski, 2013; Peterson & Slaughter, 2017; Shahaieian et al., 2011; Wellman, 2017).

To this end, Wellman and Liu (2004) developed a more comprehensive ToM assessment tool to evaluate the abovementioned subcomponents or mental states across six different tasks, namely Diverse Desires (DD), Diverse Beliefs (DB), Knowledge Access (KA), Content False Belief (CFB), Explicit False Belief (EFB) and Hidden Emotions (HE; which I will describe in detail in Chapter 4). They developed and tested the ToM Scale to examine ToM progression according to the above sequence. Over the past ten years, this scale has gained popularity among researchers engaged in exploring ToM across cultures and is highly regarded as a sensitive tool for capturing ToM differences in children from diverse cultural backgrounds (Peterson & Slaughter, 2017; Shahaieian et al., 2011; Wang, 2010; Wellman, 2012). The effectiveness of this scale in capturing the order of steps indicative of sequential ToM development (Asakura & Inui, 2016) was also confirmed by a longitudinal microgenetic<sup>3</sup> study conducted by Rhodes and Wellman (2013). In Chapter 2, I present a narrative literature review of the evidence for cultural differences in ToM progression.

### 1.3 Potential Socio-Cultural Mechanisms Influencing ToM

Researchers' interest in exploring ToM development in different cultures led to the emergence of a focus on sociocultural influences on ToM and the need for culture-sensitive tools to provide evidence of sociocultural influences, a gap in the field of cognitive psychology was identified. In this section, I explain the possible sociocultural mechanisms influencing ToM, commencing with a brief description of assumptions of universality in the field of ToM

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<sup>3</sup> 'Longitudinal Microgenetic' is a methodological approach in which the phenomenon of interest (e.g., a psychological construct) is repeatedly evaluated or measured in a sample of subjects to capture change in detail "over the course of transition in the domain of interest" (Flynn, Pine, & Lewis, 2006, p.152).

development. This is followed by a definition of culture and an overview of potential sociocultural factors influencing ToM from the perspective of a broader cultural framework (collectivism versus individualism). Finally, a description of the collectivistic and individualistic cultural characteristics in Colombia and Australia, respectively, is presented.

The universal approach states that children's performance of ToM tasks is the same across all cultures (Avis & Harris, 1991; Callaghan et al., 2005; Ferres, 2003; Lee, Olson, & Torrance, 1999; Naito, Komatsu, & Fuke, 1994; Wellman et al., 2001). That is, the position is that, irrespective of culture, successful understanding of FB tasks marks the "acquisition" of ToM around the age of four to five years (Blijd-Hoogewys et al., 2008; Callaghan et al., 2005; de Rosnay, 2017; Wellman et al., 2001). However, some researchers claim that despite some specific cognitive skills children gain across development are universal (e.g., executive functions), social, contextual and environmental influences also shape children's individual experiences and contribute to sociocognitive development and further understanding of the mind (Astington & Barriault, 2001; Carlson et al., 2013; Chenari, 2009; de Rosnay, 2017; Miller, 2012; Markel et al., 2012; Pavarini et al., 2013).

Given the potential influence of sociocultural factors on ToM, it is necessary to introduce a definition of culture and describe the enculturation process experienced during early childhood. Matsumoto and Juang (2016) described culture as a specific process of environmental, contextual and biological adaptation mediated by social interaction. Keller (2017) considers culture as a "representation of environmental conditions" (p. 833) like, for example, history, economy, education and caregiving systems that influence human behaviours. In alignment with these authors, my own view of culture is one of a holistic social system, shaped and defined by traditions, norms and values, specific to a group of people. That is, culture is a complex social network and belief system that defines a group (Matsumoto & Juang, 2016). It is through social interaction and many other routes, like immediate

environmental structure, that children learn about and are socialised into a culture – this process is known as enculturation.

Enculturation is defined as an interactive learning process with primary socialisation agents (e.g., parents, family and teachers) who are, in turn, influenced by culture in a macro way (Bornstein, 2012; 2013; Keller, 2007; Miller & Goodnow, 1995). Children learn about their culture, traditions, values and norms (e.g., what is expected in terms of communication, discipline and rules) by interacting with influential members of their cultural group. Hence, enculturation becomes an internalised process that impacts the individual's psychology (Hong, Morris, Chiu, & Benet-Martinez, 2000). Thus, the research on ToM has come to include a focus on sociocultural factors like family interaction, child self-concept, social practices and parent-child relationships (Astington & Barriault, 2001; Carlson et al., 2013; Hughes & Leekam, 2004; Keçeli Kaysili & Acarlar, 2011; Markel et al., 2012; Pavarini et al., 2013; Wellman, 2017; Wellman et al., 2001) because “culture unidirectionally provides the structure and environment for parents... to affect their children in culturally appropriate ways” (Matsumoto & Juang, 2016, p. 80). Additionally, other authors will go a step further and consider the relationship between culture and parenting to be bidirectional as culture is dynamic and changes over time, and as so, these two constructs influence each other (Trommsdorff & Kornadt, 2003).

One framework that is often drawn upon to explain cultural differences is the collectivistic and individualistic framework<sup>4</sup> that originated with Hofstede's work for IBM. Through his work, Hofstede (2001) identified that individualistic societies emphasise individual over group interests, and members are considered self-reliant and autonomous. In contrast, collectivistic societies focus on family, group cohesion and social closeness. Despite

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<sup>4</sup> It is worth noting that the that current conceptualisations of the collectivistic and individualistic framework presented by Hofstede are not a single bipolar dimension but two dimensions present in all cultures in which in one culture, one dimension might be emphasised more than the other.

the fact that Hofstede's cultural framework is a fairly broad categorisation and has been criticized in regards to its usefulness or applicability (Kuntoro et al., 2017; Miller, 2002; Voronov & Singer, 2002,), it has been widely used by researchers in the field of ToM to explain how sociocultural factors (e.g., parenting practices) which are likely to be influenced by collectivistic and/or individualistic cultural tendencies may, in turn, influence differences in ToM performance of children across cultures (e.g., China [collectivistic] versus USA [individualistic]; Iran [collectivistic] versus Australia [individualistic]; Peterson & Slaughter, 2017; Shahaieian et al., 2011; Shahaieian, Nielsen, Peterson, & Slaughter 2014a; Wellman, 2017; Wellman, Fang, Liu, Zhu, & Liu, 2006).

In the narrative literature review presented in Chapter 2, sociocultural factors like parent-child relationship dimensions (e.g., discipline practices, communication styles and parental authority) and child self-concept dimensions (e.g., social closeness dimension) are identified as strongly influenced by collectivistic and individualistic orientations (Cross, Gore, & Morris, 2003; Keller et al., 2004; Markus & Kitayama, 1991; Rudy & Grusec, 2006; Walker-Schwab, 2013). As follows, I will briefly describe the parent-child relationship and child self-concept factors and their influence on ToM.

The quality of the parent-child relationship as the primary environment for fostering social interaction during early childhood is considered an important factor in exploring sociocognitive abilities like ToM (Flinn, Quinlan, Coe, & Ward, 2008; Miller, 2016; Pavarini et al., 2013; Sabbagh & Seamans, 2008). Moreover, parental practices of discipline, communication and authority have been found to be influenced by the broader cultural framework of collectivism and individualism (Niles, 1998). For example, research has found that collectivistic orientations are most likely associated with authoritarian parenting styles and pragmatic and guided child-rearing practices, while individualistic orientations are most likely associated with authoritative parenting styles and child-rearing practices that encourage

independence and autonomy (Rudy & Grusec, 2006). In addition, some researchers have suggested that ToM performance is negatively associated with authoritarian styles and harsh discipline practices, and positively related to authoritative styles that encourage open communication and reflection on others' feelings (Hughes & Ensor, 2006; O'Reilly & Peterson, 2014b; Pavarini, et al., 2013; Ruffman, Perner, & Parkin, 1999). It is widely accepted that active involvement of parents with their children, frequent emotional regulation through positive verbalisation, and induction-based discipline practices (e.g., explaining rules and negotiating) represent individualistic aspects of parenting that enhance children's ability to understand their own and others' mental states (Dunn, Brown, & Beardsall, 1991; Ensor & Hughes, 2008; Pavarini, et al., 2013; Ruffman et al., 1999; Slaughter, Peterson, & Mackintosh, 2007; Yagmurlu & Sanson, 2009). Chapter 2 provides further information about the influence of parent-child interaction on ToM.

Child self-concept is one of many sociocultural factors that reflects collectivistic and individualistic cultural dimensions (Markus & Kitayama, 1991). Although this construct has not been widely investigated, Ahn and Miller (2012) identified four self-concept tendencies that broadly represent collectivist/individualist sociocultural characteristics. According to these authors, social closeness (friendship dimension) and Traditionalism (normative dimension) are related to a collectivistic cultural framework; whereas Social Potency (leadership dimension) and Achievement (hard-work dimension) are related to an individualistic cultural framework (for further description of these dimensions see Chapter 4). Ahn and Miller (2012) explored the relationship between ToM and these four child self-concept dimensions and found that Korean children who scored higher in Traditionalism performed better on FB than their American counterparts who scored higher in Social Potency. The authors concluded that a tendency in children towards more collectivistic self-concept orientations may be related to successful FB performance. To date, Ahn and Miller's study is the only research that provides

evidence in support of a possible connection between child self-concept and ToM in pre-school children. Chapter 2 provides further details about the possible influence of self-concept factors on ToM.

### 1.3.1 Cultural Comparison between Australia and Colombia

Due to the potential influence of individualistic and collectivistic cultural orientations on sociocultural factors (e.g., discipline practices and parental style) and, in turn, ToM performance, I investigated the influence of sociocultural factors on ToM performance in children from two different cultural settings, namely Colombia and Australia.

Hofstede (2001) described Colombian as collectivistic dominant culture, while Anglo-Australians<sup>5</sup> has been identified to belong to an individualistic dominant culture. The latter emphasises the individual and autonomous, independent tendencies, whereas the former emphasises sociocentric, interdependent trends, and the focus is more about the behaviour, thoughts and beliefs of others in the in-group (Carlson, Kurato, Ruiz, Ng, & Yang, 2004; Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002). Cauce and Rodriguez (2002) claimed that the collectivistic orientation of Latin American cultures underpins child-rearing methods which are characterised by strong sociocentric beliefs and values.

Latin American and Anglo populations have been found to be different in parental authority, dependence on extended family, encouragement of individual autonomy of the child, parental control and structured parent–child interactions (Harwood et al., 2002). For example, Latin American mothers tend to devote exclusive maternal attention to their child for most of its time awake; they are more vigilant, controlling and focused on teaching during playtime (Harwood et al., 2002). In contrast, Anglo dyads are more independent from each other when

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<sup>5</sup> The term Anglo-Australian will be used in this thesis to refer to the dominant culture in Australia. So using this term excludes making reference to Aboriginal Australians or non-Anglo migrants in this multicultural nation.

the child is awake; parents use less controlling strategies to model behaviour and allow their children to freely explore with toys during playtime.

In Colombian culture, parenting practices embody an awareness of norms, strict discipline, respect for parental authority and little or no encouragement of questioning from the child (Carlson et al., 2004; Luis, Varela, & Moore, 2008). Yet, affection and closeness prevail in these parent-child relationships (Franco, Fogel, Messinger, & Frazier, 1996). Generally, this culture has been recognised for possessing high levels of social interaction, community participation, family-centred orientation and interdependence (Carlson et al., 2004; Gracia & Musitu, 2003; Posada et al., 2002). In contrast to their Anglo counterparts, Colombian parents regard their children as immature and in constant need of parental supervision and guidance (Putzi, 2008).

On the other hand, despite the influence of cultural diversity through multiculturalism, Anglo-Australian culture is characterised as individualistic (Australian Bureau of Statistics, 2006). Parenting styles in Anglo-Australian are known to be authoritative and to focus on encouraging independence and inductive-based discipline (negotiation instead of imposition; Yagmurlu & Sanson, 2009). For example, Herz and Gullone (1999) and Rubin et al. (2006) found that Anglo-Australian parents regarded high levels of extraversion and less inhibited personalities as desirable for their children.

## 1.4 Summary

It is reasonable to assume that cultural variability in parent-child relationships and other sociocultural factors may influence the acquisition of psychological constructs (Matsumoto & Juang, 2016; Peterson & Slaughter, 2017). According to Chasiotis, Bender, Kiessling, and Hofer (2010) in collectivistic dominant cultures, “parenting behaviours like lots of body contact and emotional warmth, on the other hand, increase the sense of belonging and may at the same



time blur the distinctiveness of the motivational states of the child and mother (or any other significant other interacting with the child), thereby delaying the onset of mentalistic understanding” (p. 383). In fact, in collectivistic cultures individual attitudes are not good predictors of individual behaviours, because intentions and desires are subject to external group norms (Lillard, 1998). In this sense, one could expect sociocultural factors (group norms, family dynamics, parenting style and self-concept), which are influenced by broader cultural frameworks, to play a role in the differences in development of ToM in children from collectivistic and individualistic cultural backgrounds.

Notwithstanding a steady increase in the number of cross-cultural investigations, the evidence to date is scarce, and whether ToM performance is culturally influenced remains the subject of ongoing debate because the mechanisms that generate ToM differences are unclear. To address this paucity, my study was aimed at investigating ToM progression and the role of potential sociocultural factors in ToM in children between the ages of four and six from two culturally different countries, Colombia and Australia. In addition, my study examined five parent-child relationship dimensions and four child self-concept dimensions as potential sociocultural mechanisms that may contribute to different ToM performances in children from these cultural groups.

These objectives underscored the need for a comprehensive review of literature for evidence of differences in the ToM performance of children from different cultures and identification of potential sociocultural factors related to ToM performance. Key aspects of cultural differences in ToM and the main gaps identified in the literature are outlined in the review reported in Chapter 2. In Chapter 3, I present the research questions and hypotheses that guided my empirical investigation. In Chapter 4, I explain the methods and procedures used, and in Chapter 5 I present the results. Finally, a discussion of the main findings, conclusions, limitations and future research directions is given in Chapter 6.

The present research is intended to provide a deeper understanding of the sociocultural factors that influence differences in children's performance of ToM subcomponents. The findings and conclusions are expected to advance the field of cognitive psychology by contributing to explanations for the differences in ToM performance (not assessed by FB alone) of children from different cultural backgrounds in order to contribute new insights into cultural aspects of relevance. I also hope to inspire other researchers to investigate new ways of approaching ToM by changing their methodological approach from a single ToM marker, like FB, to multiple subcomponents, broadening the scope of current research by exploring sociocultural factors and cultural mechanisms in cross-cultural research and expanding ToM knowledge in other disciplines, such as education. In my experience as a researcher and practitioner in the field of psychology, parents have little or no knowledge of ToM, and future research may also enhance their understanding of the essential role they play as nurturers of ToM in different cultural settings.

## Chapter 2

### Narrative Literature Review

#### 2.1 Introduction

Theory of Mind (ToM) development in children has been investigated for more than 30 years, mainly in children from English-speaking countries like the USA and the UK (Astington & Barriault, 2001; Miller, 2012; Pavarini et al., 2013; Wellman et al., 2001). More recently, a number of investigations have assessed children from different cultural backgrounds, and some of these studies have been reviewed in several narrative review papers. The major conclusion of these reviews was that ToM performance in children varies across cultures, with most of the differences attributable to the collectivistic or individualistic nature of the cultural contexts (Kallberg-Shroff & Miller, 2014; Ojalehto & Medin, 2014; Slaughter & Perez-Zapata, 2014). However, the number of studies reviewed was limited, and some of the conclusions related to sociocultural mechanisms that can explain variability in ToM performance were not thoroughly explored. Therefore, my aim was to conduct a more comprehensive review of the current literature and focus attention on empirical studies of sociocultural factors that can potentially explain ToM variability in children from different cultural backgrounds.

To this end, I conducted a narrative review of 131 empirical studies on ToM. Specifically, the aims of the present review were to identify: 1) differences and similarities<sup>6</sup> in

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<sup>6</sup> The universal approach states that the children's performance on ToM tasks is the same across all cultural backgrounds (Avis & Harris, 1991; Callaghan, Rochat, Lillard, Claux, Odden, Itakura, Tapanyan, & Singh, 2005; Ferres, 2003; Lee, Olson, & Torrance, 1999; Naito, Komatsu, & Fuke, 1994; Wellman et al., 2001). Therefore, in this narrative literature review children's performance across cultures will be established as similar if the percentage of FB pass rates is comparable to those reported by Wellman et al (2001) for Anglo children: 20% success (or below-chance level) at age of three, 50% success (or chance level) at around the age of 3.6 years (44 months), 75% success (or above-chance level) at around the age of 4.6 years (56 months), and mastery of ToM (or 100% success rate) at around the age of five or six (Miller, 2012, Peterson & Slaughter, 2017; Wellman, 2017). Also, similarities in the ToM scale will be established based on Wellman and Liu's (2004) ToM scale sequence for Anglo children (i.e., DD – DB – KA – FB – HE).

In addition to the above, if pass rates were not reported or if a study presented multiple statistical procedures for various ToM tasks or groups (e.g., ToM battery, age groups, cultural groups) or conducted a series of small studies (e.g., see Barrett et al. 2013; Callaghan et al. 2005) then, the summary in the Tables will focus on the authors' main conclusions as a correct and valid report about children's similar or different ToM performance cross cultures (e.g., Barrett et al. 2013 concluded that: FB performance was similar to Western children; Wang, Wang

the FB performance of children across different cultures; 2) differences and similarities in the performance of ToM subcomponents (desires, emotions, knowledge tasks) by children across different cultures; 3) potential sociocultural factors related to ToM performance in children from different backgrounds; and 4) gaps in the current literature for consideration in future research.

This chapter begins with a description of the method used for the literature search. I then present the main results relating to children's performance of ToM tasks as reported in the studies reviewed. This is followed by a discussion of the results in terms of cross-cultural differences and related sociocultural factors. Finally, I outline the limitations of the current literature, identify future directions for research and present my conclusions.

## 2.2 Method

The literature search was conducted using the search engine PsycINFO and two different blocks of keywords. The first block consisted of "Theory of mind", "False Belief", "Mental\*", "Understanding of the mind", "Mind understanding" and "Mind reading" joined by the "OR" operator; and the word "Culture" joined to this group by the "AND" operator. The second block included "Theory of mind" and "children" joined by the "AND" operator; and the words "autism", "brain injury", "deaf\*", "disabled", "psychosis", "intellectual disabilities", "cerebral palsy", "clinical", "blind" and "cognitive disabilities" joined by the "NOT" operator. The "NOT" operator was used to exclude irrelevant topics. To refine the search, several database filters or research limiters were used in the seven steps shown in Figure 1.

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et al., 2017 concluded that: Hong Kong children outperform their USA counterparts; or in Wellman, Fang, and Peterson [2011] the authors reported that Chinese children ToM sequence was: DD > KA > DB > FB > HE, while in Anglo children ToM sequence was: DD > DB > KA > FB > HE).

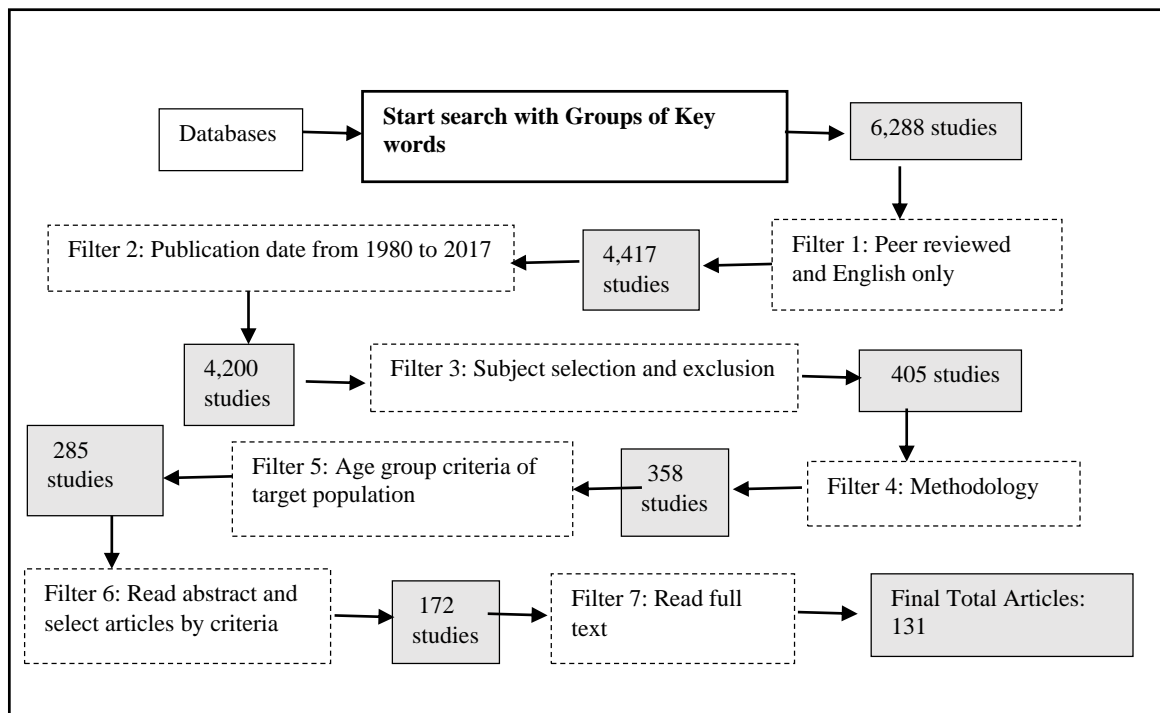


Figure 1. The literature search process and Collection of Relevant Studies

First, the articles were filtered by targeting only peer-reviewed journals in the English language. Then, the search focused on relevant publications from 1980 to 2017, because researchers have been investigating ToM development in children for the past 30 years (Slaughter & Perez-Zapata, 2014). In step three, specific subject filters were used as limiters to focus the search on relevant topics, including cognition, child development, psychosocial development and cross culture, and to exclude less relevant topics, such as biology, cognitive impairment, autism, physiology, psychiatry and medicine. In step four, the filter “methodology” was used to select only empirical and quantitative studies. In step five, the age of the targeted populations in the remaining studies was filtered by only selecting childhood – from birth to 12 years. In steps six and seven, the collected studies were further examined for their relevance to this literature review by reading the abstracts and the full texts. The final inclusion criteria comprised: 1) studies that examined typically developed children only; 2) studies that explored cross-cultural differences in ToM performance (cross-cultural studies); and 3) studies of ToM performance in single cultures other than from English-speaking

countries (mono-cultural studies). In mono-cultural studies where authors had not compared their participants' performance with those of Anglo children (e.g., USA, UK), I used the data in Wellman et al.'s (2001) meta-analysis to draw comparisons.

Most studies on ToM examined children in the two to six years old age range. However, my review included studies of participants up to 15 years of age (e.g., Mayer & Träuble, 2012; Robberts, 2008; Vinden, 1999; Wang, Devine, Wong, & Hughes, 2016) because they shed additional light on cultural differences in ToM performance, primarily revealing that some children from collectivistic dominant cultures, over the age of six experienced delays in successful accomplishment of ToM tasks compared to children from individualistic dominant cultures (mostly from English speaking countries).

## 2.3 Results

The outcomes reported in the studies reviewed were classified into two main categories: 1) ToM performance of False Belief (FB) tasks only; and 2) ToM performance on ToM batteries (e.g., ToM scale) and other tasks used to assess constructs different from FB (e.g., emotions tasks, desires tasks, and knowledge tasks; (see Figure 2). In each category, the studies were further classified into subcategories based on whether they reported similar, different or mixed\*<sup>7</sup> results on children's performance across cultures.

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<sup>7</sup> \* In the mixed results category, the pointed arrows indicate that these studies emanate from the main studies' category boxes because this subcategory was constructed from studies that found similarities or differences as their main core finding, but also reported an opposing outcome for a specific task or cultural group. This is why the total number of studies do not match and one study might be classified in two sub-categories. For an example, Callaghan et al.'s (2005) study which was primarily allocated to the 'Similarities in FB Performance' category because the authors' main claim was that ToM development is universal (or similar across cultural groups). I cite this study again in the FB mixed category due to reports of low FB performance in four-year-old Samoan children. Likewise, studies using other ToM assessment tools like the Knowledge tasks, ToM batteries, or the ToM Scale as the main measure, and found similar ToM performances in children across cultures, but different performance in some ToM subcomponents like FB were also categorised as in the mixed results category. For example, Calero et al. (2013) reported the same ToM scale sequence in Argentinian Children to that reported in Wellman and Colleagues for American and Australian samples however, FB performance in Argentinian children was reported to be at low levels compared to the latter groups reported in the literature. Studies indicating mixed results will be identified with the symbol (†) in Tables 1 to 4 in this Chapter.

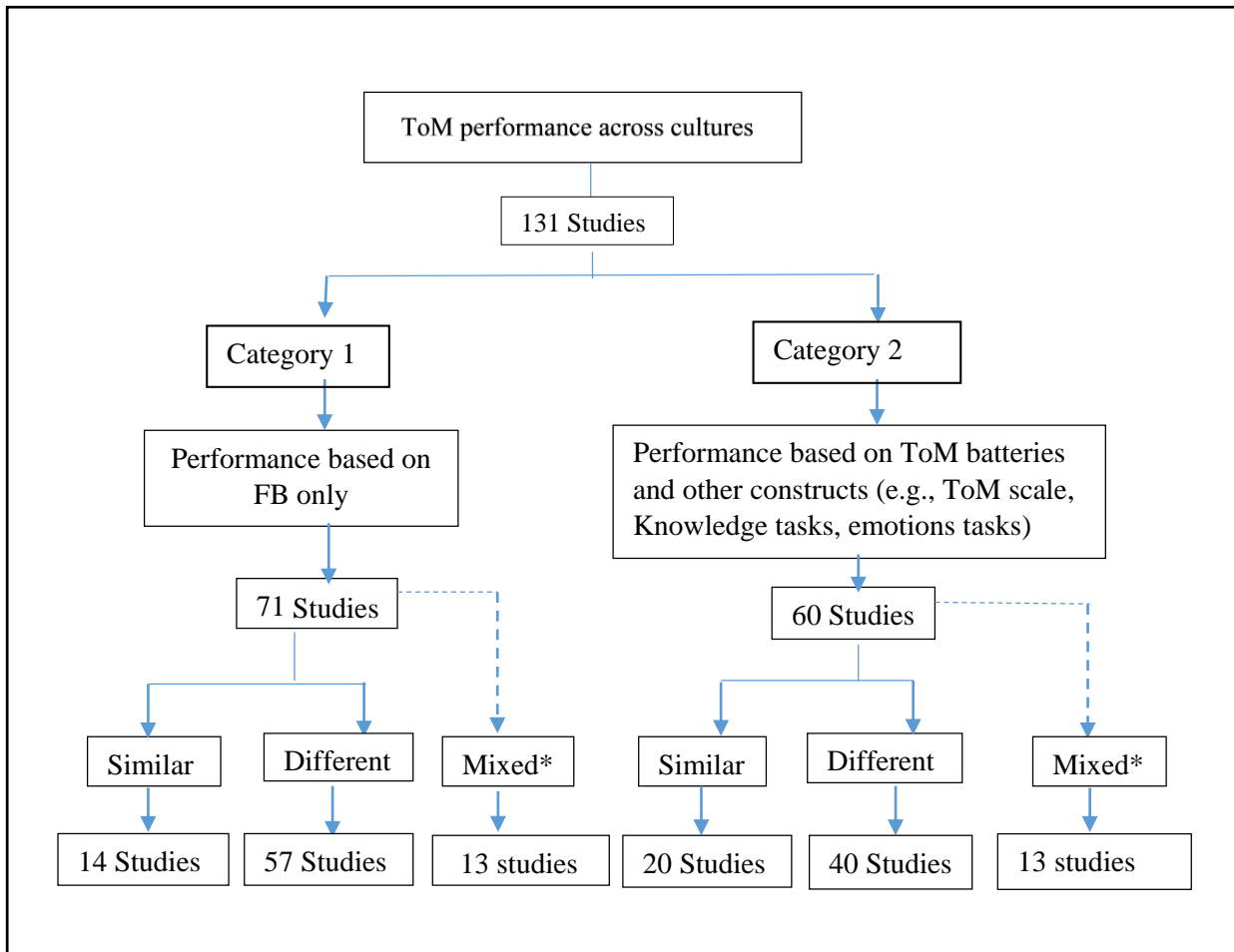


Figure 2. Literature Review's Main Categories and Number of Studies

The studies were conducted on all continents (except for Antarctica), ranging from Asia (e.g., Farrar et al., 2013; Laya de García et al., 2016; Peterson & Slaughter, 2017; Shahaieian et al., 2011), Europe (e.g., Berthoud-Papandropoulou & Kilcher, 2003; Lockl & Schneider, 2007; Jester & Johnson, 2016), Oceania (e.g., Mayer & Träuble, 2012; Oberle, 2009; O'Reilly & Peterson, 2014) and Africa (e.g., Avis & Harris, 1991; Chasiotis et al., 2010; Robberts, 2008 ) to South, Central and North America (e.g., Calero, Salles, Semelman, & Sigman, 2013; Callaghan et al., 2005; Shatz, Diesendruck, Martinez-Beck, & Akar, 2003). Their specific contexts ranged from urban to rural and Indigenous populations (e.g., Rochat et al., 2009; Shahaieian, 2015; Vinden, 1999).

In the rest of this section, a review of the categories and subcategories depicted in Figure 2, including the impact of sociocultural factors on the ToM performance of participants is presented. It is worth mentioning that of the 131 studies reviewed, 48 involved data collection from multiple cultures, while in the remainder, a single culture was examined. The exact number of cross-cultural and mono-cultural studies in each of the abovementioned categories is shown in their relevant sections. The main findings in each category, which can also be seen in the corresponding tables, are described below.

### 2.3.1 Category 1: ToM Performance across Cultures Based on False Belief Tasks

Category 1 includes studies that used only False Belief (FB) tasks as the litmus test for assessing children's ToM. Out of 71 studies, 14 reported similar performance by children from collectivistic dominant cultures and individualistic dominant cultural backgrounds (the latter mostly from English speaking countries), while 57 studies reported differences. Some found mixed results. In this category, 23 studies included data from multiple cultures; the remainder collected evidence from a single culture. Some of the studies in the latter group compared their findings to those reported in the literature for Anglo children. In the case of those which did not do so, I compared the reported pass rates with the expected FB performance pass rates for Anglo children, as proposed by Wellman et al. (2001) and presented in Chapter 1.

#### 2.3.1.1 Studies Reporting Similarities in FB Performance across Cultures

Fourteen studies (seven cross-cultural and seven mono-cultural) reported similarities in FB performance of children across different cultural groups (see Table 1). All reported similar performance on FB tasks by children from the UK, the USA and Canada and children from other cultural backgrounds (e.g., China, Germany, Korea) in the age range identified in Wellman et al.'s (2001) meta-analysis, suggesting that ToM follows a universal development in children across cultural settings (e.g., Callaghan et al., 2005; Lee, Olson, & Torrance, 1999; Oberle, 2009).



Table 1

*Studies Reporting Similarities in FB Performance across Cultures*

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
Avis and Harris (1991)	Baka in Cameroon	2.11 to 6.1 years and months	FB tasks: CL (manipulation)	Consistent FB performance with Western samples. Authors claim ToM development is universal From the older group (n = 17), 16 passed question 1, 14 passed question 2 and 14 passed question 3 From the younger group (n = 17), 11 passed question 1, 11 passed question 2 and 12 passed question 3	NR
† Barrett et al. (2013)	Shuar/Colono from Ecuador, Yasawa from Fiji, Salar from China, Kenya	16 to 64 months	FR battery: implicit CL, Content and AR (looking and non-verbal versions)	FB performance similar to Western children. Children from Kenya have difficulties resolving the tasks	NR
† Callaghan et al. (2005)	Canada, India, Peru, Samoa, Thailand	30 to 70 months	CL FB	Synchrony in FB understanding across all cultures Most 4 year old Samoans fail FB tasks	NR
Flavell, Zhang, Zou, Dong, and Qi (1983)	China, USA	3 to 5 year olds	AR tasks	Similar performance on AR on both groups	NR
Kaysili and Acarlar (2011)	Turkey	3 to 5.11 years and months	CL, content FB	FB performance similar to Anglo children	NR
Kobayashi, Glover, and Temple (2007)	Japan (bilinguals), USA (mono-linguals)	8 to 11.11 years and months	2 <sup>nd</sup> order FB tasks	No differences in FB performance	NR
Lee et al. (1999)	China	3 to 5 year olds	FB tasks: Content, CL and AR (manipulation of verbs)	FB Performance was similar to Western children	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Lockl and Schneider (2007)	Germany	Longitudinal study: 3 to 5 year olds	FB battery: First and second order FB tasks	Average FB pass rates (minimum and maximum scores achieved): 3 year olds = 28.6% (min 14.6%, max = 34.8%) 4 year olds = 62.4% (min 46.6%, max = 81%) 5 year olds = (min 81.3%, max 91.1%) and 46.8% (min 38.5%, max 52.7%) on 2 <sup>nd</sup> order FB	NR
Naito et al. (1994)	Japan	3 to 5 year olds	FB battery: Deceptive reality and content FB tasks	Children performed similarly to Western children	NR
Oberle (2009)	Micronesia	3 to 5 year olds	Content FB	Similar FB performance to Anglo children Success rates: 16% (3 year olds) and 96% (5 year olds)	NR
Oh and Lewis (2008)	Korea, England	3.5 to 5.0 years and months	Content and CL FB -"self" and "other" versions	Overall similar FB performance across groups	NR
Rochat et al. (2009)	USA, China, Brazil (Recife, Rio de Janeiro, Favela), Peru (Junin region), Fiji (Yasawa)	3 to 5 year olds	CL FB	Pass rates: 3 year olds = 26% (below-chance levels) 5 year olds = 85% (above-chance levels) Synchrony across cultures	NR
Sabbagh, Xu, Carlson, Moses, and Lee (2006)	China, USA	36 to 59 months	FB battery: CL, Content, deceptive, AR	Similar FB performance	NR
Wimmer and Hartl (1991)	Austria (German speakers)	3.1 to 5.10 years and months	FB battery	Similar FB performance to Anglo children. Success rates: 80% (4 year olds) and 100% (5 year olds)	NR

ToM = Theory of Mind; FB = False Belief; TB = True Belief; DD = Diverse Desires; DB = Diverse Beliefs; KA = Knowledge Access; HE = Hidden Emotions; S = Sarcasm (ToM scale tasks); AR = Appearance Reality task; TD = Typically Developed; LI = Language Impairment; IK = Ignorance Knowledge; MS = Mental States; SES = Socio Economic Status; SD = Socio Demographic; CL = Changed Location; EC = Emotional Components; EU = Emotional Understanding; NR = Not Reported; SCF = Socio Cultural Factors; T1 = Time 1; T2 = Time 2; T3 = Time 3.

### *2.3.1.2 Studies Reporting Differences in FB Performance across Cultures*

Fifty-seven studies (16 cross-cultural and 41 mono-cultural) reported differences in FB performance in children across diverse cultural backgrounds (e.g., Germany versus Samoa, Mayer & Trauble 2015; UK versus Hong Kong, Hughes et al., 2017 see Table 2). The results indicated that FB performance did not follow the age range proposed in Wellman et al.'s (2001) meta-analysis. From around the age of four onwards, children's FB performance predominantly remained at chance or below-chance levels (e.g., Laya de García, Peterson, & de Rosnay, 2016; Naito & Koyama, 2006; Wang, Zhu & Wang, 2017). However, seven studies reported better FB performance by children from Asian countries compared to their American and European counterparts (Ahn & Miller, 2012; Goetz, 2003; Farrar, Lee, Cho, Tamargo, & Seung, 2013; Lane et al., 2013; Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 1996; Mizokawa & Lecce, 2016; Vinden, 2001).

Of the 57 studies in this category, 30 assessed children from Asian countries. The majority of these (mostly situated in China, Hong Kong and Japan) found that children performed poorly (or below-chance levels) in FB tasks compared to Anglo or Western children (e.g., Cheung et al., 2004; Farhadian et al., 2011; Hughes, Devine, & Wang, 2017; Hughes et al., 2014; Laya de García et al., 2016; Matsui, Rakoczy, Miura, & Tomasello, 2009; Wang, Zhu et al., 2017). However, the results of six studies contradicted the abovementioned findings. Specifically, children from Korea, China and Japan were reported to perform better than their American and Italian counterparts (e.g., Ahn & Miller, 2012; Goetz, 2003; Farrar et al., 2013; Lane et al., 2013; Mizokawa & Lecce, 2016; Vinden, 2001).

Some of the abovementioned studies included samples of immigrant groups (Goetz, 2003; Vinden, 1999, 2001). For example, two of these studies included Korean and Chinese children

living in the USA (Goetz, 2003; Vinden, 2001). Specifically, Goetz reported that Chinese bilinguals living in the USA outperformed their Chinese and American monolingual counterparts living in their homelands. Additionally, there was a one-year delay in ToM development in Western children from Europe and North America living in Papua New Guinea (PNG) compared to Western children living in their homelands (Vinden, 1999). It is worth noting that bilingualism and migration effects on ToM have not been widely investigated.

Thirteen studies in other urban contexts examined the FB performance of children from Europe and South, Central and North America. They found that some children, mainly between the ages of three and six, demonstrated low and intermediate levels of FB success rates. Even after the age of five or six, mastery had not yet been achieved (e.g., Germany, Spain, France, Switzerland, African-American; Arranz, Artamendi, Olabarrieta, & Martin, 2002; Bradmetz & Gauthier, 2005; Berthoud-Papandropoulou & Kilcher, 2003; Currenton, 2004; Holmes, Black, & Miller, 1996; Licata, Kristen, & Sodian, 2016; Piekny, Grube, & Maehler, 2013). However, exceptions were found in children from Greece and Brazil, who indicated better comprehension of FB tasks than their American and UK counterparts (Lewis et al., 1996) and children from Turkey and Puerto Rico (Shatz et al., 2003).

Finally, a major developmental lag was reported in studies with Indigenous and ethnic minority groups. Fourteen studies on such groups in Asia, Africa, South America and Oceania examined children between the ages of 3 and 15 and found their performance of standard FB tasks to be three or more years delayed compared to children from Australia, North America and Europe (e.g., Germany, Asurini [Brazil], Nso [rural Cameroon] and Samoa; de Castro Menezes, Da Silva Cruz, Veloso Correa, & Brito, 2014; Chasiotis et al., 2010; Hölzel & Keck, 2013; Mayer & Träuble, 2012; 2015). Some children in these studies did not pass FB tasks until the age of seven

(e.g., Tolai, Yucatec Maya and Mofu) or eight (Samoa). Others, such as 10 and 13 year-old Samoans (Mayer & Träuble, 2012) and nine year-old Azurinis (de Castro-Menezes et al., 2014) achieved low FB success rates. Some of these children (e.g., Quechua and Bosmun) found certain FB tasks, like changed location (CL) FB, so difficult that the outcomes did not provide usable data for statistical analysis (Vinden, 1996; Von Poser & Ubl, 2013).

Table 2

*Studies Reporting Differences in FB Performance across Cultures*

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
Anh and Miller (2012)	Korea, USA	4 to 6 year olds	CL FB tasks battery: object, internal person, external person versions	Korean children achieved higher FB scores than American children. FB total score: 56 (Koreans) / 31 (USA)	Child self-concept
Arranz et al. (2002)	Spain (Spanish and Basque speakers)	3.1 to 4.2 years and months	FB Battery	Percentage of children who passed the hardest FB task: 10.7% of children were younger than 3 years, 6 months 22.38% of children were aged between 3 years 6 months and 4 years 26.31% of the children were older than 4 years Total percentage of correct answers: 20.1%	Family context, attachment, number of siblings, number of younger versus older siblings, birth order
Berthoud-Papandropoulou and Kilcher (2003)	Switzerland (French speakers)	3 to 8 year olds	FB task: "lie" and "not lie" version	Standard FB failure rates: 90% (3-yr olds); 68% (4-yr olds); 59% (5-yr olds) Standard FB success rates: 42% (5-yr olds); 90% (6-, 7- and 8-yr olds)	NR
Bensalah, Olivier, and Stefaniak (2012)	France	3.6 to 6 years and months	4 FB stories – CL	FB emergence at age 5 and 6 4-year olds presented more difficulties and erroneous responses on FB	NR
Bradmetz and Gauthier (2005)	France	4 to 9 year olds	FB battery	39% of 5 year olds failed FB, 90% of 6 year olds passed FB Mastery achieved after the age of seven	NR
Chasiotis et al. (2006)	Germany, Costa Rica, rural Cameroon (Nso group)	36 to 60 months	FB tasks battery: CL, penny game and deception	Children from Germany and Costa Rica achieved significantly higher scores on FB than children from Cameroon FB mean scores achieved (range 0 – 1): 0.65 (Germany), 0.60 (Costa Rica), 0.41 (Cameroon)	Maternal education

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
Chasiotis et al. (2010)	Germany, rural Cameroon (Nso group)	4 to 6 year olds	FB tasks: 1 <sup>st</sup> and 2 <sup>nd</sup> order FB	German children performed significantly better on FB than Cameroon children FB mean scores achieved (range 0 – 3): 1.88 (Germany) and 1.33 (Cameroon)	Sociocultural orientation of autobiographical memory (self-description), implicit motive, family environment and SD variables
Cheung, H. (2006)	China	3.10 to 4.9 years and months	CL FB	Low levels of FB performance FB mean scores achieved (range 0 – 12): 5.3 (Study 1), 8.8 (Study 2) and 7.3 (Study 3)	NR
Chen and Lin (1994)	China	3 to 4 year olds	FB battery: narratives, standard FB and Ignorance components	Low levels of performance compared to Western children No difference in the performance between 3 and 4 year olds	NR
Cheung, Chen, and Yeung (2009)	Hong Kong	4 to 5 year olds	FB battery: CL, content and AR (verb manipulation)	Average percentage pass rates ranged from 35% to 50% (Maximum score 5 on the FB battery, average FB score achieved = 2.3)	NR
Cheung, Yan Mak, Luo, and Xiao (2010)	Hong Kong (bilinguals and Eng. learners)	3.3 to 4.4. years and months	FB battery: CL and contents	Performance was at low levels: average scores 2.6 and 4.2 (Maximum score 12)	NR
Cheung et al. (2004)	New Zealand, China	3 to 5 year olds	FB battery: CL, content and AR.	Children from New Zealand achieved higher pass rates than Chinese children. Total FB mean scores achieved (range 0 – 6): 3.1 (New Zeland) and 2.6 (China)	NR
Curenton (2004)	African American & European American	3 to 5 years old	CLFB	European American children (72% pass rates) outperformed their African American peers (50% pass rates) on FB	SES

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
De Castro-Menezes et al. (2014)	Azurini (Amazonia Brazil)	2 to 10 year olds	Content FB	Pass rate: 25% (3-year olds); 0% (4-year olds); 50% (5- and 8-year olds); 67% (6-, 7- and 9-year olds) Mastery was achieved at the age of ten (100% passed)	NR
Farhadian et al. (2011)	Iran	3.6 to 5.6 years and months	FB battery: 6 tasks	21% failed all FB questions; 21% only passed one task; 22% passed two tasks; 34% passed all FB tasks (maximum score achieved = 6)	Number of siblings and birth order
Farrar et al., (2013)	Korea, USA	Longitudinal study: 42.88 to 53.94 months (initial age)	FB tasks: content and CL	Faster FB development in Korean children Mean scores (range 0 – 6) T1 = 1.11 (Korea) / 1.53 (USA) T2 = 3.55 (Korea) / 2.10 (USA) T3 = 3.62 (Korea) / 3.00 (USA)	NR
Guiberson and Rodriguez (2013)	Mexico (living in the USA)	3 to 5.11 years and months	FB tasks: “self” and “other” questions	Success rates: at intermediate level and slower than other Spanish samples 89% of 5-year olds performed at an intermediate level	SD variables and SES
†Goetz (2003)	China, USA, Chinese living in USA	3.2 to 4.11 years and months	FB battery: AR, perspective taking level 2, content and CL FB	Chinese children living in USA (bilinguals) performed better than Chinese and American children living in their homelands (monolinguals) Chinese and American monolinguals performed similarly	NR
†Hughes et al. (2014)	UK, Italy, Japan	5 to 6 year olds	FB tasks battery: 1 <sup>st</sup> order and 2 <sup>nd</sup> order FB (different versions)	British children outperformed Italian and Japanese children Similar performance in Italian and Japanese children	NR
Hughes et al. (2017)	Hong Kong, UK	3 to 4.9 years and months	FB Battery: CLFB, CFB, Unexpected identity FB	Children from UK outperformed children from Hong Kong on FB tasks Delayed FB in children from Hong Kong was confirmed	Parental mind-Mindedness
Holmes et al. (1996)	African American	3.7 to 5.8 years and months	FB battery: Content and CL (own belief and others’ belief)	37% success rate for 4-year olds and 57% for 5-year olds FB mastery not achieved	NR



Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Hölzel and Keck (2013)	Yupno from PNG	3 to 6 year olds	FB battery: content, verbal and non-verbal versions of the CL FB	<p>Verbal content FB: Out of 40 children, only 16 passed the control question</p> <p>Verbal CL FB: Of the 40 participants 14 failed the control question</p> <p>Performance was below-chance levels (no 5-year olds passed)</p> <p>Pass rates: 16% (3 - 4 year olds) and 20% (5 - 6 year olds)</p> <p>Non-verbal FB: Performance was at above-chance</p> <p>Pass rates: 60% (3 – 4 year olds) and 65% (5 – 6 year olds)</p> <p>No FB mastery was achieved at 5 years old</p>	NR
Knight (2008)	Yucatec Maya (Mexico)	4 to 8 year olds	Content FB (human, non-human and God questions)	40% of children failed standard FB tasks – low FB performance across the age range	NR
Knight, Sousa, Barrett, and Atran (2004)	Yucatec Maya (Mexico)	4 to 7.10 years and months	Content FB (God and human questions)	<p>One to two years delay in passing standard FB tasks compared to Anglo samples</p> <p>Passed FB task at seven years old</p>	NR
Lane et al. (2013)	China, USA	44 to 63 months	FB tasks: contents and CL	<p>Chinese children performed better than USA children</p> <p>Total FB mean scores achieved (range 0 – 2): 0.45 (USA) and 0.72 (China)</p>	Temperament and child behaviour
Laya de Garcia et al. (2016)	Philippines	3 to 6 year olds	FB battery: content and CL FB	Only 12% of children passed FB tasks	NR
Lewis et al. (1996)	Greece	36 to 59 months	FB battery: Content, CL, AR	Very high levels of success on FB tasks compared to Anglo children	Family environment
Lewis, Huang, and Rooksby (2006)	China	3 to 5 year olds	Content (self and other version) and CL FB	<p>Poor performance on FB tasks compared to Western samples</p> <p>-1 year developmental lag</p> <p>Total number of children passing / failing: Content (self): 40 (fail), 27 (pass) / Content (other): 51 (fail), 16 (pass) / CL: 56 (fail), 11 (pass)</p>	Parental styles

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
Liu, Wang, Luo, and Su (2016)	China	Study 1 (long.): 2.6 to 4.2 years and months (initial age). Study 2 - 3.7 to 5.4 years and months	FB battery: CL and contents	FB average scores: - Study 1 (max score: 2): 0.64 (T1) and 1.10 (T2) - Study 2 (max score 4): Pre-test: 1.07 to 1.47 and post-training: 1.27 to 3.60 Performance was at low levels before training	Maternal mental state talk
Lu, Su, and Wang (2008)	China	Study 1 (long.): 2.8 to 4.4 years and months (initial age)  Study 2: 3 to 4.3 years and months	FB battery: CL contents, deception	FB total average scores and rates: - Study 1 (max score: 4) – total FB average score achieved: 2.29 (T1) and 3.31 (T2) - FB rates: 31% fail both FB tasks at T1 and T2; 40% passed only 1 task at T2 but not at T1; 19% passed both FB tasks at T1 and T2; 10% presented poor performance at T2 but not at T1.  - Study 2 (Max score: 12) –total FB average score achieved: Pre-test: 0.54 (EG), 0.56 (CG). Post training: 2.35 (EG) 0.84 (CG). General performance was at low levels	Talking about others
Licata et al. (2016)	Germany	50-month longitudinal study: at T1 age range was 6 to 9 months (mothers were assessed) At T2 age range was 4.1 to 4.4 years and months	Content and CL FB	T2 FB performance Percentage of pass rates: 36.8% passed Content FB and 40.4% passed explicit FB tasks 17.2% passed both FB tasks, 41.4% passed only 1 task and 41.4% fail both FB tasks	Maternal mind-mindedness and maternal emotional ability (or sensitivity)

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Maridaki-Kassotaki, Lewis and Freeman (2003)	Greece	3.3 to 5.4 years and months	FB battery: Content, AR and CL (verb manipulation on test question of CL FB 'kitazo/na vro' (find/look carefully) and 'psahno/na vro' (look for).	Pass rates: Content FB: Age groups: 4-year olds = 76%; 5-year olds = 79% Total: 73% (above-chance). AR: Age groups: 4-year olds = 73%; 5-year olds = 84%. Total: 76% (above chance) CL FB using 'find carefully' (kitazo): Age groups: 4-year olds = 77%; 5-year olds = 80%. Total: 80% (above-chance) CL FB using 'look for (psahno): Age groups: 4-year olds = 23%; 5-year olds = 34%. Total: 33% (below-chance)	Mother's verb usage
Mayer and Trauble (2012)	Samoa	3 to 14 year olds	CL FB	Delayed FB performance: Passed FB only after the age of eight 30% of the 10- and 13-year olds still failed	NR
Mayer and Trauble (2015)	Samoa, Germany	5.5 to 7.2 years and months	FB battery: Three-location Content FB and TB condition	German children outperformed Samoan children Poor FB performance by Samoan children at the age of eight Total number of children passing / failing: Germans: FB = 5 (fail), 15 (pass) / TB = all children pass Samoans: FB = 16 (fail), 4 (pass) / TB = 13 (fail), 7 (pass)	NR
Matsui et al. (2009)	Japan, Germany	2.11 to 3.9 years and months	FB battery: CL and content FB: standard, "maybe (uncertainty)" and "sure (certainty)" version	On standard FB German children performed better than Japanese children, performance was at floor for Japanese children. Japanese children performance improve when "sure" version was used and showed better understanding of FB tasks than German children.	NR
Mizokawa and Lecce (2016)	Japan, Italy	6 year olds	2 <sup>nd</sup> order FB tasks	Japanese children significantly outperformed Italian children on FB Average score (max score: 2) and pass rates: Japan: 0.88 – pass rates: 42.11% and 44.74%. Italy: 0.56 – pass rates: 13.16% and 26.32% FB mastery not achieved	Sensitivity to peer and teacher criticism.
Mizokawa (2015)	Japan	5.8 to 6.8 years and months	FB battery: 1 <sup>st</sup> and 2 <sup>nd</sup> order FB	Average scores: 1 <sup>st</sup> FB (max 4): 3.21 / 3.14; 2 <sup>nd</sup> order FB (max 2): 0.94 / 0.90 1 <sup>st</sup> FB mastery was not achieved Performance was at low and intermediate levels	Sensitivity to peer versus teacher's criticism

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
Matsui, Yamamoto, and McCagg (2006)	Japan	3 to 6 year olds	FB battery: CL and contents	42% passed all tasks. 39% passed one or two tasks (transitional level) 19% failed all tasks Low levels of performance compared to Anglo	NR
Mizokawa and Koyasu (2007)	Japan	4.5 and 6 year olds	FB battery: 1 <sup>st</sup> order, 2 <sup>nd</sup> order FB, FB crying task	Pass rates: 1 <sup>st</sup> FB: 6.25% (4-yr olds), 30% (5-yr olds) and 60% (6-yr olds) 2 <sup>nd</sup> FB: 12.5% (4-yr olds), 30% (5-yr olds) and 48% (6-yr olds) Crying: 0% (4-yr olds), 10% (5-yr olds) and 16% (6-yr olds) FB mastery was not achieved	NR
Naito (2003)	Japan	3.11 to 7.7 years and months	FB battery: CL, FB, AR and Aspectuality tasks	Low levels of FB performance compared to Western children Total FB mean scores achieved (range 0 – 4): 2.24 (4-yr olds ), 2.61 (5-yr olds), and 3.21 (6-yr olds)	NR
Naito and Koyama (2006)	Japan	35 to 91 months	Different version of CL FB	Developmental lag of 2 to 3 years	NR
Ohtsubo (2007) Empirical study only	Japan	3.4 to 4.8 years and months	CL FB	Developmental lag: High proportion of failure at 4 years old and better success rates after 5 years and 3 months	NR
Piekny et al. (2013)	Germany	Longitudinal study: at T1, age range: 4.6 to 5.1 years & months. At T2 age range: 5.6 to 6.1 years and months	Content FB	43 children (27%) correctly respond to FB at T1 and 81 (50%) children at T2. FB performance was low for the age range	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Rubio-Fernandez and Geurts (2013)	Spain	2.10 to 4 years and months (3 studies were conducted)	FB battery: Content FB and FB Duplo task (DT – this is a manipulated FB task)	Study 1: 22.7% success rate on FB (below-chance levels) and 80% success rate on DT (above-chance levels) Study 2: 17.6% success FB rate (below-chance levels) Study 3: 22.2% success FB rate (below-chance levels) No differences found in performance of children older and younger than 3.6 years old	NR
†Shatz et al. (2003)	Turkey, Puerto Rico, Brazil, USA	3 to 4.11 years and months	CL and Content FB using stories – (manipulation of verbs and justification)	Justification question: Brazilian and American presented better understanding of FB than Turkish and Puerto Rican children Turkish and Puerto Rican: better outcomes answering the “think” question Brazilian and American: better outcomes answering the “look for” question	NR
†Tietz and Völkel (2013)	Tonga Island	3 to 6 year olds	CL and content FB	Good performance in CL Poor performance in content FB CL FB (naturalistic method): Pass rates: 47.2% (3- and 4-year olds = chance levels) and 75.5% (5- and 6-year olds = above-chance levels) Content FB: failure rate = 84% FB mastery not achieved by the age of six	NR
Tardif, Wing-Chee So, and Kaciroti (2007)	Hong Kong	Study 1: 4 – 6.8 years and months. Study 2: 3-5 year olds.	FB battery: CL and contents	FB total average scores: Study 1 (Max score 4): 1.29 (4 year olds), 1.79 (5 year olds) and 2.33 (6 year olds). Study 2 (Max score 8): T1 = 1.52 (at floor) / T2 = 2.83 / T3 = 3.31 / T4 = 4.23. FB performance was at low levels but slowly increased with age	NR
†Tardif, Wellman, and Cheung (2004)	Hong Kong	3.2 to 6.0 years and months	FB battery: Content, CL, AR (verb manipulation)	Lag on content and CL FB performance compared to Anglo children (when neutral verb was used) FB performance levels: 3 year olds: Below-chance 4 year olds: Below and at chance 5 year olds: Mastery was not achieved High levels of pass rates on AR	NR

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
Vinden (2001)	USA, Koreans, living in the USA	36 to 90 months	FB tasks battery: Content and AR (self and other versions with Emotional component)	5 year-old Korean children performed significantly better than American children on FB tasks 3 year old and 4 year old Korean and American groups performed similarly	Parental styles
Vinden (1999)	Tainae, Tolai (PNG), Mofu from Cameroon  Western sample (living in PNG)	3.3 to 15 years and months	FB tasks: CL with "look", "think" and Emotional component questions	Western children: Outperformed non-Western children One-year lag compared to Western children tested in their homeland  Non-Western children: Difficulties with the emotional component Mofu and Tolai passed FB at the age of seven. Tainae showed poor performance and at the age of 13, 14 and 15 FB skills were unclear	NR
†Vinden (1996)	Peru (Quechua)	4 to 8 year olds (not exact birth age)	AR and CL FB	CL FB understanding: chance and significantly below-chance levels AR tasks: above-chance performance Some children were unable to respond to FB tasks (were excluded from the sample)	NR
Vinden (2002)	Cameroon (Mofu)	4 to 11 year olds	FB battery: Contents, CL, AR and evidence task with FB and TB questions	Delayed development compared to Western children Above-chance level in FB only achieved after age of seven in some children	NR
Von Poser and Ubl (2013)	Bosmun from northeast PNG	3 to 5 year olds	FB battery: Deceive task based on FB and content FB	FB rates: 5-year olds = 69% success and 31% failure (mastery not achieved). Performance was at chance level 3-year olds = 8% success and 92% failure Deceive task: None of the children passed this task	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Wang, Hadi and Low (2015)	Semai tribe (Peninsular Malaysia)	3 to 5.4 years and months (Divided into 3-year old and 4-year old group)	FB battery: Object location and object identity FB (prediction and verbal questions)	Total FB pass rate: 32% correctly predicted and verbally responded to FB tasks Pass rates verbal FB: 64% (4- to 5-year old group) and 29% (3- to 4-year old group) FB mastery was not achieved	NR
Wang, Zhu et al. (2017)	Hong Kong	3 to 6 year olds	FB battery: CLFB and Content FB	Delayed FB FB pass rates: 29% pass all FB tasks 6.3% of the 3 year olds 12.9% of the 4 year olds 43.2% of the 5 year olds 60% of the 6 year olds	Parental mind-mindedness
†Wang, Low, Jing, and Qinghua (2012)	China	3 to 4 year old	FB battery: CL, Content and misinformation. (Target present and target absence versions – eye gaze vs verbal performance)	FB eye gaze performance: 75% to 100% of children looked at the correct location. FB verbal performance: was slow - 8% to 21% of 3 year olds pass (below-chance performance), and 42% to 62% of the 4 year olds (below/chance performance) passed these tasks. After task manipulation (target absent versions): 12% to 29% of 3 year olds pass (below/chance performance) and 67% to 77% of 4 years olds pass (above-chance performance). FB performance lagged compared to Anglo children in the literature	NR
†Wang and Su (2009)	China	4 and 5 year olds	FB tasks: content and CL	FB Success rates experiment 1: Children with classmates of the same age: 76.19% (4 year olds), 81.25% (5 year olds). Children with classmates of different ages: 33.3% (4 year olds), 92.86% (5 year olds) FB Success rates experiment 2: Children with classmates of the same age: 83.9%; children with classmates of different ages: 48.4%. No difference in FB performance between 5 and 4 year olds	Social Interaction: classmates of the same age vs. different ages

ToM = Theory of Mind; FB = False Belief; TB = True Belief; DD = Diverse Desires; DB = Diverse Beliefs; KA = Knowledge Access; HE = Hidden Emotions; S = Sarcasm (ToM scale tasks); AR = Appearance Reality task; TD = Typically Developed; LI = Language Impairment; IK = Ignorance-Knowledge; MS = Mental States; SES = Socio Economic Status; SD = Socio Demographic; M= Months; CL = Changed Location; EC = Emotional Components; EU = Emotional Understanding; NR – Not Reported; SC F = Sociocultural; T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4; Long. = Longitudinal; Max = Maximum; Min = Minimum; EG = Experimental Group; CG = Control Group; PNG = Papua New Guinea.

### *2.3.1.3 Studies Reporting Mixed Results in FB Performance across Cultures*

In two studies with similar FB performance results (see subsection 2.3.1.1), researchers reported some inconsistent results with regard to some children in specific cultural groups. For example, Barrett et al. (2013) observed that children from Kenya performed implicit FB tasks poorly compared to children from ethnic groups in Ecuador (Shuar/Colono), Fiji (Yasawan) and China (Salar), who performed comparably to what the authors nominated Western samples. In addition, Callaghan et al. (2005) reported that the majority of four-year-old Samoan children failed FB tasks compared to their peers in India, Canada, Peru and Thailand. However, since Callaghan et al. (2005) combined the data of all the five cultural settings and suggested that children's overall performance was synchronous, the authors concluded that ToM is universal. In other studies (n = 11) on differences in the FB performance of children from different cultural settings (see subsection 2.3.1.2), researchers also found similarities (e.g., Goetz, 2003; Hughes et al. 2014; Wang & Su, 2009; Wang et al., 2012).

Studies reporting mixed results were possibly due to changes in the traditional FB task scenarios and test questions. Rubio-Fernández and Geurts (2013) found that three-year-old Spanish children's performance of the FB Duplo<sup>8</sup> task increased to an unexpected 80% success rate for their age (at above-chance levels), while their performance of traditional content FB tasks was at below-chance levels. Likewise, children from some Indigenous groups (Bosmun, Quechuan, Tongan and Yupno) were found to improve in FB performance when methodological variations to traditional FB tasks (e.g., AR, non-verbal versions and naturalistic methods) were

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<sup>8</sup> The FB Duplo task prompts participants to keep track of the protagonist's perspective and encourages them to lead the protagonist of the story to the target object. Unlike the traditional FB test question: "where will X look for the bananas?", participants were asked "what happens next?" and "what is she going to do now?" while holding or playing with the girl toy.



used, while their performance on standard tasks was poor (Hölzel & Keck, 2013; Matsui et al., 2009; Tietz & Völkel, 2013; Vinden, 1996; Von Poser & Ubl, 2013).

Another possible reason for mixed results was the use of verb modifications in the test question. For example, Maridaki-Kassotaki et al. (2003) found when the verb “look for” was used in the FB test question, Greek children performed at below-chance levels, but their performance was at above-chance levels when the verb “find carefully” was used. Similarly, children from China, Japan and Hong Kong performed at above-chance levels when verb marking was used (e.g., look for and think falsely) as opposed to neutral verbs (e.g., think and believe; Cheung et al., 2009; Lee et al., 1999; Matsui et al., 2009; Tardif et al., 2004). Shatz et al. (2003) reported that Turkish and Puerto Rican children had better FB outcomes when the “think” question was asked, while the performance of Brazilian and American children was better when the “look for” question was presented. These possible methodological influences are worthy of further examination.

### 2.3.2 Category 2: ToM Performance on Batteries and Other Tasks Assessing ToM Constructs Different From FB

This category included 60 studies (25 cross-cultural and 35 mono-cultural) assessing children on tasks in addition to FB. The assessment tools used in these studies were the ToM scale (Wellman & Liu, 2004), ToM batteries (e.g., early, basic and advanced ToM tasks derived from Robberts, 2008) and other tasks assessing constructs like knowledge, emotions and desires. For example, Sidera, Amado and Serrat (2013) used Own Pretend Emotions tasks<sup>9</sup> to assess children’s

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<sup>9</sup> Example of Own-Pretend Emotions task: The investigator presents Ernic the puppet to the child. Ernic brings his toy car for the child and the experimenter to play with while he goes away to take a nap. Then the experimenter says to the child: “OK, now we’ll pretend that the car got broken, and we’ll put on a sad face, OK? Oh, the car has fallen (turn the car upside down to pretend the car crashed into the table)...” so the experimenter puts on a sad face and says: “Oh, the car got broken, what a pity! Let’s see how you put on a sad face.” Next, Ernic, who is unaware of the pretend game and the child’s real emotion, comes back and says: “Hi X, why do you look sad? Didn’t you like my car?”. Thereafter, the child is asked two test questions: 1) “Does the puppet think that you are really sad or does he think that you’re pretending to be sad?”. 2) “Why does he think that you are really sad/you’re pretending to be sad?”. To

abilities to understand that simulated emotions in a pretend context (e.g., play context) are not real. In 20 studies in this category, researchers reported similar performance by children across diverse cultural backgrounds, while differences were observed in 40 studies. In 16 of the abovementioned studies, authors reported mixed results.

### *2.3.2.1 Studies with Similarities in Performance on ToM Batteries and Other Tasks Assessing ToM Constructs Different From FB*

Twenty studies (7 cross-cultural and 13 mono-cultural) examined children's ToM performance across various continents (e.g., Calero et al., 2013; Gardner, Harris, Ohmoto, & Hamazaki, 1988; Jester & Johnson, 2016; Kuntoro et al., 2013; Robberts, 2008). These studies, which were mainly conducted in urban contexts with the exception of two that included indigenous and ethnic minority groups (O'Reilly & Peterson, 2014; Taumoepeau, 2015), found similar performance in Australia, USA and the UK (e.g., Lim, Williams, Cebula, & Annaz, 2010; Robberts, 2008; see Table 3).

Studies that assessed ToM progression using the Theory of Mind scale (Wellman & Liu, 2004) found that the order followed by Australian and American children, namely Diverse Desires (DD), Diverse Beliefs (DB), Knowledge Access (KA), False Beliefs (FB) and Hidden Emotions (HE), was also the most likely progression for Asian, Latin American and Indigenous Australian children (i.e., Indonesia, China, Singapore, Argentina; Calero et al., 2013; Kuntoro et al., 2013; O'Reilly & Peterson, 2014). Studies assessing children's abilities to understand ToM subcomponents like knowledge and hidden emotions (using different tasks from those on the ToM scale, like, for example "knowing how, and knowing that" by Tardif, Wellman, Fung, Liu, & Fang,

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correctly perform in this task, the child has to answer that Erin thought that they were really sad because he (Ernie) did not know that they were just pretending. (For more details see Sidera et al., 2013, p. 22 - 23).

2005), showed no significant differences between the performance of children from Asian countries (e.g., China and Japan) and children from the USA (e.g., Gardner et al., 1988; Tardif et al., 2005). Finally, research exploring desire and belief subcomponents supported the claim that children from different backgrounds appear to understand desire tasks earlier than beliefs, suggesting that early understanding of desires might be universal (e.g., Ferres, 2003; Pascual, Aguado, Sotillo, & Masdeu, 2008; Tsuji, 2010).

Table 3

*Similarities in the Performance of ToM Batteries and Other Tasks Assessing ToM Constructs Different From FB across Cultures*

<b>Authors</b>	<b>Culture</b>	<b>Age</b>	<b>Assessment Tools</b>	<b>Main Results</b>	<b>SCF Measured</b>
†Calero et al. (2013)	Argentina	6 to 8 year olds	ToM scale	Sequence (Percentage of pass rates): DD (82%) > DB (74%) > KA (63%) > FB (47%) Rep. = NR; I = NR Pass rates were all at low levels compared to Anglo – performance was similar to preschoolers' in Wellman and Liu's (2004) study EFB (64%), Belief-emotion (60%)	Siblings and birth order
Ferres (2003)	Spain	19 to 46 months	Speech analysis	Understanding desires before beliefs same as Anglo	NR
Gardner et al. (1988)	Japan, USA	4 to 6 year olds	Real-apparent emotion (or HE) tasks	Similar performance in HE by both cultural groups	NR
Jester and Johnson (2016)	Germany	4 to 6 year olds	ToM scale	Sequence: DD > DB > KA > FB > HE Rep. = .92; I = NR FB pass rates not reported	NR
Ketelaars, van Weerdenburg, Verhoeven, Cuperus and Jansonius (2010)	The Netherlands	Longitudinal study: 5 years, 6 months at T1; 6 years, 5 months at T2; 7 years, 5 months at T3 – (Dutch speakers)	ToM battery: Emotion understanding and FB tasks	Similar ToM performance to that reported in the literature with Anglo children	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Kuntoro, et al. (2013)	Indonesia (disadvantage and middle SES), Australia (middle SES)	3.1 to 7.10 years and months	ToM Scale	Sequence: DD > DB > KA > FB > HE Rep. = .92; I = NR  Percentage of pass rates per group and task order: Anglo-Australians: 100% (DD), 82% (DB), 79% (KA), 36% (FB), 39% (HE) Middle class Indonesians: 88% (DD), 85% (DB), 58% (KA), 54% (FB), 37% (HE) Disadvantage Indonesians: 85% (DD), 85% (DB), 33% (KA), 40% (FB), 12% (HE)  Pemulung presented significantly slower scores of KA & HE Similar FB performance was reported among groups FB pass rates age-matched groups 3 to 5.6 year olds: 21% (Pemulung Indonesians), 45% (middle SES Indonesians), 27% (Anglo-Australians)	NR
Lim et al. (2010)	Scotland, Singapore	2 to 3 year olds	ToM battery: non-representation AL tasks (e.g. DD and representational tasks (e.g. FB, AR)	Similar performance in both cultural groups	NR
Misailidi (2006)	Greece	4 to 7.2 years and months	Real apparent emotion tasks battery: Prosocial motive and Self-protective motive components (with justification of answers)	Children performed similarly to Anglo children reported in the literature	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†O'Reilly and Peterson (2014)	Anglo Australian, Indigenous Australian (Aboriginal English-speaking)	2 to 5 year olds	ToM scale and FB battery	Sequence (Percentage of pass rates): DD (75%) > DB (60%) > KA (10%) > FB (15%) > HE (0%) Rep. = .95; I = .44 Indigenous Australians: outperformed Anglo-Australians on FB 2-year old groups: FB pass rates – 15%. 0% (Anglo-Australians), 38% (AboriginalAustralians) Full sample: CL FB pass rates – 0.52 (Anglo-Australians). 0.43 (Aboriginal Australians) Max score 2. No significant differences reported Total FB pass rates: 0.60 (Anglo Australians), 0.49 (Aboriginal Australians). Max score 3 No significant differences reported	NR
Pascual et al. (2008)	Spain	3 to 5 year olds	Speech analysis	Understanding desires before beliefs same as Anglo	NR
†Qu, Shen, and Qianqian (2013)	Chinese Singaporean (Bilinguals)	3 to 6 year olds	4-task ToM scale (did not include HE) and FB battery: AR, Deceptive pointing, non-mental state content and non-mental state CL FB	Study 1: Sequence: DD > DB > KA > FB Rep. = NR; I = NR Average scores per group and task orderly: 3 year olds: 77.8 (DD), 66.7 (DB), 22.2 (KA), 3.7 (CFB), 0 (EFB) 4 year olds: 72.2 (DD), 88.9 (DB), 69.2 (KA), 23 (CFB), 29.4 (EFB) 5 year olds: 93.8 (DD), 100 (DB), 100 (KA), 28.6 (CFB), 12.5 (EFB) FB performance was poor compared to Western and Chinese children. Most 5-yr olds failed FB performance was at below-chance levels AR performance: At chance levels (5 year olds only) - Content FB pass rates per age group: 3.7% (3-yr olds), 23% (4-yr olds), 28.6% (5-yr olds) Study 2: - Standard / explicit CL FB pass rates per age group: 11.9% / 28.9% (3-yr olds), 22.6% / 15.4% (4-yr olds), 31.3% / 23.3% (5-yr olds) - Self / other content FB pass rates per age group: 2.6% / 7.9% (3-yr olds), 1.9% / 5.8% (4-yr olds), 10.3% / 34.5% (5-yr olds) - Colour / identity AR FB pass rates per age group: 26.2% / 12.8% (3-yr olds), 50.9% / 30.8% (4-yr olds), 75% / 34.4% (5-yr olds)	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Qu and Shen (2013)	English-speaking Chinese Singaporean	3 to 5 year olds	4-task ToM scale and modified picture version of ToM scale	<p>ToM scale order (Percentage of pass rates): DD (91%) &gt; DB (43%) &gt; KA (43%) &gt; FB (17%)</p> <p>Rep. = NR; I = NR</p> <p>Per age groups and task orderly:</p> <p>3 year olds: 76% (DD), 55% (DB), 18% (FB), 12% (KA)</p> <p>4 year olds: 93% (DD), 91% (DB), 47% (KA), 11% (FB)</p> <p>5 year olds: 100% (DD), 64% (DB), 64% (KA), 21% (FB)</p> <p>FB performance was at below-chance levels</p> <p>Study 1: FB pass rates – 17%. FB pass rates per age group – 18% (3-yr olds), 11% (4-yr olds), 21% (5 year olds)</p> <p>Study 2: FB pass rates – 27%</p>	
Rakoczy (2010)	Germany	3 to 5 year olds (Study 1) and 3.4 to 4.6 years and months (Study 2)	ToM battery: Content FB, CL FB and conflicting desire tasks	<p>ToM performance was comparable to Anglo children's</p> <p>Total average score achieved M = .28 (Max 3)</p>	NR
Robberts (2008)	South Africa	3 to 13 year olds	ToM battery: Early, basic and advanced ToM tasks (including 1 <sup>st</sup> and 2 <sup>nd</sup> order FB)	Similar performance to Western samples: claimed Universal ToM development	NR
†Sidera et al., (2013)	Spain	4 and 6 year olds (Catalan speakers)	Real versus Pretend actions, Own Pretend emotions, Other's Pretend emotions	<p>Performance on pretend emotions was similar to that reported in other studies</p> <p>At the age of 4, children had difficulties understanding that the observer of a pretend emotion can hold an incorrect belief about the real emotion</p>	NR
Shahaeian, Henry, Razmjooee, Teymoori & Wang (2014)	Iran (Urban high SES, urban low SES and Rural)	4 to 5 years old	ToM battery: 5-task ToM scale, CLFB and emotion FB	No intra-cultural differences were found in ToM performance. No ToM progression reported	SES

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Taumoe-peau (2015)	South Island New Zealand (European vs. Pacific Islanders)	1.3 to 3.4 years and months (longitudinal study)	ToM battery: FB, knowledge access, emotional-situation tasks	Pass rates (at 3.4 years and months): 21% (FB), 28% (know-tell task), 47% (know-see task), 75% (emotion-situation task) No differences reported between groups	Maternal mental state talk
Tardif et al. (2005)	USA, China	3.4 to 5 year olds	Knowledge-Ignorance tasks: Knowing how and knowing that	No differences in performance across cultures	NR
Tsuji (2010)	Japan	Longitudinal study: 33 to 39 months (initial age)	Desire-emotion, DB, emotion-situation, point-direction, gaze-direction	Similar performance to Anglo children's	NR
†Wu and Su (2014)	China	2 to 4 year olds	5-task ToM scale	Sequence: DD > DB > KA > FB > HE (based on average scores) Rep. = NR; / = NR Average scores per group and task orderly: 2 year olds: 0.92 (DD), 0.52 (DB), 0.08 (KA), 0 (FB), 0 (HE) 3 year olds: 0.96 (DD), 0.76 (DB), 0.40 (KA), 0.04 (FB), 0 (HE) 4 year olds: 0.96 (DD), 0.83 (DB), 0.67 (KA), 0.33 (FB), 0.08 (HE) Poor performance on FB and HE (at floor)	Social abilities: sharing behaviour

ToM = Theory of Mind; FB = False Belief; TB = True Belief; DD = Diverse Desires; DB = Diverse Beliefs; KA = Knowledge Access; HE = Hidden Emotions; S = Sarcasm (ToM scale tasks); AR = Appearance Reality tasks; TD = Typically Developed; LI = Language Impairment; IK = Ignorance-Knowledge; MS = Mental States; SES = Socio Economic Status; SD = Socio Demographic; CL = Changed Location; EC = Emotional Components; EU = Emotional Understanding; NR = Not Reported; SCF = Socio Cultural Factors; Max = Maximum; Min = Minimum; Rep. = Green's reproducibility coefficients (significant if  $\geq .90$ ); / = consistency indexes (significant if  $\geq .50$ , see method chapter).



### *2.3.2.2 Studies Showing Differences in Performance on ToM Batteries and Other Tasks*

#### *Assessing ToM Constructs Different From FB*

In 40 studies (18 cross-cultural and 22 mono-cultural), differences were reported in the ToM performance of children across continents, with the exception of Africa (e.g., Fernandez, 2011; Lucas, Lewis, Pala, Wong, & Berridge, 2013; Shahaieian, et al., 2014a; see Table 4). These studies were mainly conducted in urban contexts, except for one that involved children from rural settings in Iran (Shahaieian, 2015). Some reported higher scores on ToM batteries by children from certain cultural backgrounds (e.g., Colombia, Hong Kong, Turkey, USA and UK) compared to others (e.g., Italy, UAE, India and Pakistan; Al-Hilawani, Easterbrooks, & Marchant, 2002; Fernandez, 2001; Lecce & Hughes, 2010; Lucas et al., 2013; Nawaz, Hanif, & Lewis, 2015, Nawaz & Lewis, 2017; Wang, Wang, & Chui, 2017). For example, Nawaz and Lewis (2017) and Nawaz et al. (2015) found a three-year delay in Pakistani children's understanding of ToM tasks compared to Anglo children, while, for the first time Wang, Wang, et al. (2017) reported that children from Hong Kong outperformed their USA counterparts on ToM tasks.

Children's understanding of different ToM subcomponents in a theorised sequential order for Anglo children (i.e., from Australia and USA) also varied across countries. Eleven studies of ToM progression found that the most likely order followed by Asian and Turkish children was DD > KA > DB > FB > HE (e.g., Bogor Indonesia, Singapore, Iran and China; Bozbiyik, 2016; Duh et al., 2016; Kuntoro et al., 2017; Peterson & Slaughter, 2017; Shahaieian, 2015; Zhang, Shao, & Zhang, 2016). Only in Hong Kong did the last two components of the scale follow a reverse order (i.e. HE > FB; Wang, 2010). The order reported in these studies differs from the order proposed by Wellman and Liu (2004) for Anglo children, which is DD > DB > KA > FB > HE.

In regard to children's abilities to understand other ToM subcomponents (not using the ToM scale and different from FB), it is noteworthy that children from some Asian (e.g., Japan, Israel, United Arab Emirates), Latin American (e.g., Peru) and European (e.g., Italy, Spain, Turkey) countries presented variable trends in their performance on knowledge and higher-order ToM tasks (e.g., HE and conflicting desires). With only a few exceptions, studies of higher-order tasks like HE (or real-apparent emotions) found that children older than six (mainly Spanish-speakers) still lacked the ability to understand these tasks as compared with their Anglo peers and reported in the literature (e.g., Cheung, C, 2006; Sidera, Marti, & Gabucio, 2008; Sidera, Serrat, Rostant, & Serrano, 2012; Tenenbaum, Visscher, Pons & Harris, 2004). In contrast, by Japanese children achieved high scores on HE tasks, regardless of their delayed FB performance in comparison to Anglo and Western samples (Mizokawa & Koyasu, 2012; Naito & Seki, 2009). The majority of the other studies reported higher scores on knowledge tasks than FB tasks by children from Israel, Spain and Japan (e.g., Resches & Perez Pereira, 2007; Ziv & Frye, 2004).

Despite achieving a high performance in some ToM subcomponents, overall examination of some children's FB performance (e.g., percentage of pass rates) as part of the whole ToM scale or other ToM batteries indicated that it was not comparable with that documented in samples from the USA, UK, Canada and Australia and; that FB mastery had not yet been achieved in the older age groups (e.g., Duh et al., 2016; Lecce, Caputi, & Hughes, 2011; Naito & Seki, 2009; Resches & Perez Pereira, 2007; Zhang et al., 2016; see Table 4). This may indicate that some children from other cultural backgrounds (e.g., Asia, Latin America and some European countries) develop ToM through different pathways (e.g., earlier understanding of HE instead of FB).

Table 4

*Differences in Performance of ToM Batteries and Other Tasks Assessing ToM Constructs Different From FB across Cultures*

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Al-Hilawani et al. (2002)	United Arab Emirates (UAE), USA	8 to 11 year olds	Meta-cognition tasks battery	TD USA children presented higher ToM raw scores compared to TD UAE children	NR
Bozbiyik (2016)	Turkey	3 to 5 year old	6-task ToM scale	ToM order based on percentages of pass rates: DD (81.25%) > KA (65.63%) > DB (56.25%) > CFB (31.25%) > HE (15.63%) > EFB (12.50%) Rep. = NR; I = NR Per age groups: 3 y.o = DD (69.23%) > DB (58.58%) > KA (46.15%) > CFB (15.38%) > EFB (15.38%) > HE (0%) 4 y.o = KA (81.82%) > DB (63.63%) > CFB (36.36%) > HE (27.27%) > DD (10%) > EFB (0%) 5 y.o = KA (75%) > DD (75%) > DB (50%) > CFB (50%) > EFB (25%) > HE (25%)	Maternal mental state talk
Caputi, Lecce, Pagnin, and Banerjee (2012)	Italy	4.5 to 8 years and months (longitudinal study)	ToM battery: FB and EU tasks	Children showed better performance on EU than FB	Pro-social behaviour
†Cheung, C (2006)	Canada (Anglo), Bilingual Cantonese Canadian	4.3 to 6.8 years and months	ToM battery (3 last steps of the ToM scale): 2 contents FB, explicit FB, belief-emotion task, 2 HE task	Similar performance in FB and belief-emotion tasks in both cultural groups Anglo Canadian children performed better on HE than Cantonese bilinguals	Traditionalism in Cantonese parents only
Deneault and Marcelle (2013)	Canada (French Canadians)	3.8 to 5.1 years and months	ToM battery: FB battery and EU task	Significantly higher scores in FB than EU tasks	Social adjustment

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Duh et al. (2016)	China	3.0 to 5.11 years and months	ToM scale	Sequence: DD (89%) > KA (76%) > DB (71%) > CFB (48%) > HE (44%) > EFB (37%) Rep. = .89; I = .27 Per age groups and task orderly: 3 year olds: 87% (DD), 57% (KA), 60% (DB), 27% (CFB), 26% (HE), 23% (EFB) 4 year olds: 88% (DD), 83% (KA), 74% (DB), 52% (CFB), 45% (HE), 40% (EFB) 5 year olds: 92% (DD), 87% (KA), 78% (DB), 63% (CFB), 62% (HE), 47% (EFB) FB pass rate: at below and chance levels	NR
Esteban, Sidera, Serrano, Amado and Rostan (2010)	Spain (Catalan speakers)	3.3 to 4.3 years and months	ToM battery: CLFB, content FB, Desire-belief (D-B) emotion,	Average scores pre-training: Content FB (score range: 0 – 2): 0.79 (control group), 0.75 (intervention group) CLFB (score range: 0 – 1): 0.33 (control group), 0.25 (intervention group) D-B emotion (score range: 0 – 2): 1.63 (control group), 1.50 (intervention group) Total (score range: 0 – 5): 2.75 (control group), 2.50 (intervention group) Average scores post-training: Content FB: 0.77 (control group), 0.94 (intervention group) CLFB: 0.35 (control group), 0.46 (intervention group) D-B emotion: 1.65 (control group), 1.67 (intervention group) Total: 2.77 (control group), 3.06 (intervention group) Average scores on some FB tasks were poor for their age range levels. Scores on DB tasks were better than those on FB	NR
Fernandez (2011)	Colombia	4.8 to 8.8 years and months	ToM battery: ToM scale and 2 <sup>nd</sup> order FB	Better outcomes in ToM performance compared to US samples Ceiling effect in 1 <sup>st</sup> order FB and higher rates in 2 <sup>nd</sup> order FB	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Grazzani and Ornaghi (2012)	Italy	8 and 10 year olds	ToM battery: 2nd order FB battery, Emotion understanding tasks, Metacognitive, metalinguistic verb comprehension test, and describe a friend task	10 year olds outperformed their 8 year old peers on the ToM battery 8 year olds had difficulties performing FB tasks compared to children reported in the literature	NR
Joshi and MacLean (1994)	India, UK	4.2 to 5.4 years and months	Real-apparent emotion (or HE) tasks	Indian girls performed better on HE tasks than English girls	NR
†Kuntoro et al. (2017)	Indonesia (Cities of Jakarta and Bogor)	4 to 6 years old	6-task ToM scale	ToM sequential order and (Percentage of pass rates): Jakartans matched the Western ToM sequence: DD (98%) > DB (97%) > KA (66%) > FB (32%) > HE (19%) Rep.= 0.98, / = NR Bogors matched the ToM sequence from Chinese and Iranian children: DD (79%) > KA (73%) > DB (56%) > FB (22%) > HE (8%) Rep.= 0.91, / = NR	Parenting attitudes towards Individualistic versus Collectivistic tendencies Authoritative and authoritarian parenting styles
Lecce and Hughes (2010)	UK, Italy	5.0 to 6.5 years and months	ToM battery: 1 <sup>st</sup> and 2 <sup>nd</sup> order FB tasks and EU tasks	British children were better than Italian children in ToM tasks	NR
Lecce et al. (2011)	Italy	5 to 8 year olds	ToM battery: FB and EU tasks	Children showed better performance in EU than FB tasks (longitudinal study)	Sensitivity to criticism

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Lucas et al. (2013)	Turkey, Hong Kong, UK	3 to 4 year olds	ToM battery Knowledge-Ignorance (selective trust task) CL and contents FB	-Turkish children: performed better on FB and Knowledge tasks than Chinese and British children Achieved above-chance performance in the flexible trust task – the hardest task 3 year old FB performance: Chinese and British – below-chance levels; Turkish children – at chance levels 4 year old FB performance: Chinese and British – at chance levels; Turkish – above-chance levels	NR
Mizokawa and Koyasu (2012)	Japan	5 and 6 year olds	ToM battery: 1 <sup>st</sup> and 2 <sup>nd</sup> order FB, negative and positive HE	FB average scores: 1 <sup>st</sup> order FB: 2.71 (Max = 4); 2 <sup>nd</sup> order FB: 0.57 (Max = 2). Performance was at floor HE average score (Max 2 per task): 1.09 (positive) / 1.18 (negative) Better performance on HE than FB (considering age range)	Social abilities
Naito and Seki (2009)	Japan	4.5 to 9.2 years and months	ToM battery: 1 <sup>st</sup> and 2 <sup>nd</sup> order FB tasks with belief and ignorance/ Knowledge questions, EU tasks: pro-social and self-representational questions	1 <sup>st</sup> order FB pass rates: 30% (4 year olds), 67% (6 year olds), 95% (8 year olds) 2 <sup>nd</sup> order FB pass rates: 14% (4 year olds), 58% (6 year olds), 95% (8 year olds) correctly passed and justified FB -understanding of 1 <sup>st</sup> order FB until the ages of 6 to 7 year old, and 2 <sup>nd</sup> order FB after middle childhood -Better performance on Ignorance/Knowledge questions than on False Belief questions -Improved pass rates on EU tasks: 49% (4 year olds), 76% (6 year olds), 92% (8 year olds) Earlier HE understanding than Western children	NR
Nawaz and Lewis (2017)	Pakistan	3 to 5.11 years and months	ToM battery: pretence, desire, belief and FB tasks	Below-chance FB performance Lag of 3 years in ToM development	Content and quality of mother-child talk
Nawaz et al. (2015)	Pakistan	3 to 5.11 years and months	ToM battery: pretence, desire, belief and FB tasks	Below-chance FB performance Lag of 3 years in ToM development	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Ornaghi, Brockmeier and Gavazzi (2011)	Italy	2.11 to 4.9 years and months	ToM battery: Content and CL FB with prediction and explanation questions and EU test	-3 year olds presented poor FB performance – 97% failure (only 1 child passed – data was not used in analysis) EU (Max score = 9) – Average score: Pre-training: 2.24 (EG), 3.14 (CG); Post-training: 4.29 (EG), 2.86 (CG) -4 year olds showed low FB performance that significantly improved after training. FB (Max score = 6) – Average score: Pre-training: 2.14 (EG), 2.44 (CG); Post-training: 4.72 (EG), 3.72 (CG) EU (Max score = 9) – Average score: Pre-training: 3.22 (EG), 3.38 (CG); Post-training: 4.78 (EG), 4.19 (CG)	NR
Peterson and Slaughter (2017)	Singapore (Chinese ethnicity)	3.0 to 6.4 years and months	5-task ToM scale and 3 FB tasks	Sequence and (Percentage of pass rates): DD (95%) > KA (77%) > DB (55%) > FB (23%) > HE (13%) Rep. = .93; / = NR FB average score achieved: .55 (score range 0-3)	NR
Resches and Perez Pereira (2007)	Spain	3.4 to 5.9 years and months	ToM battery: CL FB and Ignorance-Knowledge (IK) tasks	100% of 4.7 to 5.9 year olds passed IK tasks, and 74% passed FB tasks 38.8% of 3.4 to 4.6 year olds passed IK, and 72% failed FB tasks	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Shahaeian et al. (2011)	Iran, Australia	3.0 to 6.5 years and months	ToM scale	<p>-Iranian children sequence and (Percentage of pass rates): DD (86%) &gt; KA (88%) &gt; DB (47%) &gt; FB (16%) &gt; HE (17%) Rep. = .94; I = .25 KA was significantly easier</p> <p>- Anglo-Australian children sequence (Percentage of pass rates): DD (95%) &gt; DB (77%) &gt; KA (68%) &gt; FB (28%) &gt; HE (16%) Rep. = .95; I = .45 DB was significantly easier Anglo-Australian children passed FB more often than Iranian children FB pass rates: 16% (Iran) and 36% (Anglo-Australian)</p>	Number of siblings
Shahaeian et al. (2014a)	Iran, Australia	3 to 9 years old	6 ToM scale tasks	<p>-Iranian children sequence and (Percentage of pass rates): DD (86%) &gt; KA (75%) &gt; DB (45%) &gt; FB (57%) &gt; HE (48%) &gt; S (26%) Rep. = .92; I = .42 Performed better on KA and S</p> <p>-Anglo-Australian children sequence and (Percentage of pass rates): DD (97%) &gt; DB (87%) &gt; KA (82%) &gt; FB (57%) &gt; HE (40%) &gt; S (9%) Rep. = .97; I = .56 Performed better on DD and DB FB pass rates: 57% (both countries) FB pass rates per age group: 3 to 5 year olds – 18% (Iran), 40% Australia; 5 to 7 year olds – 75% (Iran), 65% (Australia); 7 to 9 year olds – 88% (Iran), 100% (Australia)</p>	Number of siblings
Shahaeian, Nielsen, Peterson, Aboutalebi, and Slaughter (2014b)	Australia, Iran	3 to 5 year olds	ToM battery: KA (when/ how), DB, FB battery	<p>Anglo-Australian children performed better on DB tasks than Iranian children Iranian children performed better on KA tasks than Anglo-Australian children Similar performance on FB tasks: FB pass rates 3 year olds: 16% (Iran), 23% (Australia) FB pass rates 4 year olds: 86% (Iran), 90% (Australia)</p>	NR



Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Shahaeian (2015)	Iran (intra-cultural study: High SES, Low SES, Rural)	4 to 5 year olds	ToM battery: FB, DB and ToM scale	Sequence: DD (92%) > KA (77%) > DB (59%) > FB (41%) > HE (33%) Rep. = NR; I = NR FB pass rates: 46% (High SES), 49% (Low SES), 35% (Rural SES) – Total 41%. Rural children performed poorly in KA No differences in total ToM scale, FB and DB scores across groups	Family and social environment
Sidera et al. (2008)	Spain	5 to 7 years old (Catalan speakers)	Real apparent emotion tasks: deception and pretend play stories (with justification of answers)	Performance on real-apparent emotions was delayed compared to Anglo children reported in the literature - was at below-chance levels for their age range	NR
Sidera, Serrat, Rostan and Sanz-Torrent (2011)	Spain	4 to 12 years old (Catalan speakers)	Internal versus external emotion tasks battery (positive and negative components): deception and pretend play stories (with justification of answers)	Lag in performance compared to Anglo samples documented in the literature Children at the age of 12 still fail some tasks (e.g., recognition of negative internal emotion)	NR
Sidera et al. (2012)	Spain	4 to 12 years 6 months old	Real apparent emotion tasks battery: deception and pretend play stories – with negative and positive emotional components (with justification of answers)	Lag in performance compared to Anglo samples documented in the literature. Conceptual change evident between the ages of 6 and 8 At the age of 12, some children presented difficulties understanding some tasks	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Tardif and Wellman (2000)	China, Hong Kong	21 to 44 months	Speech analysis	Earlier understanding of “desires” and “knowing” terms in Asian samples than Anglo children	SES, SD
†Tenenbaum et al. (2004)	Peru (Quechua), UK (UK sample from Pons, Lawson, Harris, & de Rosnay’s, 2003 study)	4 to 7 years old	Emotion understanding battery: Test of Emotion Comprehension (TEC)	6 year old Quechua children performed at chance levels on belief and hidden emotion components, while Anglo children achieved mastery On mixed emotions task, Quechua children achieved higher scores than their British counterparts Overall emotion performance was better in British children	NR
Wang (2010)	China, Hong Kong	4.1 to 7.6 years and months	ToM scale	-Chinese children sequence: DD (.94) > KA (.78) > DB (.56) > CFB (.47) > EFB (.47) > HE (.40) Rep. = .92; / = .23 Chinese children performed better in FB than Hong Kong children. Pass rates on higher order ToM scale subcomponents per age groups: FB: 21% (4-yr olds); 47% (5-yr olds); 66% (6-yr olds); Total (47%) HE: 38% (4-yr olds); 31% (5-yr olds); 51% (6-yr olds); Total (40%) -Hong Kong children sequence: DD (.89) > KA (.83) > DB (.61) > HE (.52) > EFB (.35) > CFB (.33) Rep. = .91; / = .17 Pass rates on higher order ToM scale subcomponents per age groups: FB: 8% (4-yr olds); 32% (5-yr olds); 64% (6-yr olds); Total (40%) HE: 52% (4-yr olds); 44% (5-yr olds); 60% (6-yr olds); Total (52%) HE was easier than CFB for the 4-yr olds than for the older (5- and 6-yr old) age groups	NR
†Wang et al. (2016)	UK, Hong Kong	9 to 15 year olds	Advanced ToM battery	Hong Kong bilinguals and UK children performed similarly on ToM tasks Performance of Hong Kong monolinguals was delayed compared to the former groups	NR

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
Wang, Wang et al., (2017)	Hong Kong, USA	4 to 6 year olds	KA, CFB from the ToM Scale, Preschool Teaching and Learning Comprehension Index	Hong Kong children outperform their USA counterparts	NR
Wahi and Johri (1994)	India	3 to 8 year olds	Mental – real distinction task	Low pass rates in ToM compared to Western samples Affluent Indian children outperformed disadvantaged children	NR
Wellman, Fang, and Peterson (2011)	China, USA, deaf Anglo-Australians	3.1 to 6.0 years and months	ToM scale	-Chinese children sequence: DD > KA > DB > FB > HE -Anglo children sequence: DD > DB > KA > FB > HE Rep. = .95; I = .52 (For combined data) FB pass rates not reported	NR
Wellman, Fang, Liu, Zhu, and Liu (2006)	China, Australia, USA	2.9 to 6.1 years and months	ToM scale	-Chinese children sequence: DD > KA > DB > FB > HE Rep. = .93; I = .25 FB pass rates reported for Chinese children only: 54% (content FB), 49% (explicit FB) Better performance in KA -Anglo children sequence: DD > DB > KA > FB > HE Better performance in DB	NR
Wu, Wang, and Liu (2017)	China	3 to 5.6 years and months	Knowledge display rules battery: negative and positive hidden emotions (with justification of answers)	Lag in their performance compared to Anglo samples documented in the literature	Maternal expressiveness

Authors	Culture	Age	Assessment Tools	Main Results	SCF Measured
†Yang, 2014	USA, China	3 to 7 years olds	ToM battery: Internal conflicting desires tasks and FB tasks	FB tasks: Similar performance across cultural groups  Internal conflict desire tasks: Chinese children performed better than their Anglo counterparts  Conceptual change in Chinese children was 1 year earlier at the age of 4 and 5, than in American children (between 5 and 7)	Socio-emotional characteristics: measured through peer assessments of social functioning, peer nominations, teacher-ratings and self-reports
Zhang et al. (2016)	China	3 to 6 year olds	ToM scale	Sequence: DD (91%) > KA (69.8%) > DB (86.8%) > FB (48.6%) > HE (31.5%) Rep. = .95; / = NR. FB pass rate: at-chance levels	NR
Ziv and Frye (2004)	Israel	3 to 6 year olds	ToM battery: using narratives about teaching scenarios: knowledge difference, teacher's FB and standard FB tasks	Knowledge tasks performance significantly above-chance across age groups FB performance: 3 to 4 year olds significantly below-chance levels 5 and 6 year olds significantly above-chance levels	NR

ToM = Theory of Mind; FB = False Belief; TB = True Belief; DD = Diverse Desires; DB = Diverse Beliefs; KA = Knowledge Access; HE = Hidden Emotions; S = Sarcasm (ToM scale tasks); AR = Appearance Reality tasks; TD = Typically Developed; LI = Language Impairment; IK = Ignorance-Knowledge; MS = Mental States; SES = Socio Economic Status; SD = Socio Demographic; CL = Changed Location; EC = Emotional Components; EU = Emotional Understanding; NR = Not Reported; SCF = Socio Cultural Factors; Max = Maximum; Min = Minimum; Rep. = Green's reproducibility coefficients (significant if  $\geq .90$ ); / = consistency indexes (significant if  $\geq .50$ , see method chapter).

### *2.3.2.3 Studies Reporting Mixed Results in Performance on ToM Batteries and Other Tasks Assessing ToM Constructs Different From FB*

There were thirteen studies in this category, that is, in which similar ToM performance (e.g., the same ToM scale progression) by children from different regions and Anglo (e.g., Australia, USA) and European (e.g., Turkey) background, yet different performance on some ToM subcomponents like FB pass rates was reported. For example, in studies that reported similarities in ToM progression between Asian and South American children and their Australian and American counterparts (DD > DB > KA > FB > HE) below-chance levels in FB performance of the former groups of participants (e.g., Argentina, Singapore; Calero et al., 2013; Qu et al., 2013) was also observed.

In a recent study by Kuntoro et al. (2017), who used the ToM scale, the authors reported that children from two different cities in Indonesia, Bogor and Jakarta, presented different ToM sequences. While the former performed similarly to children from other Asian countries (e.g., China, Iran), ToM sequence in the latter group was the same as that in samples from Australia and USA. In a sample of Turkish children, Bozbiyik (2016) identified that the performance of each ToM scale subcomponent differed in the ToM order across three age groups (e.g., 3 year olds = DD > DB > KA > CFB > EFB > HE; 4 year olds = KA > DB > CFB > HE > DD > EFB; 5 year olds = KA > DD > DB > CFB > EFB > HE). These findings suggest cultural and individual differences in ToM, which will be discussed later.

Finally, cross-cultural studies assessing Asian, Anglo (e.g., UK) and European children indicated that while performance of some tasks differed (e.g., FB) across cultural groups, children displayed similar ToM abilities in other tasks (e.g., emotion tasks, KA). For example, Lucas et al. (2013) found that the performance of Turkish children on FB, KA and advanced ToM tasks was

superior to that of their Chinese and British peers, while performance of these tasks between the latter groups was similar (see also Cheung, C, 2006; Tenenbaum et al, 2004; Yang, 2014; Wang et al., 2016; Table 4).

### 2.3.3 The Impact of Sociocultural Factors on Children's ToM Abilities

Of the 131 studies herein reviewed, in only 30 did researchers discuss differences in ToM performance across cultures from the perspective of the sociocultural influence of parents (e.g., parental style, discipline practices, maternal talk) and children (e.g., child's self-concept, autobiographical narratives, implicit motive<sup>10</sup> and child temperament; see Table 5). In these studies, some authors used sociocultural factors to explain differences in collectivistic and individualistic cultural orientations influencing ToM performance (Ahn & Miller, 2012; Chasiotis et al., 2010; Lane et al., 2013). In addition, two studies reported a significant relationship between some sociodemographic variables, such as number of siblings and ToM performance. Although these sociodemographic variables are not considered to be sociocultural variables, I included them because the authors of these studies discussed the relationship between siblings and ToM from a cultural perspective. These are described at the bottom of Table 5. The findings of these 28 studies are further elaborated in the discussion section of this chapter.

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<sup>10</sup> Implicit Motive is a frequent unconscious need that directs behaviour, social relationships and affective experiences (McClelland, 1987). For example, individuals driven by social interaction will pursue the opportunity to build close social relationships.

Table 5

*Main Findings on the Impact of Sociocultural Factors on ToM across Cultures*

<b>Authors</b>	<b>Cultural Background</b>	<b>Sociocultural Factors</b>	<b>Main Results</b>
Anh and Miller (2012)	Korea, USA	Child self-concept	Korean children who leaned towards more collectivist self-concepts showed better FB performance
Arranz et al., (2002)	Spain	Family context, attachment, number of siblings, number of younger versus older siblings, birth order	Significant relation between FB and secure attachment, but no relation between FB and siblings variables
Bozbiyik (2016)	Turkey	Maternal mental state talk	Mothers' use of mental state talk about oneself, the child and others was related to ToM in children Mental state (internal and external) explanations were not associated with ToM
Caputi et al. (2012)	Italy	Pro-social behaviour	Early individual differences in ToM abilities significantly predicted pro-social behaviour later in school years
Chasiotis et al. (2010)	Germany, Cameroon	Socio cultural orientation of autobiographical memory (self-description), implicit motive, family environment (family allocentricism) and SD variables	Cameroonian children, whose mothers scored higher in interdependent family environments, achieved lower scores in FB performance than their German peers German children who had a more independent (individualistic) sociocultural orientation in their autobiographical narratives and implicit motives performed better on FB than Cameroonian children
Cheung, C. (2006)	Canada (Anglo), bilingual Cantonese Canadian	Traditionalism in Cantonese parents	Children from families with stronger Cantonese traditions performed better on belief-emotion tasks than Cantonese children from less traditional families
Deneault and Marcelle (2013)	Canada (French Canadians)	Social adjustment	Emotional understanding (but not FB) tasks predicted 4 levels of social adjustment (security, autonomy, integration with peers and less internalising problems)

<b>Authors</b>	<b>Cultural Background</b>	<b>Sociocultural Factors</b>	<b>Main Results</b>
Hughes et al. (2017)	Hong Kong, UK	Parental mind-Mindedness	Parental mind-Mindedness is a universal ToM predictor Parents from Hong Kong described their children less in terms of mental states than UK parents. Children from Hong Kong achieved lower FB scores
Kuntoro et al. (2017)	Indonesia (Cities: Jakarta and Bogor)	Parenting attitudes towards Individualistic versus Collectivistic tendencies  Authoritative and authoritarian parenting styles	Parents from both cities rated higher in collectivistic tendencies and authoritative parenting styles Authoritarian parenting styles were negatively related to ToM  Difference in ToM sequences related to: Bogor parents being more committed to and involved in children's education processes than parents from Jakarta
Lane et al. (2013)	China, USA	Temperament and child behaviour	Children with less reactive and socially withdrawn temperament characteristics (more desirable in collectivist cultures like China) had a better FB performance
Lecce et al. (2011)	Italy	Social skills, sensitivity to criticism	Individual differences in social skills were significantly related to emotional understanding tasks and not FB. Children with better skills to deal with criticism showed better ToM abilities
Lewis et al. (2006)	China	Parental styles and child interaction	Ambiguous <sup>11</sup> parental styles and low levels of parental response towards transgressions were negatively related to FB in Chinese children Negative relationship between proximity to and interaction with older cousins and low levels of FB performance in Chinese children
Lewis et al. (1996)	Greece	Family, siblings, number of relatives and adults in the community that interacted with the child	FB performance was positively influenced by the interaction with older siblings, adults (kin) and other older children (neighbours)

<sup>11</sup> Ambiguous parenting styles, according to Ruffman et al. (1999), refer to a combination of low levels of parental response toward transgressions in which parents do discuss the transgression but do not discuss the victim's feelings with their children at the same time that reprimand is used.



<b>Authors</b>	<b>Cultural Background</b>	<b>Sociocultural Factors</b>	<b>Main Results</b>
Licata et al., (2016)	Germany	Maternal mind-mindedness and maternal emotional ability (or sensitivity)	Maternal mind-mindedness did not predict FB performance, but maternal emotional ability (or sensibility) did predict FB abilities in children
Liu et al. (2016)	China	Maternal mental state talk	Reference to behavioural cues (behavioural talk) when communicating rather than mental states predicted FB performance in Chinese children
Lu et al. (2008)	China	Talking about others	Talking about others (in terms of external actions, context, relationships with other vs talking about one's own inner world) was positively related to FB performance in some tasks
Mizokawa and Koysu (2012)	Japan	Peer problems (social abilities)	Children who have the ability to understand 1 <sup>st</sup> order FB, unlike HE and 2 <sup>nd</sup> order FB, appeared to have fewer difficulties with peer interaction
Mizokawa and Lecce (2016)	Japan, Italy	Sensitivity to peer and teacher criticism	Japanese children had a more positive attitude towards teachers' criticism than Italian children, and this was related to ToM
Mizokawa (2015)	Japan	Sensitivity to peer vs. teacher criticism	Children with better FB performance were more vulnerable to teachers' criticism and accepted teachers' criticism positively
Nawaz and Lewis (2017)	Pakistan	Content and quality of mother-child talk	Low use of mental state talk: 2% by mothers and 1% by children  No associations between maternal mental state talk and ToM

<b>Authors</b>	<b>Cultural Background</b>	<b>Sociocultural Factors</b>	<b>Main Results</b>
Shahaeian et al. (2014) <sup>12</sup>	Iran	Parenting questionnaire (Ruffman et al., 1999) Discipline practices strategies.	Children whose parents avoid discussion about misbehaviour presented lower ToM scores -Mothers who openly discussed with their children the reasons for misbehaviour were positively related to ToM -Control (authoritarian) was negatively related to FB, and being able to explain the feelings of the victim was positively related to FB
Shahaeian (2015)	Iran (intra-cultural study: High SES, low SES, rural)	Number of siblings, family and social environment	The number of siblings did not predict ToM Number of days that children played with peers and the amount of parental involvement interfering with conflict between siblings were positively and negatively related to ToM respectively
Shahaeian et al. (2013)	Iran, Australia	Number of siblings	Number of siblings was related to faster ToM progression in Anglo-Australian children but not in Iranian children
Shahaeian et al. (2011)	Iran, Australia	Sibling status (e.g., having siblings vs. singletons)	Sibling effects influence ToM in Anglo-Australian children but not in Iranian children. Anglo-Australian children with siblings develop ToM faster
Taumoepeau (2015)	South Island, New Zealand	Maternal mental state talk	Mothers who identified with Pacific Islander culture made use of mental state talk (or cognitive talk) in lower proportion than NZ mothers who identified with European trends Cognitive talk was a strong and consistent predictor of ToM performance in children
Vinden (2001)	Korean American, USA	Parental styles	FB performance in Anglo children was negatively related to parenting control Authoritarian parenting style appeared to affect the FB rather than the emotional components

<sup>12</sup> Shahaeian et al.'s. (2014) study was not included in the previous sections of this literature review because the authors did not provide descriptive statistics of the ToM scores. However, it is reviewed in the current section because it reports significant cultural outcomes of parenting practices and their relation to ToM in Iranian children.

<b>Authors</b>	<b>Cultural Background</b>	<b>Sociocultural Factors</b>	<b>Main Results</b>
Wang and Su (2009)	China	Social interaction: classmates of the same age vs different ages	4 year olds who interacted with peers of different ages showed a more advanced FB performance Children with classmates of the same age performed slowly on FB
Wang, Zhu et al., (2017)	Hong Kong	Parental mind mindedness	Parental mind mindedness associated to FB performance in children
Wu et al., (2017)	China	Maternal expressiveness	Mothers' positive expressiveness was positively related to children's emotional knowledge, while mothers' negative expressiveness was not
Wu and Su (2014)	China	Social abilities: sharing behaviour	Sharing behaviour (as an early indicator of pro-social behaviour) was associated with ToM performance Children who performed better on DB and KA tasks than on DD, FB and HE tasks displayed more spontaneous sharing behaviours
Yang (2014)	China, USA	Socio-emotional characteristics: measured through peer assessments of social functioning, peer nominations, teacher-ratings and self-reports	Chinese children: no correlations between FB and socio-emotional characteristics conflicting desire tasks were positively related to positive peer nomination and social cooperative behaviours and negatively related to shy-anxious characteristics  American children: higher levels of FB performance were related to lower rates of negative peer nominations and high scores on self-perceptions of social integration performance on conflicting desire tasks were related to aggressive characteristics and negative peer nominations

## 2.4. Discussion

The present review was aimed at identifying: 1) differences and similarities in FB performance of children across different cultures; 2) differences and similarities in performance of ToM subcomponents (desire, emotion and knowledge tasks) by children across different cultures; 3) potential sociocultural factors related to ToM performance of children from different backgrounds; and 4) gaps in the current research that need to be taken into consideration in future studies. In this section, I provide a brief overview of the main findings with a focus on ToM variability across countries as highlighted by the results in light of individualistic versus collectivistic dominant cultural backgrounds. Then, I elaborate on the ToM differences in the context of potential sociocultural influences also considering Hofstede's cultural framework.

### 2.4.1 General Discussion of the Main Findings on Children across Cultures

The present review identified that 74% ( $n = 97$ ) of studies reported differences across cultures, illustrating the possible impact of cultural influences on children's ToM performance. At the same time, the evidence showed that, regardless of whether children from different countries acquire ToM at a later or earlier age than their Anglo (e.g., UK, USA) counterparts, ToM development progresses from below chance to above chance as children grow older. This is in line with Liu, Wellman, Tardif and Sabbagh's (2008) and Wellman et al.'s (2001) proposition, showing that ToM development in children from all cultures progressively shifts from below chance to above chance (i.e., developmental trajectory), but the ability to understand ToM consolidates at different ages across diverse groups (i.e., developmental timing). Authors have termed this phenomenon synchronous trajectory and non-parallel developmental timing.

In relation to age differences in acquiring ToM, it was clear that, with few exceptions (e.g., Ahn & Miller, 2012; Lane et al., 2013; Mizokawa & Lecce, 2016; Vinden,

2001; Wang, Wang, et al., 2017), FB performance of children from countries with a more dominant collectivistic cultural background like Asian countries (e.g., Philippines, Pakistan and Japan), and certain ethnic groups (e.g., in Samoa, Tolai, Azurini and Semai), but also some in children from some urban European countries with individualistic cultural tendencies (e.g., France, Switzerland and Spain) was found to be delayed compared to children from the UK and the USA (e.g., see Wellma et al's (2001) meta-analysis). This lag in acquiring ToM abilities in children from some Asian countries and urban European countries was evident in the one- to three-year age range, showing that most children did not achieve mastery at the ages of five or six, while in ethnic groups, some children were observed to lag five years or more behind in their ability to understand ToM as assessed through FB.

#### 2.4.2 Broader Cultural Framework and ToM: Collectivistic versus Individualistic Cultural Differences

Although researchers have attempted to explain ToM differences in light of collectivistic versus individualistic cultural frameworks, empirical evidence to support the role of individualism-collectivism in shaping ToM is limited. As clearly evidenced in this review, cultures considered to have a dominant collectivistic orientation, like Japan, Hong Kong and Samoa, have been found to have significant differences in ToM development compared to children from some dominant individualistic cultural settings (e.g., UK, USA, Germany; Mayer & Träuble, 2012; Lewis, et al. 2006; Liu, et al. 2008). Yet, other studies have shown no differences in ToM performance between children from individualistic and collectivistic cultures (e.g., Baka, Micronesia, Korea; Avis & Harris, 1991; Oberle, 2009; Oh & Lewis, 2008). To add further complexity, FB performance in children from some collectivistic cultures (e.g., Peru, Hong Kong, China and Japan) appeared to be somewhat inconsistent, with a mix of better, comparable and poorer results (e.g., Callaghan et al.,

2005; Hughes et al., 2014; Mizokawa & Lecce, 2016; Vinden, 1996; Wang, Wang et al., 2017). However, the lag in children from China, Japan and Hong Kong has been consistently demonstrated in meta-analyses conducted by Ohtsubo (2007), Liu et al. (2008) and Wellman et al. (2001). Nonetheless, the overall data do not provide an entirely clear picture of how the individualistic-collectivistic framework influences ToM performance (Slaughter & Perez-Zapata, 2014).

A similar situation of inconsistencies in ToM performance, like the one described above, was also observed in studies using tasks other than or in addition to FB, such as the ToM scale. Children from collectivistic settings like Argentina, Indonesia, China and Singaporean children of Chinese heritage displayed the same order of ToM subcomponents observed in Anglo samples (i.e., DD > DB > KA > FB > HE; Calero et al., 2013; Kuntoro et al., 2013; Qu et al., 2013; Qu & Shen, 2013, Wu & Su, 2014). However, more recent investigations consistently confirm that children from collectivistic countries present a different ToM sequence from Anglo samples (i.e. DD > KA > DB > FB > HE; Duh et al., 2016; Peterson & Slaughter, 2017; Zhang et al., 2016). Children from China (from Beijing), Singapore, Hong Kong, Bogor Indonesia and Iran have been seen to acquire KA after Desires, while Anglo (e.g., Australia, USA) children have been found to develop DB as the second ToM subcomponent. It is worth noting that regardless of differences or similarities in the ToM sequence, the subcomponent of desire was always acquired first, while FB and HE were acquired last in all children across cultures, indicating a universal order for these ToM subcomponents (de Rosnay, 2017; Peterson & Slaughter, 2017). This evidence shows that similarities in ToM progression may attest to its universal aspects, while significant differences may be indicators of socio-cultural influences like those highlighted in children's performance of some ToM subcomponents like FB, DB, KA and HE (e.g. Calero

et al., 2013; Duh et al., 2016; Peterson & Slaughter, 2017; Shahaieian, 2015; Zhang et al., 2016).

In summary, the evidence is inconsistent with regard to the role of individualism-collectivism in cultural differences in ToM development, in part due to: 1) unexplored potential sociocultural factors that may provide insights into ToM; and 2) possible “uncontrollable confounding factors (rather than focal conceptions of skills)” (Wellman et al., 2006, p. 1077). Therefore, sociocultural mechanisms that can explain variability in ToM performance across cultures represent an important gap worthy of further research. In the second part of this discussion I will elaborate on the ToM differences found in some studies reviewed here in light of the context of potential sociocultural influences.

#### 2.4.3 Possible Explanations for Cultural Differences in ToM: The Role of Specific Sociocultural Mechanisms

A further objective of this narrative literature review was to identify potential sociocultural factors related to ToM performance in children from different backgrounds. Of the 131 studies reviewed, researchers in only 30 explored sociocultural factors (i.e., parental style, social interaction, family environment and siblings) and explained their findings through a cultural lens. Those that did not investigate sociocultural factors drew largely speculative conclusions about their influence on ToM from individualistic and collectivistic perspectives. This indicates that researchers in the field of ToM still have to face unexplained inconsistencies in children’s performance as well as gaps in explaining the possible socio-cultural mechanisms that underlie ToM differences, however, the individualistic-collectivistic framework has been a widely used as a cultural conceptualisation to explain country differences in ToM. Therefore, it is through this cultural framework that scholars have found it useful to identify differences like

authoritarian versus authoritative parental styles, autonomy versus social dependency and an emphasis on family harmony versus independency to explain differences in ToM (e.g., Ahn & Miller, 2012; Kuntoro, et al., 2013; Kuntoro, et al., 2017; Peterson & Slaughter, 2017; Shahaeian, et al., 2013).

#### *2.4.3.1 Parent-Child Interaction and ToM*

One of the main sociocultural factors that could explain cultural differences in ToM development is children's relationship with their parents (Miller, 2016). Culture influences the everyday dynamics of parent-child relationships and results in varying parenting practices. According to Bornstein (2013), every cultural group has its own normativity, beliefs and behavioural systems that influence parental cognition and practices. "Parental values, philosophies of childrearing and day-to-day social practices may well contribute to the cultural contrast in the aspects of others' thought processes that children first notice and make sense of" (Peterson & Slaughter, 2017, p. 29). Parents' relationships with their children create a context that comprises a number of different variables influencing the way children develop, such as parenting involvement, attachment, communication and discipline practices (Kamphaus & Reynolds, 2006). These variables could be considered to be important drivers of socio-cognitive development, including ToM (Miller, 2016; Pavarini et al., 2013). In this section, different aspects of parent-child interactions and their associations with ToM are discussed in the context of the reviewed studies.

##### *2.4.3.1.1 Parenting Styles, Discipline Practices and ToM*

Researchers have indicated that ToM performance is negatively associated with authoritarian parenting styles and harsh discipline practices (characteristics of collectivistic settings), and positively related to authoritative styles that encourage open communication and reflection on other people's feelings (characteristics of individualistic settings; Hughes



& Ensor, 2006; Kuntoro, et al., 2017; O'Reilly & Peterson, 2014; Pavarini, et al., 2013; Ruffman, Perner, & Parkin, 1999).

Failure to carry out FB tasks or variability in the acquisition of ToM constructs (e.g., KA) in children from some collectivistic cultures (e.g., Philippines, China and Iran) have been attributed by scholars to parental styles in which children's blind obedience of authority is highly valued. This means little discussion of others' perspectives and parenting practices characterised by guided, pragmatic teaching methods rather than encouraging autonomy and independence (Laya de García et al., 2016; Liu et al., 2008; Peterson & Slaughter, 2017; Wellman et al., 2006; 2011; Zhang et al., 2016). Moreover, studies by Shahaieian et al. (2014) and Lewis et al. (2006) highlighted the negative influence of some aspects of collectivistic parenting orientations. In particular, Shahaieian et al. (2014) reported three main findings in relation to discipline practices and ToM in Iranian children. Firstly, children of mothers who used silence or avoidance disciplinary strategies achieved lower ToM performance. Secondly, using control and authoritarian strategies to deal with children's transgressions were negatively related to FB performance, whereas discussing the victim's feelings with children was positively related to FB performance. Thirdly, children whose mothers discussed their inappropriate behaviour with them performed better on ToM.

Although there is limited empirical evidence in regard to the mechanisms that cause ToM variability and its relationship to parenting styles, the findings nevertheless indicate a stronger negative link between ToM performance and collectivistic parenting orientations (e.g., parental control and lack of autonomy) than individualistic parenting orientations. However, it is important to point out that some parents from collectivistic cultures also used discipline strategies that encourage open discussion (Kuntoro, et al., 2017; Shahaieian et al., 2014). This means that despite the cultural setting, some parents may have incorporated

both authoritarian and authoritative strategies and practices, thereby fostering ToM development. For example, Vinden's (2001) findings confirmed that Korean children, whose mothers scored high on certain authoritarian factors like their Anglo counterparts, achieved higher levels of FB performance than their Anglo peers, indicating that development of Korean children's mindreading skills may benefit from both authoritarian and authoritative parenting styles.

There is also a possibility that not all discipline strategies and parenting practices related to collectivistic cultures result in delayed ToM performance and, instead, may even help children acquire the skills to pass some tasks before others (e.g., KA before FB). Early performance of knowledge tasks by children from Iran, China, Singapore and Hong Kong was thought to be related to childrearing practices with an emphasis on pragmatic guided methods, considered collectivistic parenting practices (KunTORO, et al., 2017; Peterson & Slaughter, 2017; ShahaEian, et al., 2013; Wellman et al., 2006; 2011; Zhang et al., 2016). While a small number of empirical studies provide only limited evidence, these factors could be indicators of sociocultural influences on ToM yet to be explored.

To sum up, the evidence herein presented is mixed, while some research suggests a negative influence of collectivist parenting styles in ToM, other has found this cultural influence on parenting to foster some ToM abilities in children. Therefore, more research is necessary to clarify the impact of parenting styles on children's ToM abilities across cultural settings.

#### *2.4.3.1.2 Parent-Child Communication and ToM*

Children learn different levels of mental state talk (cognitive talk using the words "think", "believe", "know") from their relationships and communication with parents, thereby encouraging ToM (see Bozbiyik, 2016; Devine & Hughes, 2018, 2017; Hughes et al., 2017; Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003; Wu et al., 2017). However, in

this literature review it was identified that parents in collectivistic settings whose first language is not English may influence ToM in their children by using different communication styles to those used by Anglophonic parents from individualistic cultural backgrounds. Liu et al. (2016) found that Chinese mothers made more reference to behavioural cues when communicating, unlike Anglo mothers who referred to mental states, and this was a significant positive predictor of FB performance in children. Hence, an alternative pathway to influencing FB understanding in Chinese children may be related to mothers' speech which involves talking about others in terms of their actions and external factors (i.e., behavioural talk), rather than mental states (Liu et al., 2008). These authors concluded behavioural talk may be the mechanism underlying the approximately one-year lag in Chinese children's ToM performance compared with that of Anglo children. Although the use of mental state talk is believed to be a key factor in ToM (Devine & Hughes, 2018, 2017; Hughes et al., 2017), it appears that emerging studies are starting to confirm that parents in some cultural settings maintain other ways of talking and communicating that influence ToM in their children in the long run. However, more research is necessary to confirm these conclusions because it is not clear how the mechanisms of engaging children in a communication path other than mental state talk is related to the acquisition of the abilities to understand subjectivity of the mind and may result in later ToM development in children from collectivistic dominant cultures.

In other collectivistic contexts, parental and cultural beliefs about how members of a social group use or express mental states may have resulted in poor FB understanding in some children. Laya de García et al. (2016) identified two cultural parental beliefs in the Philippines: 1) children only understand language after 16 months of age and, therefore, parents do not use mental state talk before this age (Williams, Williams, Lopez, & Tayko, 2000); and 2) children only "have a mind of their own" after the age of six (Cruz, Protacio,

Balanon, Yacat, & Francisco, 2001, p. 104). Hence, parents only use mental state communication when they consider children old enough to understand (Alampay, 2014; Laya de García et al., 2016). Also, in the adult-child interactions and communication of Southern Pacific Islanders (e.g., Samoa and Yap; Mayer, 2012), discussion of the mind is not encouraged because the contents of the mind are considered private and impenetrable (also referred to as “opacity of the mind”; Mayer, 2012; Mayer & Träuble, 2012; 2015). These sociocultural beliefs influence how parents and children interact and communicate, and authors have concluded that this may have resulted in delayed acquisition of ToM skills in the one-to-five-year age range compared to Anglo children. Children from these contexts may need to use other cognitive tools to interpret subjectivity of the mind, and consequently, behavioural cues may be more accessible than mental content to aid conceptual change and understanding of ToM, influencing children to understand the relationship between mental contents and observable behaviour at different developmental timing.

Overall, different parental communication environments may provide children with the mechanisms through which they acquire abilities to understand ToM, albeit at a different pace. In each specific sociocultural context, children learn particular cues about how people interact, communicate and behave, and how this relates to their internal world. The parent-child relationship, thus, provides children with cultural knowledge and information about their social, internal and external worlds (Fonagy et al., 2007). As noted by Bornstein (2013), “central to a concept of culture, therefore, is the expectation that different cultural groups possess distinct beliefs and behave in unique ways with respect to their parenting” (p. 260). This suggests that parenting factors (e.g., communication, interaction and discipline practices) provide key insights into the extent to which ToM is culturally influenced and which aspects exert major impacts. The following section focuses

on family environment and siblings as additional aspects of family socialisation practices affecting children's ToM development.

#### *2.4.3.2 Family Environment, Siblings and ToM*

The family environment, if it is defined by positive relationships with parents and siblings, adequate physical and affective nurturing and positive social experiences, has been found to significantly and positively predict ToM development (Arranz et al., 2002; Galende, de Miguel, & Arranz, 2011). Parents' cultural values and norms influence the environments for raising their children. While the number of siblings is not culturally determined, the way siblings interact during their childhood may be influenced by sociocultural factors, because the older and more experienced members of a group (like parents) mediate and transmit cultural values to others in the group (Bornstein, 2012). The reviewed studies suggest there may be a link between differences in ToM performance and the number of siblings, as well as collectivistic versus individualistic family environments.

Although the number of siblings has been found to be positively associated with ToM performance in Anglo children, this was not the case for children from collectivistic cultures like Iran (e.g., Shahaieian, et al., 2011; Shahaieian, et al., 2013; Shahaieian, 2015). One could relate this to the impact of interdependent family environments. For example, Shahaieian et al. (2014) identified that Iranian mothers used silence and avoidance as discipline strategies when dealing with children's transgressions. These passive disciplinary strategies, which are highly valued in Iranian culture to avoid conflict and argument and promote social harmony and group cohesion, were negatively related to ToM. One could therefore speculate that this need for conflict avoidance between siblings within Iranian's family environments, may be the reason why previous studies in this cultural group have failed to show links between the number of siblings and ToM as opposed to Anglo samples. In fact, Shahaieian (2015) concluded that the number of siblings

does not predict ToM; rather, the number of days children play with peers and the amount of parental involvement in conflict between siblings are predictors of ToM.

To sum up, the overall findings like those presented by Shahaieian et al. (2014) not only supports the cultural influence of the overall family environment, but also highlights potential influence of collectivistic or individualistic cultures on ToM through sociocultural factors like discipline practices and parenting styles. Nevertheless, supporting evidence is scarce, and further investigations will be necessary to corroborate these conclusions.

#### *2.4.3.3 Social Interaction and ToM*

In studies of the relationship between ToM and social interaction in Anglo children it was concluded that “ToM skills transform and/or are transformed by children’s close relationships” (Hughes & Leekam, 2004, p. 590). This shows the key role of parents in developing their children’s ToM skills as they model what they consider to be desirable styles of social interaction and “accepted” cultural values, and to encourage their children to adopt those styles to help them become active members of a social group (Bornstein, 2013; Chasiotis et al., 2006). Therefore, parents in all cultural contexts assist and encourage children to meet socialisation goals (Bornstein, 2013; Rao, McHale, & Pearson, 2003), such as social adjustment, prosocial behaviour, dealing with social rejection and criticism and acquiring general social interaction skills (e.g., Caputi et al., 2012; Deneault & Marcelle, 2013; Lecce et al., 2011; Mizokawa, 2015; Mizokawa & Koyasu, 2012; Mizokawa & Lecce, 2016; Yang, 2014; Wu & Su, 2014 in Table 5).

Wu and Su (2014) found that Chinese children who performed better on the ToM scale (total score) and better in DB and KA tasks than DD, FB and HE tasks displayed more spontaneous sharing behaviours. Although these findings were not presented from a cultural perspective, the authors concluded it was unnecessary for Chinese children to

understand sophisticated mental states like FB and HE to engage in spontaneous sharing. Based on this, one could argue that Chinese children with better ToM performance understood spontaneous sharing as an expected behaviour from their parents, because it promotes collectivistic values like family harmony and conflict avoidance (Oyserman, Coon, & Kemmelmeier, 2002). This could also be related to behavioural maternal talk and mothers' use of behavioural cues rather than mental states. Liu et al. (2016) regard behavioural maternal talk as a possible mechanism for promoting ToM in this cultural group, since it facilitates understanding of other people's needs, intentions and thoughts in terms of their actions. In other words, these children might have easily engaged in directed and spontaneous sharing behaviours because they were capable of understanding other people's true state of affairs (what people truly know [KA] and truly believe [DB]), which may not be the case with tasks that require understanding of manipulated information (e.g., FB).

Another aspect of socialisation identified as influenced by sociocultural factors was sensitivity to criticism. Sensitivity to criticism is reduced by social interaction because children with good social understanding are better able to cope with criticism (Lecce et al., 2011). Japanese children with good social abilities and a positive attitude towards teachers' criticism and acceptance (unlike peer criticism) were found to perform better on ToM tasks than their Italian peers (Hughes & Leekam, 2004; Mizokawa, 2015; Mizokawa & Koyasu, 2012; Mizokawa & Lecce, 2016). In fact, Mizokawa (2015) and Mizokawa and Lecce (2016) interpreted their findings from a cultural perspective and associated the positive responses of Japanese children to teacher criticism with the mother-child relationship standards of Japanese dyads, such as focus on achievement effort, stress of authority and obedience of adults, as identified by Bornstein and Cote (2004) and Holloway (1988). This

may have helped Japanese children to understand and accept adults' expectations and criticisms, resulting in a positive association with ToM performance.

To summarise, the evidence highlights the possibility that as culture potentially influences the dyadic relationships and the environments in which these develop, modeling children's social interactions, and influencing the way children come to understand others' perspectives, facilitating early development of some ToM subcomponents (e.g., emotions, KA, DB).

#### *2.4.3.4 ToM Performance and Sociocultural Factors Assessed in Children*

In other studies, researchers assessed socio-cultural factors directly in children instead of only using parents to conduct these assessments. These socio-cultural factors included child's self-concept, autobiographical narratives, implicit motive<sup>13</sup> and child temperament. In these studies, researchers explored the relationships between these socio-cultural factors and ToM. The review of these studies indicated that, only in three cross-cultural studies these relationships have been investigated, and that their findings viewed from the collectivist-individualist cultural framework, yielded contrasting results.

As expected, Chasiotis et al. (2010) confirmed that German children, who had a more independent (individualistic) sociocultural orientation in their autobiographical narratives and implicit motive, achieved better FB performance than Cameroonian children who have a collectivistic background. In contrast, Ahn and Miller (2012) and Lane et al. (2013) observed that Korean and Chinese children, who leaned towards collectivistic cultural tendencies in child's self-concept and desired temperament (e.g., they were less reactive and socially withdrawn), achieved better FB performance than their American

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<sup>13</sup> Implicit motive is a frequent unconscious need that directs behaviour, social relationships and affective experiences (McClelland, 1987). For example, individuals driven by social interaction pursue the opportunity to build close social relationships.



counterparts from a more individualistic background. The latter evidence appears to contradict the majority of studies that support delayed understanding of FB in children from collectivistic cultures compared to children from individualistic cultural settings. Considering that the relationship between these factors and ToM has only been investigated in three cross-cultural studies, more research is necessary to develop substantial conclusions with regard to ToM abilities and children's understanding that behaviour can be influenced by complexities of the mental and social world, such as ability, personality and self-concept (Eder, 1990; Flavell, 1999; Hughes & Leekam, 2004).

## 2.5 Limitations and Future Directions

The evidence in the present review suggests that sociocultural factors are potential mechanisms for understanding ToM variability in children from different cultural backgrounds. However, explaining the effects of specific sociocultural factors on the ToM performance of children from diverse cultures has not been thoroughly attempted in the literature, and in only a limited number of studies have researchers explored the influence of specific variables. Future research therefore should examine these factors in more depth, to not only help identify how and why the performance of children from diverse cultural backgrounds differs, but also to contribute to a broader theoretical understanding of cultural mechanisms affecting ToM and ToM development in general.

Furthermore, the differences reported not only reveal a lag in children from dominant collectivistic orientated countries compared to their counterparts from dominant individualistic cultural backgrounds (mainly English speakers), but faster development in some respects, raising questions about the validity of using Anglo children's (e.g., UK, USA) ToM development as the marker for ToM development in children from other cultures. There is a distinct possibility that each culture has its own maturational ToM timetable, since ToM is shaped by relevant cultural and social experiences. Combined with

a meta-analytic approach to the literature, future research will enable clarification of this phenomenon and the possible reasons behind inconsistencies in the findings.

Another limitation identified in this review was the issue of possible methodological influences on ToM performance (see Subsection 2.3.1.3). Variations in performance due to variations in tasks make it difficult to identify possible cultural influences on children's ToM performance. Although Wellman et al. (2001) claimed the traditional FB task is a consistent and reliable measure for capturing ToM conceptual changes in children from various cultures, there is a possibility that children's task performance is impacted by a combination of cultural factors and methodological choices, as children from some cultural contexts seem to have difficulties transferring their understanding of ToM to different scenarios of FB tasks (e.g., Quechuan children's above-chance performance in AR, unlike content FB; Vinden, 1996). The extent to which methodological differences introduce variables, like increased risk of guessing, reduced task demands or increased executive demands that might alter performance outcomes is unclear (Yazdi, German, Defeyter, & Siegal, 2006). This limitation also calls for meta-analytic studies to confirm the methodological implications for ToM performance and further clarify cross-cultural differences in ToM. It also highlights the importance of future research involving suitable and consistent methodological approaches to gain more accurate results.

## 2.6 Conclusions

The present literature review sheds light on the existence of universal and potentially culturally-specific domains of ToM, as well as the influence of parent-child relationships on ToM. This review provides evidence to support the notion that parenting is a significant influencing factor and an important cultural transmission mechanism, and reinforces "the need to attend to the quality as well as the content of parent-child

interactions” (Hughes & Devine, 2017, p. 45). Based on the findings of this review, one can conclude that the cultural norms of parent-child relationships may be an important sociocultural contributor to variability in the ToM performance of children from different cultural contexts. Cultural differences between individualistic and collectivistic societies are likely to impact on parenting and to generate variability in the nature of how children and people express their understanding of the mind (Lillard, 1998). The influence of culturally different parental styles on ToM is therefore crucial and, if explored further, may help to elucidate the somewhat contradictory findings reported in ToM studies so far.

## Chapter 3

### The Present Study

In the present Chapter, I will briefly summarise the main aspects so far evidenced in the literature and the main gaps identified. Then, I will explain the empirical work conducted, the research questions and the hypotheses that guided my investigation.

Despite the slow increase in the number of cross-cultural investigations, whether ToM performance is culturally influenced remains an open question because the precise mechanisms behind cultural differences in ToM are still unclear. A common claim of cross-cultural studies comparing ToM performance of children from individualistic dominant cultures (mostly from English speaking countries) and that of children from countries of collectivistic dominant cultures, is that the majority of children from individualistic cultures (especially those from English-speaking countries) develop advanced ToM earlier than their counterparts growing up in collectivistic cultural settings. However, this claim may need to be reconsidered because, as shown in the literature reviewed in Chapter 2, some children from collectivistic dominant cultural settings (e.g., Iran, China) may also present more advanced abilities when assessed with ToM tasks other than FB, showing earlier ToM acquisition than their Anglo counterparts from individualistic dominant cultures (e.g., USA, Australia, UK). This has led researchers to consider that, although for the last three decades scholars have used False Belief (FB) tasks as the litmus test for ToM (Ghrear et al., 2016), using FB tasks as the only tool for examination of ToM has been criticised for being simplistic and limited (Blijd-Hoogewys et al., 2008; de Rosnay, 2017; Liszkowski, 2013; Peterson & Slaughter, 2017). Therefore, ToM examination through a wider lens is necessary to provide a more comprehensive understanding and clarify the influence of

sociocultural factors on ToM development (Astington & Barriault, 2001; Liszkowski, 2013; Shahaian, et al., 2011).

The research reviewed in Chapter 2 confirms differences in the performance of ToM tasks by children from diverse cultural backgrounds. The evidence presented illustrates that children develop the abilities to pass FB tasks at different ages in some collectivistic dominant cultures compared to their peers from some individualistic dominant cultures (e.g., China, USA, Germany; Lewis, Huang, & Rooksby, 2006; Naito, 2003; Slaughter & Perez-Zapata, 2014). Moreover, in cross-cultural studies using the ToM scale, researchers reported that ToM progression in some children from collectivistic dominant cultures (Diverse Desires [DD] > Knowledge Access [KA] > Diverse Beliefs [DB] > FB > Hidden Emotions [HE]) differed from individualistic samples (DD > DB > KA > FB > HE; e.g., Duh et al., 2016; Jester & Johnson, 2016; Peterson & Slaughter, 2017; Wellman & Liu, 2004).

Furthermore, the literature reviewed in Chapter 2 suggest that there is limited cross-cultural evidence involving Spanish-speaking samples. To date, only one study has used the ToM scale with Spanish-speaking participants to explore ToM progression (Calero et al., 2013). The majority of studies with Spanish-speaking samples focused on exploring children's acquisition of higher-order ToM constructs using appearance reality emotion task batteries (i.e., HE) as well as FB tasks as core assessment tools (e.g., Esteban et al., 2010; Sidera et al., 2008). Out of the 22 published studies reviewed in Chapter 2, only five collected data from multiple cultures including Spanish-speaking samples (e.g., Callaghan et al., 2005; Chasiotis et al., 2006). Fifteen reported differences in HE and FB performance of some Spanish-speaking children compared to Anglo children, denoting a slightly later emergence of the ability in the former group to understand higher-order ToM tasks (e.g.,

Argentina, Spain, Peru and Mexico; Calero et al., 2013; Guiberson & Rodriguez, 2013; Resches & Perez-Pereira, 2007; Sidera et al., 2012; Tenenbaum et al., 2004).

To date, only six<sup>14</sup> published studies have investigated ToM in Colombian children (Bermúdez-Jaimes, 2010; Bermúdez-Jaimes & Sastre-Gómez, 2010; Bermúdez-Jaimes & Sastre-Gómez, 2015; Fernandez, 2011; Maldonado-Gonzales & Navarro-Matajira, 2012; Moreno-Montoya, Botero-Suaza, Tamayo-Arboleda, & Chaves-Castaño, 2014) and none of these have investigated ToM sequence in Colombian children, but have focused on FB performance only. Fernandez (2011) reported that Colombian children achieved higher FB scores than Anglo samples documented in the literature. The other five studies found the FB performance of children ranging from three to six years was somewhat inconsistent. While performance of some FB tasks shifted from below-chance levels at the age of three to chance and above-chance levels at the age of four, the FB performance of some children at the age of five and six years remained at chance levels, indicating that they had not yet achieved mastery (Bermúdez-Jaimes, 2010; Bermúdez-Jaimes & Sastre-Gómez, 2010; Moreno-Montoya et al., 2014). FB performance was poorer when the authors used different versions of FB tasks (e.g., Appearance Reality compared to Content FB) and did not differ across certain age groups (Bermúdez-Jaimes, 2010; Maldonado-Gonzales & Navarro-Matajira, 2012; Moreno-Montoya et al., 2014). Based on this evidence, one can conclude that FB performance in Colombian children is delayed compared to Anglo children in the literature (e.g., Wellman et al., 2001).

Despite evidence pointing to differences in the ToM performance of children across cultures, the mechanisms that cause ToM variability remain unclear. This has led

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<sup>14</sup> Of the six studies, only Fernandez (2011) was included in the narrative literature review because it was published in English. The remaining five studies were published in Spanish and did not comply with Filter 1 (only studies published in English) of the search conducted for the narrative literature review.

researchers to draw conclusions about cultural differences which are speculative rather than informed by solid empirical evidence. It is possible that the past reliance on FB tasks for assessing ToM has contributed to the lack of evidence for explaining ToM differences in children across cultures. As outlined in Chapter 2, only 20 studies have assessed ToM using the ToM scale instead of FB alone. Moreover, out of the 131 studies reviewed, 48 studies collected data across multiple cultures and; only in 30 studies, sociocultural factors were explored (parental styles, discipline practices, child's self-concept and socio-economic status). These numbers highlight the need for more cross-cultural research in the field of ToM, and more in-depth exploration of the sociocultural factors that potentially influence ToM.

To address the above gaps, my empirical work was aimed at investigating ToM progression and the role of potential sociocultural factors influencing ToM in children between the ages of 4 and 6 years from two culturally different countries, namely Colombia and Australia. ToM progression in Colombian children is as yet unknown, and this is the first investigation into Colombian children using the ToM scale. It is also the first study to explore sociocultural factors and their relationship to ToM progression in typically developed Anglo-Australian children. Furthermore, cross-cultural studies comparing ToM performance between children from Australia and other cultural settings are limited. To date, only eight studies (see Chapter 2) and one meta-analysis have investigated differences in ToM performance between Anglo-Australian children and children from other collectivistic dominant cultures (e.g., China, Iran; Shahaieian et al., 2011; Wellman et al., 2006). Although the majority of these studies used the ToM scale as the main assessment tool, none investigated the potential sociocultural factors that may explain the mechanisms underlying the differences.

No cross-cultural studies have been conducted to date with Colombian and Anglo-Australian samples, nor have child's self-concept and parent-child relationship dimensions influencing ToM progression in these cultural groups been investigated so far. These sociocultural factors were chosen because they emerged from my literature review as strongly influenced by dominant collectivistic and individualistic cultural orientations which are important variations between the Anglo-Australian and Colombian contexts. These variations in light of these cultural frameworks, Colombian culture has been recognised for possessing high levels of social interaction, community participation, family-centred orientation and interdependence as well as parenting practices that embody an awareness of norms, strict discipline, respect for parental authority and little or no encouragement of questioning from the child (Carlson et al., 2004; Gracia & Musitu, 2003; Luis, Varela, & Moore, 2008; Posada et al., 2002). On the other hand, Anglo-Australian culture is well known to focus on individual, autonomous and, independent tendencies and having authoritative parenting styles that encourage independence and inductive-based discipline (Yagmurlu & Sanson, 2009). Likewise, Ahn and Miller (2012) proposed that differences between self-concepts developed in children from individualistic and collectivistic cultures. These authors stated that children from collectivistic cultures are inclined to seek more intense social contact and be more conservative with regard to norms and authority than their peers from individualistic cultures.

However, although the differences in collectivistic dominant cultures versus individualistic dominant cultures have been well defined (Hofstede, 2001), cultural differences in ToM remain speculative because solid empirical evidence is scarce. The fact that the relationship between these factors and ToM has only been investigated in a limited number of cross-cultural studies, more research is necessary to develop substantial conclusions with regard to ToM abilities, parenting practices influences and children's



understanding that behaviour can be influenced by complexities of the mental and social world, such as ability, personality and self-concept (Eder, 1990; Flavell, 1999; Hughes & Leekam, 2004). This motivated my choice to explore for the first time five parent-child relationship dimensions and four child's self-concept dimensions (see Chapter 4) as potential sociocultural mechanisms influencing differences in the ToM scale performance of children from Colombia, and Australia with Anglo cultural heritage (Anglo-Australians).

The objectives of the present study were to answer two main research questions:

1. Is Theory of Mind performance different in Colombian and Anglo-Australian children?
2. Do parent-child relationship dimensions and child's self-concept dimensions mediate differences in the Theory of Mind performance of children from Colombia and Anglo-Australia?

To address the aims of the study and answer the research questions, my inquiry was directed by the following hypotheses:

- 1) Anglo-Australian children will present higher scores than Colombian children in the total ToM scale score.

Therefore, as the evidence presented in Chapter two contributed to support the notion that socio-cultural factors like parent-child relationship dimensions (e.g., that consists of a number of different variables such as discipline practices, communication, parent-child interactions, parental involvement) and child self-concept dimensions (e.g., individuals driven by social interaction) are strongly influenced by collectivistic and individualistic orientations (Cross, Gore & Morris, 2003; Keller et al., 2004; Markus & Kitayama, 1991; Rudy & Grusec, 2006; Walker-Schwab, 2013), which in turn have been documented to impact ToM performance in children (Ahn & Miller, 2012; Miller, 2016;

Pavarini et al., 2013; Vinden, 2001). Therefore, regarding the mediating role of sociocultural factors in the relationship between culture and ToM performance, I proposed two hypotheses to be explored<sup>15</sup>:

- 2) Parent-child relationship dimensions will mediate the relationship between culture and ToM performance in the whole sample and among the age groups.
- 3) The child's self-concept dimensions will mediate the relationship between culture and ToM performance in the whole sample and among the age groups.

In regard to ToM progression, studies reviewed in Chapter 2 have found differences in the order of acquisition of ToM subcomponents between children from individualistic and collectivistic dominant cultural backgrounds (e.g., Bozbiyik, 2016; Calero et al., 2013; Duh et al., 2016; Qu et al., 2013; Shahaieian et al., 2013; Wellman et al., 2006). Therefore, in the present study, it was anticipated that the order of the ToM subcomponents in the ToM scale would show differences between the performances of children from individualistic and collectivistic dominant cultural backgrounds, Anglo-Australian and Colombian. Accordingly, it was hypothesised that:

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<sup>15</sup>These hypotheses will be explored in the whole sample and among the age groups as studies have reported differences in the ToM scale performance across cultural groups as well as age groups (Bozbiyik, 2016; Duh et al., 2016; Qu & Shen, 2013; Qu, Shen, & Qianqian, 2013; Shahaieian et al., 2011; Shahaieian et al., 2013), however the mediating role of the Parenting Relationship Questionnaire (PRQ) and Child Self View Questionnaire (CSVQ) dimensions in ToM is yet to be explored. Therefore, to confirm the mediating role of these sociocultural factors (PRQ and CSVQ dimensions) in the relationship between culture and ToM performance a series of comparative analyses will be explored before conducting the simple mediation analyses (i.e., ANOVAs and correlations – see Chapter 4). After exploring the age and culture effects on sociocultural factors, and exploring the sociocultural variables in the whole sample and among age groups that were significantly correlated with ToM, the potential mediators will be confirmed and explored through simple mediation analyses. For more details see Chapters 4 and 5.

- 4) The most likely order in the ToM scale progression in Colombian children differs from the ToM scale progression DD > DB > KA > FB > HE which is expected for the Anglo-Australian sample.

According to the literature reviewed in Chapter two, children from individualistic cultural settings (e.g., English speakers in USA Banerjee, 1997) between the ages of 4 to 6 tend to achieve above-chance levels of performance in the higher-order ToM subcomponents of False Belief and Hidden Emotions compared to the level of performance of their counterparts brought up in cultures with more collectivistic orientations than in the above mentioned cultural settings (e.g., Spain, Peru; Liu et al., 2008; Ohtsubo, 2007; Sidera et al., 2008; Sidera et al., 2011; Sidera et al., 2012; Tenenbaum et al., 2004; Wellman et al., 2001). Hence, it was hypothesised that:

- 5) Unlike their Colombian counterparts, Anglo-Australian children will achieve above-chance levels of performance on higher-order ToM scale subcomponents (FB and HE).

The method utilised to test these hypotheses is described in the next chapter.

## Chapter 4

### Method

My research study investigated Theory of Mind (ToM) performance and sociocultural factors influencing it in Colombian and Anglo-Australian children using five assessment tools. This cross-cultural study intended to comply with some of the conditions of a culture-comparative research method that requires equivalence in sampling, measurements (including linguistic equivalence) and procedures. These prerequisites are discussed in this chapter.

#### 4.1. Participants

A total of 164 participants between the ages of four and seven years old were recruited from public and independent schools in Colombia and Australia. Sampling equivalence was enhanced by administering a short socio-demographic survey (see Appendix 1) to broadly match non-cultural demographic characteristics, such as socioeconomic status (SES) and age in both cultural groups (Matsumoto & Juang, 2016), as described in the subsections below.

##### 4.1.1. Colombian Group

Seventy Colombian children (41 girls and 29 boys) between the ages of four and six ( $M = 5.3$ , range = 4.0 – 6.11,  $SD = .8$ ) were recruited from six private schools and assessed during August and December 2014 in Cali, Colombia. There were 25 four year olds ( $M = 4.4$ ; range = 4.0 - 4.10;  $SD = .3$ ), 23 five year olds ( $M = 5.5$ ; range = 5.0 - 5.9;  $SD = .28$ ) and 22 six year olds ( $M = 6.3$ ; range = 6.0 - 6.11;  $SD = .25$ ). The socio-demographic characteristics of the sample indicated that 51.4% of children were the only child in the

family, 38.6% had one sibling and 10% had two to four siblings. Spanish was the first and only language of participants, and both parents and children were born in Colombia.

A total of 57 mothers and 13 fathers participated in the study by completing the sociodemographic survey and a Parenting Relationship Questionnaire (PRQ). The sociodemographic characteristics indicated that the average age of mothers was 35 years and six months ( $SD = 6.9$ ; range = 21 - 56); 88.5% had completed a vocational or higher education degree, and 91.4% were employed. Data about the education of one mother was missing. The average age of fathers was 38 years and 6 months ( $SD = 7.3$ ; range = 23 - 61); 83% had completed a vocational or higher education degree, and 97.2% were employed (no data were provided about the education of two fathers and the employment of one father).

#### 4.1.2. Anglo-Australian Group

Ninety-five Western Anglo-Australian children (45 girls and 50 boys) aged between four and seven years ( $M = 5.6$ , range = 4.3 – 7.1,  $SD = .89$ ) were recruited from one government and two independent (private) schools in the Perth metropolitan area. They were assessed during August and December 2015. There were 22 four year olds ( $M = 4.4$ ; range = 4.3 - 4.11;  $SD = .28$ ); 35 five year olds ( $M = 5.34$ ; range = 5.2 - 5.11;  $SD = .22$ ); 31 six year olds ( $M = 6.4$ ; range = 6.0 – 6.10;  $SD = .29$ ); and 7 seven year olds ( $M = 7.0$ ; range = 7.0 - 7.1;  $SD = .04$ ). Due to the sampling conditions of the culture-comparative research method, one five year old was excluded from the sample because the child's mother was born in the Philippines and did not identify as Anglo-Australian, leaving a total sample of 34 five year olds ( $M = 5.32$ ; range = 5.2 - 5.11;  $SD = .20$ ). Seven year olds were also removed from the sample to comply with age equivalence across both cultural groups. Therefore, the Anglo-Australian sample came to consist of 87 participants between the ages of four and six (44 girls and 43 boys;  $M = 5.5$ , range = 4.3 – 6.10,  $SD = .82$ ), broadly matching the age range of the Colombian sample described above.

The socio-demographic characteristics of the Anglo-Australian sample ( $n = 87$ ) indicated that 8% were the only child in the family, 48.3% had one sibling, and 43.6% had two to four siblings. English was the participants' first and only language, and the parents identified as Anglo-Australian. Ninety percent of children were Australian-born, and 10% were born in the United Kingdom, Scotland, Canada and South Africa.

In this group, 84 mothers and three fathers participated in the study, of which 68% of mothers and 60% of fathers were Anglo-Australian born, and the remaining 32% of mothers and 40% of fathers were born in the United Kingdom, New Zealand, Ireland, Scotland, Canada, Germany<sup>16</sup> and South Africa, from Anglo ancestors. The socio-demographic characteristics indicated the mean age of mothers was 36 years and 1 month ( $SD = 5.5$ ; range = 23 - 51); 85% had completed a vocational or higher education degree, and 70.1% were employed. The mean age of fathers was 38 years ( $SD = 6.4$ ; range = 26 - 56); 70.1% had completed a vocational or higher education degree, and all were employed.

#### 4.1.3. Total Sample for Cross-Cultural Comparative Analyses

In the present study, the data from 157 participants aged between four and six years ( $M = 5.4$ , range = 4.0 – 6.9,  $SD = .82$ ) were used in the comparative analyses. The sample included 87 Anglo-Australian children and 70 Colombian children. There were 47 four year olds ( $M = 4.4$ , range = 4.0 – 4.9,  $SD = .29$ ), 57 five year olds ( $M = 5.3$ , range = 5.0 – 5.9,  $SD = .24$ ), and 53 six year olds ( $M = 6.3$ , range = 6.0 – 6.9,  $SD = .28$ ). Data on parenting relationship dimensions (PRQ) and socio-demographic characteristics were obtained from 141 mothers and 16 fathers. SES equivalence of the samples was determined according to SES indices of median family income in Perth, provided by the Australian Bureau of Statistics (ABS, 2006; 2011) and the stratification system of The Municipal Government

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<sup>16</sup> Although born in Germany, this father identified himself as Anglo-Australian.

of Valle del Cauca in the city of Cali, Colombia. Children were recruited from schools located in suburbs with similar median<sup>17</sup> family incomes.

## 4.2. Instruments

Five measures were administered in the current study. All parents completed a socio-demographic survey and a Parenting Relationship Questionnaire (PRQ; Kamphaus & Reynolds, 2006). Children were assessed using the Verbal-IQ subscale from the Wechsler Preschool and Primary Scale of Intelligence – Third Edition (WPPSI-III), the Child-Self-View Questionnaire (CSVQ; Eder, 1990), and the ToM scale (Wellman & Liu, 2004). Linguistic equivalence was established through a back-translation process (Brislin, 1970). Translation and back-translation were conducted on the CSVQ and ToM scale protocols and involved translating them from English to Spanish and back to English. This was undertaken by two independent certified translators. The back-translation process was not necessary for the PRQ and WPPSI verbal IQ subscale, because the Spanish versions had been produced by the publishers.

Measurement equivalence was addressed by using instruments from previous cross-cultural research investigating sociocultural factors and ToM in children. The CSVQ, the ToM scale, and the WPPSI Verbal IQ scale had previously been utilised in cross-cultural ToM research; these had been well documented as having acceptable psychometric properties and being reliable tools to be administered to children from different cultural backgrounds (Ahn & Miller, 2012; Brown, Mangelsdorf, Agathen, & Ho, 2008; Brown, Mangelsdorf, Schoppe-Sullivan, & Frosch, 2009; Lane et al., 2013; Shahaeian et al., 2011; Wechsler, 2002; Welch-Ross, Fasig, & Farrar, 1999; Wellman & Liu, 2004; Wellman et

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<sup>17</sup> Examples of median socioeconomic status (SES): the ABS reported that the median family income in Perth is \$1781.00 per week. The Municipal Government of Cali, Colombia stated that stratification numbers 3, 4 and 5 which the private schools were located, are indicative of families belonging to medium SES. These characteristics were checked before recruiting the sample.

al., 2006; Wellman et al., 2011). The validity and reliability of the PRQ have previously been established through its use with samples from different cultural backgrounds (e.g., Anglo-Australian, Hispanic American, Asian American and African American; Bloomquist, August, Lee, Piehler, & Jensen, 2012; Oades-Sese & Li, 2011; Wiggins, Sofronoff, & Sanders, 2009; Wise, 2012).

#### 4.2.1 Sociodemographic Survey

The sociodemographic survey consisted of a structured short survey and was used as a screening measure and indicator of the general demographic characteristics of the sample, including gender, age, socioeconomic status, employment, higher education achievement, first language spoken at home, birth order, number of siblings, birthplace and cultural background.

#### 4.2.2 Parenting Relationship Questionnaire (PRQ)

The PRQ assesses the parent-child relationship from the parents' viewpoint and consists of two forms. A 45-item preschool form (PRQ-P) that evaluates five parenting dimensions is administered to the parents of children in the two to five-year age range. A 71-item child and adolescent form (PRQ-CA) that evaluates two additional dimensions (five in common with the PRQ-P) is administered to the parents of children in the 6 to 18 year age range. Both PRQ forms were required in this study because of the age range of the sample. The PRQ-P was administered to the parents of children in the four and five year-old groups, and the PRQ-CA was administered to the parents of children in the six year-old group. However, for the purposes of analysis, only the five common dimensions across the three age groups were taken into account (see Table 6). English and Spanish paper-based forms, purchased from *Pearson Assessments USA*, were used in this study.



Table 6

*PRQ Dimensions and Descriptions (Kamphaus & Reynolds, 2006)*

<b>Dimension</b>	<b>T-Score Range</b>	<b>Description</b>	<b>Example of items</b>
Attachment (ATT)	10 – 70	Assesses the affective, behavioural and cognitive aspects of the dyad and how these aspects are reflected in feelings of closeness, empathy and understanding from the parent towards the child (e.g., understanding the child's emotional state).	<i>"My child enjoys spending time with me." "I can sense my child's moods."</i>
Discipline Practices (DP)	10 – 67	Assesses response and constancy of discipline practices towards misbehaviour, punishment and rule-establishment. Specifically, how constant are the discipline practices for the child's environment.	<i>"it is important for my child to follow family rules." "It is my responsibility as a parent to punish all of my child's misbehaviour."</i>
Involvement (INV)	15 – 75	Measures parents' participation in the child's everyday activities. This dimension measures the quality of the dyadic relationship with regards to the amount of time parents spent with their children, parent's participation in everyday activities with their children and parents' awareness of the children's common activities. In other words, how much does the parent know about his/her child.	<i>"My child and I play games together." "I teach my child how to play new games."</i>
Parenting Confidence (PC)	10 – 68	Assesses confidence with the role as a parent when actively interacting, controlling and making decisions.	<i>"I am in control of my household." "It is easy for me to make decisions about what my child should do."</i>
Relational Frustration (RF)	27 – 100	Assesses the level of parental frustration and stress towards discipline, behavioural control, affective regulation, and parents' propensity to overreact.	<i>"It is hard being a parent." "I overreact when my child misbehaves."</i>

Note: See PRQ manual for the score range convention in the Norms section. Scores ranging between 10 and 40, falling in the extreme low and below average classification in the Attachment, Discipline Practices, Involvement and Parenting Confidence dimensions, are indicators of potential relational problems. Scores of 60 or higher, falling in the upper extreme and above average in the Relational Frustration dimension, indicate problematic levels of parental frustration. See Kamphaus and Reynolds (2006) for more detail.

Score ranges and interpretation: Lower extreme: 10-30; Significantly below average: 31-40; Average: 41-59; Significantly above average: 60-69; Upper extreme: 70+ (Kamphaus & Reynolds, 2006)

The PRQ required participants to rate statements such as: "My child and I play games together" on a four-point Likert scale where "never" = 0, "sometimes" = 1, "often" = 2 and "always" = 3. Respondents selected the answer that best reflected their child-parent relationship experience (Kamphaus & Reynolds, 2006). Following the instructions in the manual, scoring consisted of adding the rated items to yield a total score for each

dimension. Raw total scores for each dimension were then converted into normative T scores.

Standardisation of the PRQ was conducted from 2003 to 2007 using a total sample of 4,130 English-speaking participants and 205 Hispanic participants living in the USA (Kamphaus & Reynolds, 2006). High internal reliability was reported at  $\alpha = .83$  for the PRQ-P and  $\alpha = .86$  for the PRQ-CA (Kamphaus & Reynolds, 2006; Lee, Anderson, Horowitz, & August, 2009; Mowder, Shamah, & Zeng, 2010). A test-retest analysis conducted by Rubinic and Schwickrath (2010) revealed a significant alpha score range of .75 to .89 for the PRQ-P and .72 to .81 for the PRQ-CA; as well as a range of .82 to .87 for each scale, showing good internal consistency. In the present study, internal reliability ranged from moderate to high for all dimensions (see Table 7).

Table 7

*PRQ Reliability Score Ranges for Subscales*

Sample	Alpha Score Range ( $\alpha$ )	
	PRQ-P subscales	PRQ-CA subscales
Colombia	.60 - .82	.70 - .89
Australia	.71 - .87	.71 - .92
Total sample (N = 157)	.69 - .84	.70 - .87

#### 4.2.3. Wechsler Preschool and Primary Scale of Intelligence (WPPSI-III)

The Wechsler Preschool and Primary Scale of Intelligence, third edition (WPPSI-III), is widely known for good reliability and validity. In the USA, the standardisation process was conducted with a sample of 1700 children (Lichtenberger & Kaufman, 2004). The standardisation process in Hispanic populations was undertaken with a sample of 1220 Spanish-speaking children (Wechsler, 2002). The internal consistency of the Verbal subscale (i.e., Information, Vocabulary and Word Reasoning) was reported at  $\alpha = .95$  for

English-speaking populations and  $\alpha = .93$  for Spanish-speaking populations, indicating good stability for this measure (Lichtenberger & Kaufman, 2004; Wechsler, 2002). Spanish answer forms were purchased from *Manual Moderno Editors* for the Colombian sample, and a research license was granted by *Pearson Assessments USA* for the Anglo-Australian forms.

In the present study, the Verbal-IQ subscale of the WPPSI-III was used as a screening measure to ensure children did not have verbal difficulties. The criterion reference score of 90 was reached by all children in my sample on the verbal IQ subscale:  $M = 110$  (range: 92 - 135;  $SD = 9.97$ ) in the Colombian sample,  $M = 105$  (range: 90 - 125;  $SD = 7.3$ ) in the Anglo-Australian sample and  $M = 107$  (range: 90 - 135;  $SD = 9$ ) in the total sample. High internal consistency ( $\alpha = .834$ ) was achieved ( $\alpha = .85$  in the Colombian sample;  $\alpha = .83$  in the Anglo-Australian sample). Additionally, this measure was used as a control tool to partialled out potential misleading results when conducting correlational analyses. This was conducted following Pavarini et al.'s (2013) suggestion to avoid what the authors called "false positive errors" (p.850) by including control measures like Verbal IQ, IQ or child's temperament when exploring sociocultural variables like parenting practices and ToM.

#### 4.2.4. Child Self-View Questionnaire (CSVQ)

The CSVQ (Eder, 1990) was used to assess children's own conceptualisation of their personality characteristics through related self-descriptions. It consisted of ten dimensions, for which Eder (1990) recommended acceptable internal consistency scores of  $\alpha = .64$ ,  $\alpha = .69$  and  $\alpha = .70$  in three groups of children aged three years and six months; four years and six months, and seven years and six months respectively. In this study, only four out of the 10 dimensions proposed by Eder (1990) were considered. This aligns with

Ahn and Miller's (2012) proposition that these dimensions more accurately assess characteristics related to collectivistic (Social Closeness and Traditionalism) and individualistic (Achievement and Social Potency) cultural factors. The Achievement dimension identified children's tendency to compete and be challenged by demanding activities. Social Potency identified leadership tendencies (e.g., capacity to influence others). Social Closeness assessed a tendency to seek social contact, and Traditionalism examined a tendency to follow the rules.

Table 8

*CSVQ Reliability Scores per Dimension*

CSVQ Dimension	Group		
	Colombia (n = 70)	Australia (n = 87)	Total (n = 157)
<b>Traditionalism</b>	$\alpha = .40$	$\alpha = .68$	$\alpha = .66^*$
<b>Social closeness</b>	$\alpha = .39$	$\alpha = .67$	$\alpha = .61^*$
<b>Achievement</b>	$\alpha = -.02$	$\alpha = .001$	$\alpha = -.017\dagger$
<b>Social potency</b>	$\alpha = .56$	$\alpha = .35$	$\alpha = .45\dagger$

\* Shows dimensions with acceptable internal consistency considered in the comparative analyses. † indicates dimensions not considered in the analyses. In Appendix 2, I present the means, SDs, and ranges and correlation of these dimensions with ToM.

Each dimension consisted of five statements for a total of 20 items. Each statement (item) was scored with a low end = 0 and a high end = 1, for a total score per dimension ranging between 0 and 5 (see examples in the Procedure section). In the present study, internal reliability scores in some dimensions were very low, so these were removed from the analysis (see Table 8).

#### 4.2.5. Theory of Mind Scale (ToM Scale)

The ToM scale (Wellman & Liu, 2004) measured ToM progression by assessing children's ability to understand five constructs through six different tasks (see Table 9).

Each task presented a control question and a test question; both required a correct response in order to pass. Each task was scored 1 = pass or 0 = fail for a maximum total scale score of six.

The ToM scale was validated using deterministic (Guttman Scalogram analysis) and probabilistic (Rasch analysis) statistical methods (see Wellman & Liu, 2004). Rasch scale analysis confirmed the scalability properties of the ToM scale by fitting children’s abilities and item difficulties into one continuum (e.g., children with lower abilities are less likely to respond to difficult items correctly). Likewise, the authors stated that the data from the ToM scale fitted the Guttman scalogram well and demonstrated significant Green’s reproducibility coefficients ( $Rep. \geq .90$ ) and consistency indices ( $I \geq .50$ ). Green’s (1956) reproducibility assessed the goodness of fit of the observed data with the expected Guttman scale sequence, whereby respondents who passed the hardest item were also expected to pass easier items. Moreover, Green’s consistency index demonstrated that items are scalable (Green, 1956). Green stated that a significant coefficient of reproducibility (Rep.) alone is not sufficient to indicate homogeneity and scalability, and a significant consistency index is also required. This is because the consistency index is a more conservative measure that assesses whether the reproducibility of the scale is greater than chance alone.

Table 9  
*Description of ToM Scale Tasks, Constructs and Expected Performance (Wellman & Liu, 2004)*

<b>Tasks</b>	<b>Construct</b>	<b>Expected Performance</b>
Diverse Desires (DD)	Desires	Understand that people can have different desires from what the child likes (e.g., if the child prefers chocolate and Mr. Jones prefers carrots, then the correct answer would be carrots.)
Diverse Beliefs (DB)	Beliefs	Understand that people can have opposing beliefs from what he or she believes is true (e.g., if the child thinks the cat is hiding in the bushes, and Linda thinks it is hiding in the box, then the correct answer would be the box.)

Knowledge Access (KA)	Knowledge	Recognise that one's own knowledge is different to other people's knowledge (e.g., understand that Polly does not know - is ignorant about the box content because she has not looked inside the box despite the child knowing about the content.)
Content False Belief (CFB) and Explicit False Belief (EFB)	False Belief (FB)	Recognise that people's beliefs about reality may be false. (CFB task: e.g., Understand that Sophia who has never looked inside the box thinks there is chocolate in the 'chocolate box' despite the child being aware of its real and diverse content. EFB task: e.g., understand that Scott will look for his mittens in the closet despite the child knowing the correct location of the mittens.)
Hidden Emotion (HE)	Emotions	Understand that people can mask emotions by expressing one emotion (e.g., happiness) while feeling a contrasting emotion (e.g., sadness)

Overall, Wellman and Liu (2004) reported the ToM scale conformed well to both the Rasch and Guttman scalograms. Moreover, the ToM scale has been established as a sensitive tool for determining ToM cultural variability (Wellman, 2012) and has demonstrated significant consistency with Green's Reproducibility coefficient (Rep.  $\geq .90$ ) in studies with children from different backgrounds (e.g., Kuntoro et al., 2013; Shahaieian et al., 2011; Wellman et al., 2011). More information about Green's reproducibility coefficients and consistency indices in this study are presented in Chapter 5.

### 4.3. Procedure

The present research was approved by the Edith Cowan University Human Research Ethics Committee before commencement. To conduct research in the government schools in Australia, Ethics approval was granted by the Edith Cowan University Human Research Ethics Committee and the Department of Education of Western Australia. Permission to conduct the research in private schools in Australia and Colombia was granted by the school principals. Teachers assisted by identifying potential eligible participants, who would be typically developed children with no sociocognitive or learning impairment (e.g., autism or dyslexia) diagnosed. Additionally, teachers from Australian schools were authorised by school principals to provide the researcher with a list of children

they believed had an Anglo-Australian background only, and in the age range required for the investigation<sup>18</sup>. Information letters, consent forms, sociodemographic surveys and PRQ forms were sent to potential participants' parents through the school. Parents returned the completed forms in sealed envelopes by placing them in the children's bags or posting them to the researcher. All children who participated in this investigation had written and signed parental consent and gave consent themselves.

The children's assessments took place on the school premises. First, a brief overview of the procedure was explained to each child, and verbal (for Colombian children)<sup>19</sup> and written (for Anglo-Australian children)<sup>20</sup> consent obtained. The scales were administered individually in a quiet and undisturbed environment. To avoid fatigue, administration took place in two sessions over two consecutive days in a pre-determined order: the Verbal-IQ scale was administered on day one (completion time: 40 - 50 minutes); and the CSVQ and ToM scale were administered on day two (completion time: 20 - 40 minutes). Short breaks were allowed if requested by the child (e.g., to use the toilet or drink water).

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<sup>18</sup> It was not necessary to conduct similar procedures in Colombia because of two reasons: 1) according to the International Migration Organization (Organización Internacional para las Migraciones – OIM), the percentage of overseas immigration in Colombia is only 0.3% (Ramirez, Zuluaga & Perilla, 2010); therefore, it was less likely to find children from a different cultural background other than Colombian. 2) Schools allocate children in the different grades according to their age; hence, with very few exceptions, typically children that attend kindergarten are aged four, pre-primary students are five years old and year 1 students are aged six. Colombian teachers collaborated to identify potential participants (e.g., children with no learning problems) and made sure they were in the age range required for this investigation.

<sup>19</sup> As directed by schools' principals, verbal consent was obtained after the researcher gave each child a brief overview of the activities before the commencement of the examination. After the verbal explanation, each child was given the opportunity to indicate if he or she was willing to participate, despite having previous authorisation from the parent or the legal carer.

<sup>20</sup> The Department of Education of Western Australia required the researcher to provide each participant with a Student's Consent Form. Because this sample included very young children, the procedures and activities were first verbally explained to each child and then the consent was read out loud. At the end of the consent form, the child could circle the options "Yes, I would like to help with the project" or "No, I do not want to help with the project", and write down their names (see form in Appendix 3).

Procedural equivalence was ensured by following the procedures used in previous cross-cultural ToM research as described below (e.g., Ahn & Miller, 2012; Shahaieian et al., 2011; Wellman & Liu, 2004).

The CSVQ assessment was conducted using two male and two female puppets presented to boys and girls, respectively. Each puppet was clothed in a different colour (e.g., purple and pink for girl puppets; blue and red for boy puppets). CSVQ was administered by presenting two contrasting statements, one at a time, with one of the puppets making a high-end statement (e.g., “I like to play with friends”) and the other puppet making a low-end statement (e.g., “I like to play alone”). This was followed by the examiner asking the test question: “How about you?” Children chose one of the two statements by repeating the one they chose (e.g., “I like to play with friends”). The statements and the appearance of the puppets were alternated to avoid fixation on any one puppet and to focus on the statements.

ToM scale administration was conducted following the procedures outlined in a manual provided by Henry Wellman via private correspondence. Toy figurines, pictures (provided by Henry Wellman via email) and props were used. A six-task scale was presented to each child individually, with each task administered sequentially in the order specified in the manual. The manual proposed a counterbalanced order, alternating between DD – KA – CFB – DB – EFB – HE and DD – EFB – DB – CFB – KA – HE. As recommended, DD (the easiest task on the scale) and HE (the hardest task on the scale) were always presented first and last, respectively. Compared to the original version, some materials were substituted, and certain pictures modified to ensure local familiarity for the Colombian sample. For example, in DB, the garage picture was substituted for a picture of a box (the type of garage depicted in the original picture is not common in Colombian



houses). In DD, the cookie picture was substituted for a chocolate bar picture, and in CFB, the Band-Aid box was substituted for a well-known chocolate candy container. No substitutions were required for EFB and HE. The DD and CFB substitutions were also used in the Anglo-Australian sample, and the original picture of the garage door in the DB task was used with this sample because Anglo-Australian children are familiar with these types of doors.

In Chapter 5, I will present the descriptive statistics, describe the statistical analyses conducted (see subsection 5.2), and report the main findings that emerged from the present study.

## Chapter 5

### Results

This chapter presents the results, starting with the descriptive statistics in which I provide details of the statistics for the Colombian sample followed by the statistics related to the Anglo-Australian sample and, finally, the total (combined) sample (see section 5.1). Section 5.2 presents the inferential statistics, which consist of three parts. In the first part, I present a series of comparative analyses. To address Hypothesis 1, I present the findings from my comparison of children's performance on ToM (total scale scores) and exploration of the influence of culture and age on ToM. Additionally, I conducted comparative analyses of ToM total scores and the sociocultural factors (PRQ and CSVQ dimensions), followed by simple mediation analyses to explore the influence of these sociocultural factors on the relationship between culture and ToM, addressing Hypotheses 2 and 3, respectively. In the second part of the inferential statistics, I followed the work of Wellman et al. (2006) and Wellman and Liu (2004) to address Hypothesis 4. I present the findings from a series of analyses on the ToM scale performance using Guttman scalogram analysis, McNemara pairwise comparison to confirm the sequences for each cultural sample and, a Chi-square test to detect differences in the pass rates of each ToM subcomponent across both cultural groups. In the third and final part of the inferential statistics, I address Hypothesis 5 by presenting the outcome of a Binomial test to evaluate children's level of performance in higher-order ToM scale subcomponents (HE and FB tasks included in the ToM scale).

## 5.1. Descriptive statistics

### 5.1.1 Descriptive Statistics for Colombian Group

In this section I present the descriptive statistics for the Colombian sample. I will first show the results (proportion of pass rates, means and *SDs*) regarding children's performance on the ToM scale and then present the descriptive statistics for the sociocultural measures.

#### 5.1.1.1 ToM Scale Performance Scores of Colombian Children

The average total ToM scale score (maximum 6) was determined by counting the number of tasks passed by each child. The ToM scale total average score for the Colombian group was  $M = 3.87$  ( $SD = 1.403$ , range = 1 - 6). Mean scores per age group were: 3.36 ( $SD = 1.18$ , range = 2 - 6) for the four-year-old group,  $M = 3.91$  ( $SD = 1.8$ , range = 1 - 6) for the five-year-old group, and  $M = 4.41$  ( $SD = .908$ , range = 3 - 6) for the six-year-old group. The proportion of pass rates per task is presented in Table 10.

Table 10

*Proportion and number of Colombian Children that Passed Each ToM Task in the total Colombian Sample and per Age Group*

Tasks	Age Groups			Total Sample
	4 ( $n = 25$ )	5 ( $n = 23$ )	6 ( $n = 22$ )	( $N = 70$ )
Diverse Desires	.88 (22)	.78 (18)	.96 (21)	.87 (61)
Diverse Beliefs	.60 (15)	.61 (14)	.82 (18)	.67 (47)
Knowledge Access	.80 (20)	.83 (19)	.96 (21)	.86 (60)
Content False Belief	.24 (6)	.57 (13)	.73 (16)	.50 (35)
Explicit False Belief	.32 (8)	.57 (13)	.46 (10)	.44 (31)
Hidden Emotions	.52 (13)	.57 (13)	.50 (11)	.53 (37)

### 5.1.1.2 Sociocultural Factor Scores of Colombian Parents and Children

The average scores for sociocultural predictors, captured by five Parenting Relationship Questionnaire (PRQ) dimensions and two self-concept dimensions from the Child Self-View Questionnaire (CSVQ), are described in Table 11 for each age group and the whole Colombian sample.

Table 11

*Descriptive Statistics - Means (SD and Scores Range) of CSVQ and PRQ Predictor Dimensions in the Colombian Sample*

Predictor	Mean (SD and Score Range)			
	Age Groups			Total
	4	5	6	N = 70
<b>CSVQ</b>				
Social Closeness (score range: 0 - 5)	4.36 (.907, 2 - 5)	4.35 (.832, 3 - 5)	4.59 (.667, 3 - 5)	4.43 (.809, 2 - 5)
Traditionalism (score range: 0 - 5)	4.40 (.707, 3 - 5)	4.26 (.752, 2 - 5)	4.27 (1.16, 1 - 5)	4.31 (.877, 1 - 5)
<b>PRQ</b>				
Attachment (score range: 10 - 70)	51.2 (8.4, 31 - 68)	53.9 (6.7, 42 - 70)	51.1 (9.7, 29 - 65)	52.0 (8.3, 29 - 70)
Discipline Practices (score range: 10 - 67)	51.2 (9.8, 25 - 67)	53.7 (9.5, 37 - 67)	44.6 (9.3, 33 - 65)	49.9 (10.1, 25 - 67)
Involvement (score range: 15 - 75)	53.5 (10, 37 - 70)	57.1 (9.3, 39 - 70)	57.1 (8, 46 - 71)	55.8 (9.2, 37 - 71)
Parenting Confidence (score range: 10 - 68)	50 (7.9, 36 - 66)	57.4 (7.4, 43 - 67)	53.1 (8.6, 39 - 67)	53.4 (8.4, 36 - 67)
Relational Frustration (score range: 27 - 100)	49.3 (9.1, 33 - 68)	50.8 (8.6, 34 - 67)	47 (8.1, 34 - 65)	49.1 (8.7, 33 - 68)

Note: See PRQ manual for the score range convention in the Norms section. Also, scores ranging between 10 and 40, falling in the extreme low and below average classification in the Attachment, Discipline Practices, Involvement and Parenting Confidence dimensions, are indicators of potential relational problems. Scores of 60 or higher, falling in the upper extreme and above average in the Relational Frustration dimension, indicate problematic levels of parental frustration. See Kamphaus and Reynolds (2006) for more detail.

Score ranges and interpretation: Lower extreme: 10-30; Significantly below average: 31-40; Average: 41-59; Significantly above average: 60-69; Upper extreme: 70+ (Kamphaus & Reynolds, 2006).

## 5.1.2 Descriptive Statistics for Anglo-Australian Group

In this section I present the descriptive statistics for the Anglo-Australian sample. I will first show the results (proportion of pass rates, means and *SDs*) regarding children's performance on the ToM scale and then present the descriptive statistics for the sociocultural measures.

### 5.1.2.1 ToM Scale Performance Scores of Anglo-Australian Children

The average total ToM scale score achieved by this group was  $M = 4.40$  ( $SD = 1.3$ , range = 2 - 6). Mean scores per age group were:  $M = 3.77$  ( $SD = 1.15$ , range = 2 - 6) in the four-year-old group,  $M = 4.15$  ( $SD = 1.45$ , range = 2 - 6) in the five-year-old group, and  $M = 5.13$  ( $SD = .92$ , range = 3 - 6) in the six-year-old group. The proportion of Anglo-Australian children that passed each ToM task and mean scores (and standard deviations) per age group and the whole Anglo-Australian sample are illustrated in Table 12.

Table 12

*Proportion and number of Children that Passed Each ToM Task in the Total Anglo-Australian Sample and per Age Group*

Tasks	Age Groups			Total Sample
	4 ( $n = 22$ )	5 ( $n = 34$ )	6 ( $n = 31$ )	( $N = 87$ )
Diverse Desires	.96 (21)	.91 (31)	.94 (29)	.93 (81)
Diverse Beliefs	.73 (16)	.65 (22)	.84 (26)	.74 (64)
Knowledge Access	.77 (17)	.97 (33)	.100 (31)	.93 (81)
Content False Belief	.41 (9)	.59 (20)	.87 (27)	.64 (56)
Explicit False Belief	.36 (8)	.50 (17)	.55 (17)	.48 (42)
Hidden Emotions	.55 (12)	.53 (18)	.94 (29)	.68 (59)

### 5.1.2.2 Sociocultural Factor Scores of Anglo-Australian Parents and Children

Table 13 shows the average scores for the sociocultural predictors captured by the five PRQ (parenting relationship) dimensions and the two CSVQ (child's self-concept) dimensions for each age group and the whole Anglo-Australian sample.

Table 13

*Descriptive Statistics Means, (SDs and Range Scores) of CSVQ and PRQ Predictor Dimensions in the Anglo-Australian Sample*

Predictor	Mean (SD and Score Range)			Total
	Age Groups			
	4	5	6	N = 87
<b>CSVQ</b>				
Social Closeness (score range: 0 - 5)	3.91 (1.07, 2 - 5)	3.94 (1.43, 0 - 5)	3.87 (1.4, 1 - 5)	3.91 (1.3, 0 - 5)
Traditionalism (score range: 0 - 5)	3.68 (1.29, 1 - 4)	3.38 (1.39, 1 - 5)	2.90 (1.6, 0 - 5)	3.29 (1.5, 0 - 5)
<b>PRQ</b>				
Attachment (score range: 10 - 70)	48.77 (9.6, 31 - 68)	51.12 (8.1, 37 - 68)	51.35 (8.7, 27 - 67)	50.61 (8.7, 27 - 68)
Discipline Practices (score range: 10 - 67)	50.45 (10.9, 27 - 67)	51.62 (8.1, 37 - 67)	46.61 (13.0, 14 - 65)	46.54 (10.88, 14 - 67)
Involvement (score range: 15 - 75)	48.36 (9.7, 34 - 70)	50.44 (8.3, 37 - 68)	52.26 (8.3, 39 - 68)	50.56 (8.7, 34 - 70)
Parental Confidence (score range: 10 - 68)	47.36 (9.3, 27 - 64)	47.62 (7.7, 27 - 67)	49.84 (8.7, 25 - 62)	48.34 (8.5, 25 - 67)
Relational Frustration (score range: 27 - 100)	52.36 (9.6, 34 - 73)	50.59 (7.3, 37 - 70)	49.16 (6.2, 38 - 59)	50.53 (7.6, 34 - 73)

Note: See PRQ manual for the score range convention in the Norms section. Also, scores ranging between 10 and 40, falling in the extreme low and below average classification in the Attachment, Discipline Practices, Involvement and Parenting Confidence dimensions, are indicators of potential relational problems. Scores of 60 or higher, falling in the upper extreme and above average in the Relational Frustration dimension, indicate problematic levels of parental frustration. See Kamphaus and Reynolds (2006) for more detail.

Score ranges and interpretation: Lower extreme: 10-30; Significantly below average: 31-40; Average: 41-59; Significantly above average: 60-69; Upper extreme: 70+ (Kamphaus & Reynolds, 2006)

### 5.1.3 Descriptive Statistics for Total Sample

For the purpose of the simple mediation analyses and the steps involved in the process described in subsection 5.2, the data from the Colombian ( $n = 70$ ) sample and Anglo-Australian sample ( $n = 87$ ) were combined. In the first subsection below, I present the descriptive statistics for the total sample ( $N = 157$ ) for the purpose of informing the

reader of the Total sample’s mean scores, standard deviations, and score ranges of all the variables explored in this study and used in the comparative analyses.

### 5.1.3.1 ToM Scale Performance Scores of Total Sample

Table 14 describes the proportion of children in the two cultural groups that passed each task by age group and for the total sample, as well as the means and standard deviations of the total scores achieved.

Table 14

*Proportion and number of Children that Passed ToM Tasks and, Total ToM Scale Mean Scores and SDs per Age Group and Total Sample*

Tasks	Age Groups			Total Sample
	4 (n = 47)	5 (n = 57)	6 (n = 53)	(N = 157)
Diverse Desires	.91 (43)	.86 (49)	.94 (50)	.90 (142)
Diverse Beliefs	.66 (31)	.63 (36)	.83 (44)	.71 (111)
Knowledge Access	.79 (37)	.91 (52)	.98 (52)	.90 (141)
Content False Belief	.32 (15)	.58 (33)	.81 (43)	.58 (91)
Explicit False Belief	.34 (16)	.53 (30)	.51 (27)	.46 (73)
Hidden Emotions	.53 (25)	.54 (31)	.76 (40)	.61 (96)
Mean (Total ToM scale Score range: 0 - 6)	3.55 (SD = 1.2)	4.05 (SD = 1.6)	4.83 (SD = 1.4)	4.17 (SD = 1.4)

### 5.1.3.2 Sociocultural Factor Scores of Parents and Children in Total Sample

Average scores for the sociocultural predictors, as captured by the PRQ (parenting relationship) dimensions and the CSVQ (child’s self-concept) dimensions per age group and for the whole sample in both cultural groups, are shown in Table 15.

Table 15

*Descriptive Statistics - Means, (SDs and Range Scores) of CSVQ and PRQ Predictor Dimensions in the Total Sample*

Predictor	Mean (SD and Score Range)			Total N = 157
	Age Groups			
	4	5	6	
<b>CSVQ</b>				
Social Closeness <sup>21</sup> (score range: 0 - 5)	4.2 (1, 2 - 5)	4.1 (1.2, 0 - 5)	4.2 (1.2, 1 - 5)	4.14 (1.1, 0 - 5)
Traditionalism (score range: 0 - 5)	4.1 (1.1, 1 - 5)	3.7 (1.2, 1 - 5)	3.5 (1.6, 0 - 5)	3.8 (1.3, 0 - 5)
<b>PRQ</b>				
Attachment (score range: 10 - 70)	50.04 (9, 31 - 68)	52.23 (7.6, 37 - 70)	51.26 (9, 27 - 67)	51.25 (8.5, 27 - 70)
Discipline Practices (score range: 10 - 67)	50.87 (10.2, 25 - 67)	52.46 (8.6, 37 - 67)	45.77 (11.6, 14 - 65)	49.73 (10.5, 14 - 67)
Involvement (score range: 15 - 75)	51.11 (10.1, 34 - 70)	53.12 (9.2, 37 - 70)	54.28 (8.5, 39 - 71)	52.91 (9.3, 34 - 71)
Parenting Confidence (score range: 10 - 68)	48.77 (8.6, 27 - 66)	51.58 (9, 27 - 67)	51.17 (8.7, 25 - 67)	50.60 (8.8, 25 - 67)
Relational Frustration (score range: 27 - 100)	50.72 (9.4, 33 - 73)	50.68 (7.8, 34 - 70)	48.26 (7.1, 34 - 65)	49.88 (8.1, 33 - 73)

Note: See PRQ manual for the score range convention in the Norms section. Also, scores ranging between 10 and 40, falling in the extreme low and below average classification in the Attachment, Discipline Practices, Involvement and Parenting Confidence dimensions, are indicators of potential relational problems. Scores of 60 or higher, falling in the upper extreme and above average in the Relational Frustration dimension, indicate problematic levels of parental frustration. See Kamphaus and Reynolds (2006) for more detail.

Score ranges and interpretation: Lower extreme: 10-30; Significantly below average: 31-40; Average: 41-59; Significantly above average: 60-69; Upper extreme: 70+ (Kamphaus & Reynolds, 2006)

### *5.1.3.3 Preliminary analyses of Sociodemographic variables: Gender, Birth Order and Number of Siblings and their relation to ToM in Total Sample*

Finally, to explore the possible influence of sociodemographic variables on ToM total scale scores, gender differences, birth order and number of siblings were also explored.

The t-tests revealed no significant gender differences in the mean total ToM scale scores in

<sup>21</sup> See Appendix 4 for normality check, skewness, kurtosis and Z-scores on each dimension. Analyses with the Social Closeness dimension need to be interpret with caution.



the Colombian sample  $t(68) = 1.9, p = .051$ , (girls  $M = 4.2, SD = 1.19$ ; boys  $M = 3.48, SD = 1.6; MD = .664$ ) or the Anglo-Australian sample  $t(85) = 1.7, p = .096$  (girls  $M = 4.6, SD = 1.3$ ; boys  $M = 4.2, SD = 1.3; MD = .474$ ). Correlational analysis showed no significant correlation between ToM and birth order (e.g., first, second or third born) or number of siblings (e.g., only child, two, three or four siblings) either in the Colombian sample or the Anglo-Australian sample [Colombia:  $r(68) = .038, p = .754$  for birth order;  $r(68) = .081, p = .506$  for number of siblings; Australia:  $r(85) = .193, p = .077$  for birth order;  $r(85) = .191, p = .079$  for number of siblings].

## 5.2 Inferential Statistics

In the first part of the analysis, four comparative analyses were conducted. A series of analyses of variance (ANOVA) was conducted to explore the main effects of culture and age on ToM, as well as on sociocultural factors (PRQ and CSVQ dimensions). Then, correlational exploratory analyses were undertaken, followed by five simple mediation analyses using sociocultural variables that were significantly correlated with ToM in the whole sample and among age groups. Mediation analyses were conducted to explore the mediating effects of sociocultural factors (PRQ and CSVQ dimensions – mediation variables) on the relationship between culture and ToM performance.

In the second part of the analysis, I followed Wellman et al. (2006) and Wellman and Liu (2004) recommendation to conduct Guttman scalogram analysis in order to identify the most likely ToM scale progression in children from each cultural group. Then, a McNemara (pairwise comparison) test was undertaken to compare the performance of children within each cultural group in a pair of tasks, thereby confirming the likely task order in the sequences based on children's responses to two ToM scale items. I also

conducted Chi-square analyses to evaluate whether the proportion of children that passed each ToM task differed between the two cultural groups.

In the third and final part of the analysis explored children's levels of performance of higher-order ToM tasks (i.e., the traditional FB tests and Hidden Emotions task). Using a binomial test, I determined the level of performance (i.e., below, chance or above-chance level) for the children in each cultural group.

## 5.2.1 Comparative Analyses

### 5.2.1.1 Comparison of ToM, CSVQ and PRQ Dimensions' Scores between the Colombian and Anglo-Australian Samples

To address Hypothesis 1, I firstly conducted a 3 (age groups) x 2 (cultures) between subjects analysis of variance (ANOVA), with total ToM scale score as the dependent variable. The analysis yielded a significant effect for age  $F(2, 151) = 11.16, p < .001, \eta^2 = .129$  and culture  $F(1, 151) = 4.85, p = .029, \eta^2 = .031$ . There was no significant interaction between age and culture  $F(2, 151) = .488, p = .615, \eta^2 = .006$ . Anglo-Australian children achieved higher scores ( $M = 4.40, SD = 1.3$ ) than Colombian children ( $M = 3.87, SD = 1.4$ ) at 95% CI<sup>22</sup> [.047 - .864]. Tukey post-hoc pairwise comparisons indicated that ToM scores achieved by six year olds ( $M = 4.83, SD = .975$ ) were significantly higher than those achieved by five year olds ( $M = 4.05, SD = 1.6$ ) at  $p = .005, MD^{23} = .78$ , at 95% CI [.20 - 1.35] and four year olds ( $M = 3.55, SD = 1.2$ ) at  $p < .001, MD = 1.28$ , at 95% CI [.67 - 1.88]. No significant ToM score differences emerged between the four and five year olds ( $p = .120$ ). See bar chart for illustration (Figure 3) of ToM total scale scores achieved across cultural groups and age groups.

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<sup>22</sup> CI = Confidence Interval

<sup>23</sup> MD = Mean Differences

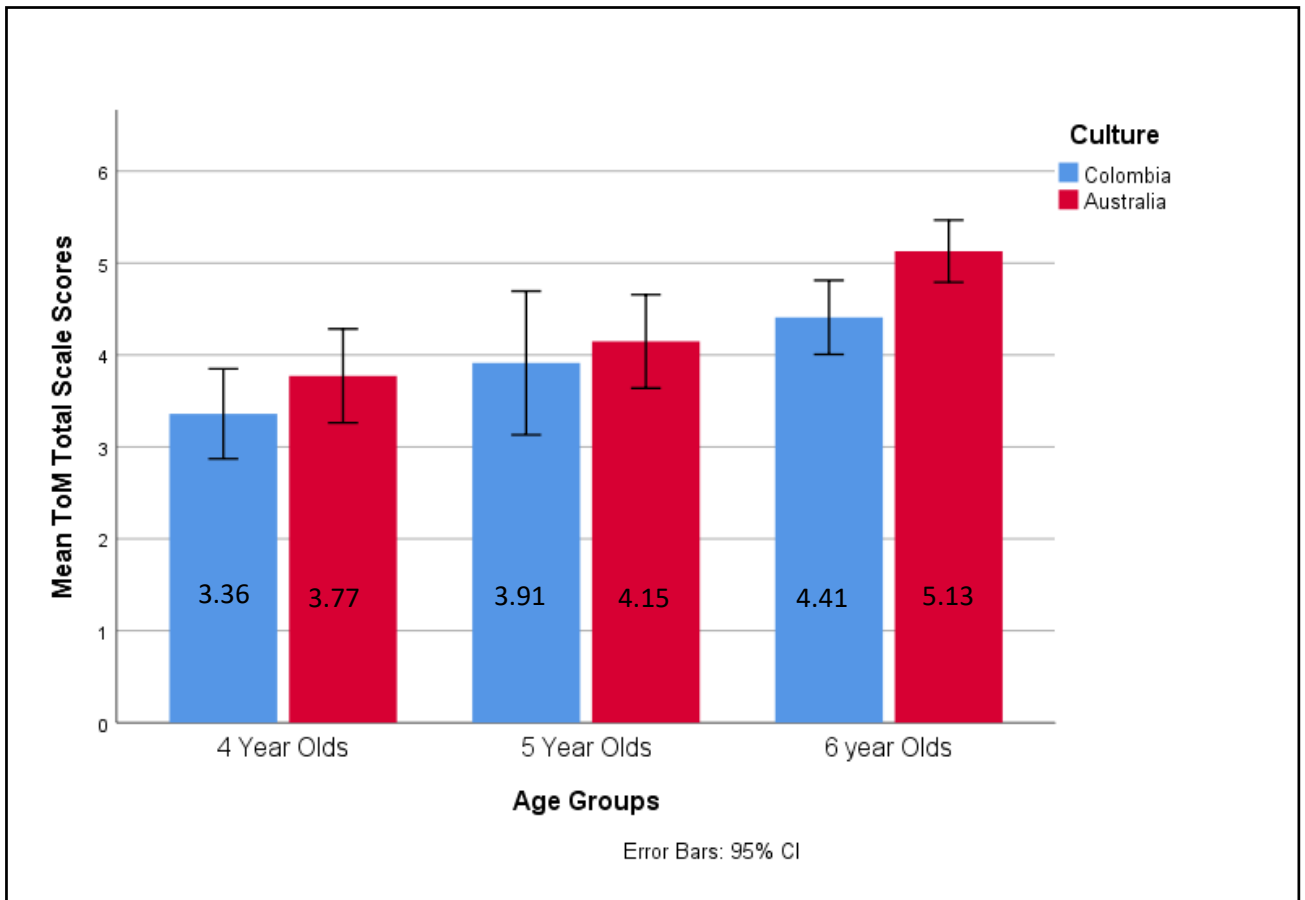


Figure 3. ToM performance across the two cultures and the three age groups.

Secondly, I conducted seven 3 (age groups) x 2 (cultures) between subjects ANOVAs to examine age and culture effects on sociocultural factors, with the PRQ and CSVQ dimensions scores being the dependent variable. Table 16 depicts the outcomes of the multiple comparison analysis.

Table 16

*Multiple Comparison Analysis: 3 (age groups) x 2 (culture) Two-Way Separate ANOVAs between Subjects' Effects on PRQ and CSVQ Dimensions*

Outcome Variable	Effect of Age				Effect of Culture				Interaction effect between Culture and Age			
	<i>df</i>	<i>F</i>	<i>P</i>	$\eta^2$	<i>df</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>df</i>	<i>F</i>	<i>p</i>	$\eta^2$
<b>CSVQ</b>												
Social closeness	(2,151)	.113	.894	.001	(1,151)	8.31	.005*	.052	(2,151)	.294	.746	.004
Traditionalism	(2,151)	1.68	.190	.022	(1,151)	24.87	< .001**	.141	(2,151)	.963	.384	.013
<b>PRQ</b>												
Attachment	(2,151)	1.10	.333	.014	(1,151)	1.41	.237	.009	(2,151)	.466	.628	.006
Discipline Practices	(2,151)	6.70	.002*	.081	(1,151)	.029	.866	.000	(2,151)	.550	.578	.007
Involvement	(2,151)	2.32	.101	.030	(1,151)	14.74	< .001**	.089	(2,151)	.150	.861	.002
Parenting Confidence	(2,151)	2.84	.061	.036	(1,151)	15.17	< .001**	.091	(2,151)	3.05	.050	.039
Relational Frustration	(2,151)	1.86	.158	.024	(1,151)	1.61	.206	.011	(2,151)	.579	.562	.008

The results revealed significant effects of age on Discipline Practices. Tukey post-hoc pairwise comparison confirmed that parents of six year olds scored significantly lower on Discipline Practices ( $M = 45.8$ ,  $SD = 11.6$ ) than parents of five year olds ( $M = 52.5$ ,  $SD = 8.6$ ) at  $p = .001$ ,  $MD = -7.06$ , at 95% CI [-11.31 - -2.05] and parents of four year olds ( $M = 50.9$ ,  $SD = 10.2$ ) at  $p = .012$ ,  $MD = -5.25$ , at 95% CI [-9.96 - -.24]. No significant differences surfaced between parents of four and five year olds regarding Discipline Practices ( $p = .376$ ).

Regarding the influence of culture, the results revealed significant effects of culture on two CSVQ dimensions and two PRQ dimensions. Colombian children scored significantly higher on Social Closeness ( $M = 4.43$ ,  $SD = .809$ ) and Traditionalism ( $M = 4.31$ ,  $SD = .877$ ) dimensions compared with Anglo-Australian children (Social Closeness,  $M = 3.91$ ,  $SD = 1.3$ ,  $MD = .526$ , at 95% CI [.886 - .166]; Traditionalism,  $M = 3.29$ ,  $SD =$

1.45, MD = .989, at 95% CI [.597 - 1.380]). In addition, Colombian parents reported significantly higher scores for Involvement (M = 55.8, SD = 9.2) and Parenting Confidence (M = 53.4, SD = 8.4) dimensions than did Anglo-Australian parents (Involvement, M = 50.6, SD = 8.7, MD = 5.56, at 95% CI [2.699 – 8.421]; Parenting Confidence M = 48.3, SD = 8.5, MD = 5.22, at 95% CI [2.572 – 7.868]).

### 5.2.1.2 Correlation Analysis between ToM and Sociocultural Factors

Associations between parent-child relationship dimensions (PRQ) and ToM across the whole sample and per age group are shown in Table 17. There were no significant associations between PRQ dimensions and ToM across the whole sample or in the four-year-old group. However, in the five-year-old group, Relational Frustration (RF) and ToM were significantly negatively correlated:  $r(55) = -.359, p = .006$ , at 95% CI [-.125 – -.022]. This association remained significant after controlling for Verbal IQ:  $p_r(54) = -.354, p = .007$ . In the six-year-old group, Involvement and ToM were significantly negatively correlated:  $r(51) = -.306, p = .026$ , at 95% CI [-.066 – -.004] and remained so after controlling for Verbal IQ:  $p_r(50) = -.323, p = .019$ .

Table 17

*Correlation Coefficients between PRQ and CSVQ Dimensions and ToM in the Total sample and per Age Groups*

Dimensions		PRQ					CSVQ	
		ATT	DP	INV	PC	RF	SC	TRAD
<b>Age Group</b>								
<b>4 (n = 47)</b>	ToM	-.011	.116	-.269	.035	.057	-.053	.075
<b>5 (n = 57)</b>	ToM	-.047	-.173	.117	.116	-.359**	.160	.016
<b>6 (n = 53)</b>	ToM	-.089	-.063	-.306*	-.206	.123	-.193	-.463**
<b>Total Sample (N = 157)</b>	ToM	-.026	-.130	-.042	.044	-.151	.018	-.172*

(\*p < 0.05, \*\*p < .001).

As for CSVQ dimensions, only Traditionalism indicated a relationship with ToM. For the whole sample, Traditionalism was significantly negatively related to ToM:  $r(155) = -.172, p = .031$ , at 95% CI  $[-.341 - -.017]$ . Even after controlling for Verbal IQ:  $p_r(154) = -.176, p = .028$ , this association remained significant. This appeared to be primarily driven by the six year olds. No relationship was found between Traditionalism and ToM in the four- and five-year-old groups; however, in the six-year-old group a significantly negative correlation surfaced between ToM and Traditionalism:  $r(51) = -.463, p < .001$ , at 95% CI  $[-.444 - -.134]$ . This remained significant after controlling for Verbal IQ:  $p_r(50) = -.449, p = .001$ .

### 5.2.2 Mediation Analyses: Role of Sociocultural Factors in the Relationship between Culture and ToM

I conducted four simple mediation analyses to explore the mediating effects of sociocultural mechanisms on the relationship between culture and ToM, addressing Hypotheses 2 and 3, based on significant correlations identified in the previous analyses: Traditionalism (for the whole sample and six year olds), Involvement (for six year olds) and Relational Frustration (for five year olds; see Figure 4 for a general illustration of a simple mediation analysis and Tables 18 and 19 for results).

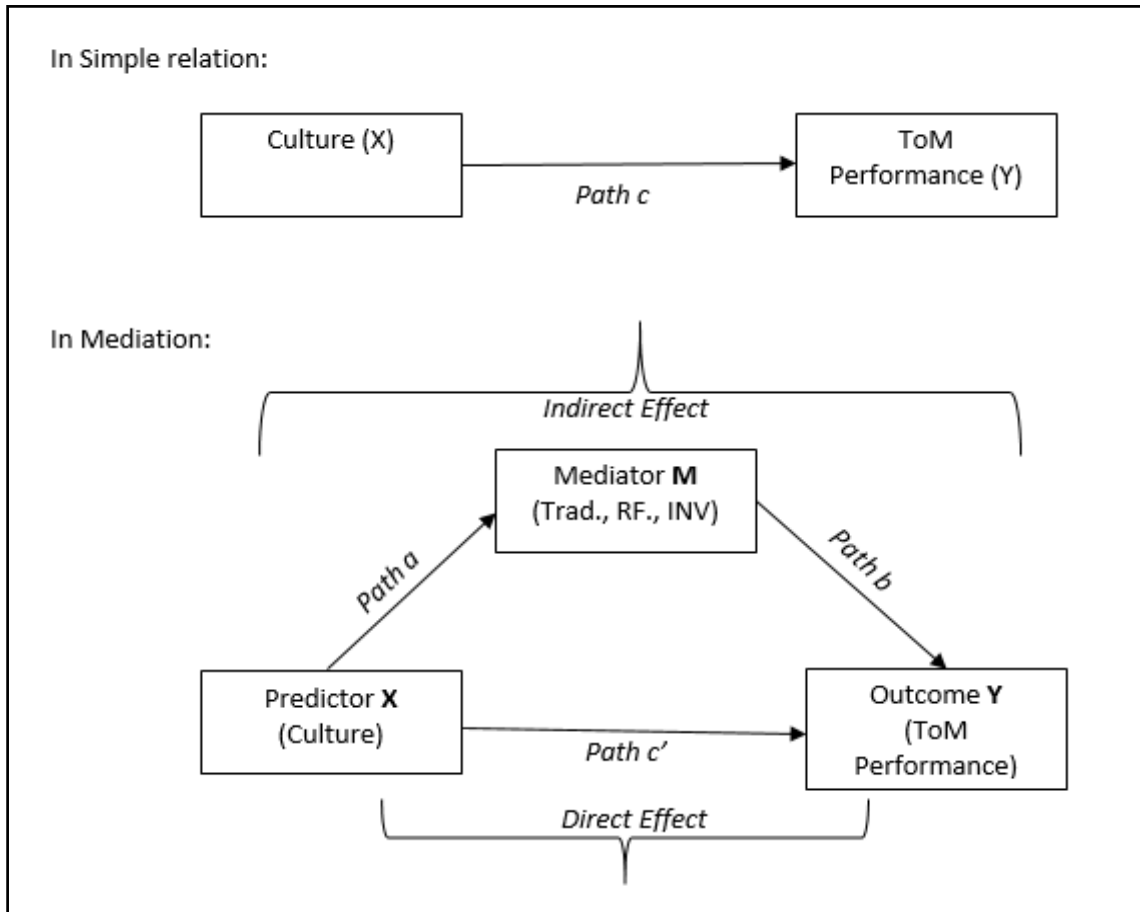


Figure 4. Simple Mediation Model Diagram

Note: Simple Mediation Model Showing the Influence of X (Culture) on Y (ToM Performance) by Mediators M (Trad. = Traditionalism, RF = Relational Frustration and INV = Involvement). This figure was based on Hayes' (2013) and Field's (2013) Simple Mediation Conceptual Diagram.

Figure 4 illustrates the simple mediation model for the influence of X (culture) on Y (ToM performance) through mediators M (Trad. = Traditionalism, RF = Relational Frustration and INV = Involvement). Path *c* is the direct relation where X (predictor variable) predicts Y (or the outcome). This path is also known as *total effect* when M (mediator) is not in the model. Path *a* indicates that X predicts M; Path *b* indicates that M predicts Y; and Path *c'* indicates that the relationship between X and Y will be affected by the presence of M, whereby X will no longer directly predict Y or its effect is lessened (Field, 2013; Hayes, 2013). The *direct effect* is the effect of X on Y, controlling for M; and the *indirect effect* refers to the effect of X on Y through M, also known as the combination of the effects of paths *a* and *b* (*indirect effect* = *ab*). Following Hayes' (2009) procedure, this indirect effect was calculated using the bias-corrected bootstrap sampling method. If

bootstrap intervals were above zero, a significant mediation was confirmed (see Hayes, 2013 and Field, 2013). The unstandardised regression coefficients for  $c$ ,  $a$ ,  $b$  and  $c'$  per variable for the whole sample and per age group are shown in Tables 18 and 19 below.

Table 18

*Simple Mediation Analyses Coefficients for the effect of PRQ Dimensions of Involvement and Relational Frustration, on the relationship between culture and ToM Performance*

Antecedent (Predictor)		Involvement (M)			ToM performance (Y)		
		Coeff.	SE	$p$	Coeff.	SE	$P$
<b>6 year-old group</b>	Culture (X)	$a$ -4.88	2.29	.039	$c$ .719	.255	.007
	Involvement (M)	-	-	-	$c'$ .597	.262	.03
	Constant	62.01	3.81	$p < .001$	$b$ -.025	.015	.106
		R <sup>2</sup> = .081 F (1, 51) = 4.5, $p = .039$			R <sup>2</sup> = .179 F (2, 50) = 5.46, $p = .007$		
<b>5 year-old group</b>	Culture (X)	$a$ -.238	2.13	.911	$c$ .234	.434	.591
	Relational Frustration (M)	-	-	-	$c'$ .217	.409	.598
	Constant	50.83	1.64	$p < .001$	$b$ -.073	.026	.007
		R <sup>2</sup> = .0002 F (1, 55) = .124, $p = .911$			R <sup>2</sup> = .133 F (2, 54) = 1.14, $p = .02$		

As shown in Table 18, simple mediation analysis indicates that culture significantly predicted Involvement ( $a = -4.88, p = .039$ ) in the six-year-old group only, explaining 8.1% of the variance, while Involvement did not predict ToM performance ( $b = -.025, p = .106$ ). However, an inferential test indicated that bias-corrected bootstrap confidence interval of 95% for indirect effect ( $ab = .1227$ ), based on 5,000 bootstrap samples, showed intervals above zero (.0017 to .3790). Therefore, mediation was confirmed, and the model effectively explained 18% of the variance in ToM performance. The model accounted for a small



effect:  $k^2 = .065$ , 95% Bca CI [.0089 - .1863]. In the five-year-old group, Culture did not significantly predict Relational Frustration ( $a = -.238$ ,  $p = .911$ ); however, Relational Frustration significantly predicted ToM ( $b = -.073$ ,  $p = .007$ ). An inferential test indicated a bias-corrected bootstrap confidence interval of 95% for indirect effect ( $ab = .017$ ) based on 5,000 bootstrap samples. Intervals were not above zero (-.2776 to .4274) and mediation was therefore not confirmed.

Table 19

*Simple Mediation Analysis Coefficients for the effect of Traditionalism on the relationship between culture and ToM Performance*

	Antecedent (Predictor)	Traditionalism (M)			ToM Performance (Y)				
		Coeff.	SE	<i>p</i>	Coeff.	SE	<i>p</i>		
<b>Whole sample</b>	Culture (X)	<i>a</i>	-1.03	.198	$p < .001$	<i>c</i>	.531	.218	.016
						<i>c'</i>	.408	.236	.08
	Traditionalism (M)		-	-	-	<i>b</i>	-.120	.089	.177
	Constant		4.31	.147	$p < .001$		4.39	.415	$p < .001$
		R <sup>2</sup> = .148 F (1, 155) = 26.99, $p < .001$			R <sup>2</sup> = .048 F (2, 154) = 3.89, $p = .022$				
<b>6 year old group</b>	Culture (X)	<i>a</i>	-1.37	.396	.0011	<i>c</i>	.719	.255	.007
						<i>c'</i>	.4002	.267	.14
	Traditionalism (M)		-	-	-	<i>b</i>	-.234	.085	.008
	Constant		5.64	.658	$p < .001$		5.006	.624	$p < .001$
		R <sup>2</sup> = .189 F (1, 51) = 11.94, $p = .0011$			R <sup>2</sup> = .248 F (2, 50) = 8.26, $p < .001$				

Table 19 shows the results of simple mediation analysis, indicating that Culture significantly predicted Traditionalism ( $a = -1.03$ ,  $p < .001$ ) in the whole sample, explaining 14.8% of the variance. However, Traditionalism did not predict ToM ( $b = -.120$ ,  $p = .177$ ). An inferential test at a bias-corrected bootstrap confidence interval of 95% for indirect

effect ( $ab = .123$ ) based on 5,000 bootstrap samples showed that intervals were not above zero (-.0358 to .3155). Therefore, no mediation was found, and the model accounted for only 4.8% of the variance in ToM performance.

In the six-year-old group, Culture significantly predicted Traditionalism ( $a = -1.37$ ,  $p = .0011$ ), explaining 18.9% of the variance. Traditionalism also significantly predicted ToM ( $b = -.234$ ,  $p = .0008$ ). Using an inferential test at a bias-corrected bootstrap confidence interval of 95% for indirect effect ( $ab = .320$ ) based on 5,000 bootstrap samples, intervals were above zero (.0978 to .7151). Mediation was confirmed, explaining 25% of the variance in ToM performance. This model accounted for a relatively moderate to large effect:  $k^2 = .16$ , 95% Bca CI [.0481 - .3165].

### 5.3 Guttman Scale Analysis, McNemara Pairwise Comparison and Chi-Square analyses

To address Hypothesis 4, following the work of Wellman et al. (2006) and Wellman and Liu (2004), I conducted a series of analyses to confirm the ToM progression of the scale subcomponents of each cultural sample. Once an order was established via Guttman scalogram, a McNemara pairwise comparison test and a Chi-square test were also conducted. The former test helped to compare children's performance on a pair of tasks within each cultural group, while the latter was to determine differences in the proportion of children who passed each ToM task between the two cultural groups.

#### 5.3.1 Guttman Scale Analysis: ToM Scale Performance in Colombian Children

Every child generated one pattern indicating how he/she responded to each task in the ToM scale (e.g., one child could pass DD, DB, CFB, HE but fail EFB and KA, while another could pass DD, KA, HE and fail CFB, EFB and DB). The proportions of individual

responses to each task (see Table 10) were ranked in order of difficulty (e.g., from items more likely to be passed to items less likely to be passed) to form a Guttman scalogram. The Guttman scalogram analysis indicated that  $DD > KA > DB > HE > CFB > EFB$  was the most likely progression for Colombian children by capturing the responses of 41.4% of children, with 58.6% presenting other patterns (see Table 20). In other words, of the 70 participants, 29 children followed this particular Guttman scale order, which showed no participants failed all tasks (pattern 1); two participants passed DD only (pattern 2); four participants passed DD - KA (pattern 3); three participants passed DD – KA - DB (pattern 4); nine participants passed DD – KA – DB - HE (pattern 5); two participants passed DD – KA – DB – HE - CFB (pattern 6); and nine participants passed all tasks in the scale (pattern 7). However, the order of ToM subcomponents  $DD > KA > DB > HE > CFB > EFB$  (i.e., ToM progression) presented a low coefficient of reproducibility (Rep. = .88; significant Rep  $\geq .90$ ) and Index of Consistency ( $I = .20$ ; significant  $I \geq .50$ ), suggesting the performance in the six-task scale did not follow a strictly sequential order or lacked homogeneity.

The five-task scale, which omitted EFB (as instructed in the manual), showed that 48.6% ( $n = 34$ ) of Colombian children adhered to the  $DD > KA > DB > HE > CFB$  (Rep = .91;  $I = .18$ ) progression. Despite a significant reproducibility coefficient, the more conservative Index of Consistency was below significance, again suggesting that the progression of the performance on the five-task scale lacked homogeneity.

Table 20

*Guttman Scale Patterns for the Colombian Sample*

Task	Patterns							Other Patterns
	1	2	3	4	5	6	7	
Diverse Desires (DD)	-	+	+	+	+	+	+	
Knowledge Access (KA)	-	-	+	+	+	+	+	
Diverse Beliefs (DB)	-	-	-	+	+	+	+	
Hidden Emotion (HE)	-	-	-	-	+	+	+	
Content False Belief (CFB)	-	-	-	-	-	+	+	
Explicit False Belief (EFB)	-	-	-	-	-	-	+	
Number of children	0	2	4	3	9	2	9	41 (58.6%)

**Note:** The above table illustrates seven patterns of response. The minus sign (-) represents failure in the task, while the plus sign (+) represents success.

Additionally, for confirmation purposes, ToM progression across age groups was further explored. The most likely progression for Colombian children per age group, together with Green's Reproducibility coefficient and Consistency Index, is shown in Table 21.

Table 21

*ToM Progression per Age Group by Percentage, Green's Reproducibility (Rep.) and Consistency Index (I) per age groups in the Colombian Sample*

Group	Progression	Percentage	Rep. (sig. $\geq$ .90)	I index (sig. $\geq$ .50) <sup>24</sup>
4	DD > KA > DB > HE > EFB >CFB	52%	.96 (6-task scale)	-1.5 (6-task scale)
	DD > KA > DB > HE > EFB	60%	.97 (5-task scale)	-1.9 (5-task scale)
5	KA > DD > DB > HE > CFB > EFB	39%	.96 (6-task scale)	-1.1 (6-task scale)
	KA > DD > DB > HE > CFB	43%	.97 (5-task scale)	-1.3 (5-task scale)
6	KA > DD > DB > CFB > HE > EFB	41%	.96 (6-task scale)	-2.7 (6-task scale)
	KA > DD > DB > CFB > HE	59%	.98 (5-task scale)	-3.1 (5-task scale)

<sup>24</sup> The explanation Green (1956) presents regarding Negative Consistency Index (*I*) coefficient is that, "If the items show some negative correlation in the sample, *I* will be negative" (p. 81). It is worth noting that this index is referred to by Green (1956) as optional.

### 5.3.2 McNemara Pairwise Comparison in Colombian Children

Given that the five-item Guttman scale yielded better reproducibility (rep. Coefficient) than the six-item scale, a McNemara pairwise comparison test was conducted to compare the performance on a pair of tasks and confirm the Guttman sequence, according to the analyses of Wellman et al. (2006) and Wellman and Liu (2004). For the Colombian children, the Diverse Desires task was equal in difficulty to the Knowledge Access task,  $\chi^2(1) = .053, p = .819$ , the Knowledge Access task was easier than the Diverse Beliefs task,  $\chi^2(1) = 6.26, p = .012$ , the Diverse Beliefs task was easier than the Hidden Emotions task  $\chi^2(1) = 4.17, p = .041$ , and the Hidden Emotions task was equal in difficulty to the Contents False Belief task,  $\chi^2(1) = .118, p = .732$ . Based on these outcomes, Colombian children's performance of each pair of tasks yielded a likely order of ToM subcomponents from the easiest to the hardest: DD = KA > DB > HE = CFB.

### 5.3.3 Guttman Scale Analysis: Anglo-Australian Children's ToM Scale Performance

The individual responses to each task (see Table 12) were ranked proportionately in order of difficulty to produce a Guttman scalogram. The Guttman scalogram analysis indicated DD > KA > DB > HE > CFB > EFB as the most likely progression for Anglo-Australian children, capturing the performance of 53% of children, with 47% following other patterns (see Table 22). In other words, out of the 87 participants, 46 children followed this Guttman scale pattern, which showed no participants failed all tasks (pattern 1) or passed DD only (pattern 2), while six participants passed both DD - KA (pattern 3); five participants passed DD - KA - DB (pattern 4); four participants passed DD - KA - DB - HE (pattern 5); eight participants passed DD - KA - DB - HE - CFB (pattern 6); and 23 participants passed all tasks on the scale (pattern 7). However, the order of ToM subcomponents DD > KA > DB > HE > CFB > EFB (i.e., ToM progression) presented a low coefficient of reproducibility (Rep. = .89; significant Rep  $\geq$  .90) and Index of

Consistency ( $I = .43$ ; significant  $I \geq .50$ ), suggesting the six-task scale performance only marginally followed a sequential order and lacked homogeneity.

Table 22

*Guttman Scale Patterns for the Anglo-Australian Sample*

Task	Patterns							Other Patterns
	1	2	3	4	5	6	7	
Diverse desires (DD)	-	+	+	+	+	+	+	
Knowledge access (KA)	-	-	+	+	+	+	+	
Diverse Beliefs (DB)	-	-	-	+	+	+	+	
Hidden emotion (HE)	-	-	-	-	+	+	+	
Content False belief (CFB)	-	-	-	-	-	+	+	
Explicit False belief (EFB)	-	-	-	-	-	-	+	
Number of children	0	0	6	5	4	8	23	41 (47%)

**Note:** The above table illustrates seven patterns of response. The minus sign (-) represents failure of the task, while the plus sign (+) represents success

In the five-task scale, which omitted EFB as instructed in the manual, 60% ( $n = 53$ ) of Anglo-Australian children followed the progression DD > KA > DB > HE > CFB ( $Rep = .91$ ;  $I = .34$ ). Despite the significant  $Rep.$ , the Index of Consistency was not significant, suggesting that the progression of the performance on the five-task scale lacked homogeneity.

Once again, for confirmation purposes, ToM progression across the age groups was further explored. Table 23 depicts the most likely progression for Anglo-Australian children by percentage per age group and Green's  $Rep.$  coefficient and Consistency Index.

Table 23

*ToM Progression per Age Group by Percentage, Green's Reproducibility (Rep.) and Consistency Index (I) per age groups in the Anglo-Australian sample*

Group	Progression	%	Rep. (sig. $\geq$ .90)	I index (sig. $\geq$ .50)
4	DD > KA > DB > HE > CFB > EFB	32%	.96 (6-task scale)	-2.3 (6-task scale)
	DD > KA > DB > HE > CFB	45%	.97 (5-task scale)	-2.5 (5-task scale)
5	KA > DD > DB > CFB > HE > EFB	53%	.96 (6-task scale)	-0.36 (6-task scale)
	KA > DD > DB > CFB > HE	71%	.97 (5-task scale)	-0.30 (5-task scale)
6	KA > DD > HE > CFB > DB > EFB	68%	.98 (6-task scale)	-0.62 (6-task scale)
	KA > DD > HE > CFB > DB	70%	.98 (5-task scale)	-1.3 (5-task scale)

The order of the ToM scale for Anglo children as presented in the literature (i.e., DD > DB > KA > FB > HE) was also examined. To this end, the Guttman scalogram was arranged in the order proposed for Anglo children to find the percentage of children matching the Anglo patterns according to the literature as well as the coefficient of reproducibility (Rep.) and Index of Consistency (*I*) achieved. The results indicated 45% ( $n = 39$ ) of children in the present Anglo-Australian sample matched the order DD > DB > KA > CFB > EFB > HE (Rep = .84;  $I = .32$ ; in the six-task scale) and 57% ( $n = 50$ ) DD > DB > KA > CFB > HE (Rep = .89;  $I = .45$ ; in the five-task scale). The reproducibility and consistency coefficients confirmed this ordering was not significant and did not match the predicted order of ToM performance for Anglo samples.

#### 5.3.4 McNemara Pairwise Comparison in Anglo-Australian Children

Given that the five-item Guttman scale yielded better reproducibility (rep. Coefficient) than the six-item scale, a McNemara pairwise comparison test was conducted to compare the performance of a pair of tasks and confirm the Guttman sequence according to the analyses of Wellman et al. (2006) and Wellman and Liu (2004). For the Anglo-Australian children, the Diverse Desires task was equal in difficulty to the Knowledge

Access task,  $\chi^2(1) = .0, p = 1$ , the Knowledge Access task was easier than the Diverse Beliefs task,  $\chi^2(1) = 10.7, p = .001$ , the Diverse Beliefs task was equal in difficulty to the Hidden Emotions task  $\chi^2(1) = .806, p = .369$ , and the Hidden Emotions task was equal in difficulty to the Contents False Belief task,  $\chi^2(1) = .310, p = .577$ . Based on these outcomes, Anglo-Australian children's performance of each pair of tasks yielded a likely order of ToM subcomponents from easiest to hardest: DD = KA > DB = HE = CFB.

### 5.3.5 Chi-Square Analysis of Performance on Each ToM Scale Subcomponent: Comparison between Colombian and Anglo-Australian Samples

After examining the order of the scale for each cultural group, follow-up analyses were conducted to determine the proportion of children that passed each ToM task in order to detect differences between the two cultural groups. A Chi-square test revealed no significant differences between the proportion of pass rates of Anglo-Australian and Colombian children (see Tables 1 and 3) on DD,  $\chi^2(1) = 1.59, p = .207$ , DB,  $\chi^2(1) = .772, p = .380$ , KA,  $\chi^2(1) = 2.31, p = .128$ , CFB,  $\chi^2(1) = 3.28, p = .070$ , EFB,  $\chi^2(1) = .248, p = .618$ , or HE,  $\chi^2(1) = 3.65, p = .056$ .

### 5.4 Binomial Test: Level of Performance of Cultural Groups on Each Higher-Order ToM Subcomponent (FB and HE)

Finally, to address Hypothesis 5, a binomial test was conducted to determine the level of performance achieved for each higher-order ToM subcomponent (FB and HE tasks) by Colombian and Anglo-Australian children. In the Colombian sample, the proportions of pass rates for CFB (.50), EFB (.44) and HE (.53) were not statistically significantly different from chance (CFB,  $p = .1$ ; EFB,  $p = .403$ ; HE,  $p = .720$ ), with the overall proportion of pass rates at chance levels (50%). On the other hand, the binomial test revealed that the proportion of Anglo-Australian children who passed CFB (.65) and HE (.68) was statistically significantly different from chance ( $p = .005$ ;  $p = .001$ , respectively);



in other words, they achieved above-chance levels of performance on these tasks. However, pass rates for EFB (.49) were not statistically significant or different from chance ( $p = .830$ ).

## Chapter 6

### Discussion and Conclusions

The main aims of the present study were to explore cultural differences in ToM performance using the ToM Scale (Wellman & Liu, 2004) and the influence of sociocultural factors on ToM performance of children from two culturally diverse countries, namely Australia and Colombia; therefore, I attempted to answer two questions:

- 1) Is ToM performance different in Colombian and Anglo-Australian children?
- 2) Do parent-child relationship dimensions and child's self-concept dimensions mediate differences in ToM performance in children from Colombia and Anglo-Australia?

To answer these research questions, my inquiry was directed by five hypotheses as described in Chapter 3. In this chapter, firstly, I discuss the differences found in ToM performance (ToM total scale scores) between Colombian and Anglo-Australian children and present the examination of the relationship between ToM (ToM total scale scores) and sociocultural factors (parenting relationship and self-concept dimensions). Additionally I will discuss the role of some of these factors as potential mediating mechanisms in this relationship. I then describe the main findings regarding the order in ToM progression and elaborate on some findings of ToM performance that emerged from this study that were contrary to those expectations. At the end of this chapter, I discuss the limitations of the study and propose directions for future research. Finally, I present my conclusions including an overview of the implications and the contributions of this study.

## 6.1. Mediating Socio-Cultural Mechanisms in ToM Performance: Colombian versus Anglo-Australian Samples

A general finding of cross-cultural studies comparing Theory of Mind (ToM) performance between children from individualistic dominant cultural backgrounds (mainly from English-speaking countries) and children from collectivistic dominant cultural backgrounds is that children from the former cultural groups develop advanced ToM earlier than the latter (e.g., Wellman et al., 2001). In line with this overall finding, in the present study I found that Anglo-Australian children achieved significantly higher total ToM scale scores than Colombian children, supporting hypothesis one (see Chapter 3). This may be due to differences between the cultural orientations of collectivism and individualism frameworks. The current conceptualisations of the collectivistic and individualistic framework have been used by researchers to explain how sociocultural factors, like family interaction, child's self-concept, social practices and parent-child relationships, can create differences in ToM performance of children across cultures (Astington & Barriault, 2001; Carlson et al., 2013; Hughes & Leekam, 2004; Keçeli Kaysili, & Acarlar, 2011; Markel et al., 2012; Pavarini et al., 2013; Peterson & Slaughter, 2017; Shahaieian et al., 2011; Shahaieian et al., 2014; Wellman et al., 200; Wellman, 2017; Wellman et al., 2006). Consistent with this proposal, in the present study I found that some dimensions of the child's self-concept (CSVQ) and parent-child relationship (PRQ) mediated the relationship between culture and ToM performance, partially confirming hypotheses two and three (see Chapter 3). The dimensions that differed between the two cultural groups are discussed below, followed by an examination of the associations and mediation observed between these dimensions and ToM.

Cultural differences were found in only two of the five parenting dimensions. As assessed by the PRQ, it was found that Colombian parents presented higher scores on the

Involvement and Parenting Confidence dimensions than did Anglo-Australian parents. However, only the Involvement dimension was found to mediate the relationship between culture and ToM, and within the six-year-old groups only.

The PRQ dimension of Involvement may have captured the tendency of Colombian parents, unlike Anglo-Australian parents, to be more intensely involved in social interaction, to be more aware of children's activities and to participate in everyday activities with their children, possibly at a more pragmatic level (e.g., items "*I teach my child how to play new games.*" and "*My child and I do arts and crafts together.*"). One could speculate that these high scores, which are reflective of collectivistic cultural orientations, influence Colombian parents. Parents from collectivistic cultures, like China, Iran and some Latin American countries, are known for a predisposition towards control in their parenting practices and for using guided and pragmatic teaching methods when interacting with their children (Harwood et al., 2002; Shahaeian et al., 2011; Shahaeian et al., 2014b; Wellman et al., 2006). This dimension may have captured that Colombian parents also tend to display parenting practices like those identified by Harwood et al. (2002) in Latin American parents, such as, parental teaching during playtime as common practice, and mothers' tendency to be vigilant, controlling, and focus their maternal attention on the child's daily activities. In fact, Posada et al. (2002) observed that active interactions between Colombian mothers and their children were characterised by mothers seeking intensive social contact and face-to-face exchanges. These characteristics observed by Posada et al. (2002) may well have captured the warmth and affectionate attributes of Colombian parents, as well as the prominently controlling and vigilant features of their childrearing practices (Franco et al., 1996; Luis et al., 2008; Posada et al., 2002; Putnick et al., 2012).

On the basis of the above argument, it is logical to assume that in the parent-child interactions of children growing up in collectivistic dominant cultures like the Colombian

culture, children may have fewer opportunities and social scenarios to practice their ToM skills because they develop an emotional dependency on parents whose main role is to restrict the expression of emotions and thoughts to help children comply with social rules and cultural conservatism (Harwood et al., 2002). For example, it is very common for Colombian parents to discourage children to share their opinions and interfere in an adult conversation because this is a sign of being disrespectful. According to Hofstede (2001), Colombian culture is highly normative in their thinking and traditions are strongly respected. This could explain low ToM scores achieved by this cultural group as this was also evidenced in studies with children from highly collectivistic dominant cultures (e.g., Laya de García et al., 2016; Shahaieian et al., 2014).

As for parental involvement in the Anglo-Australian culture, Goodnow, Cashmore, Cotton and Knight (1984) highlighted the inclination of Anglo mothers to be more careful about how they get involved, despite spending time with their children and enjoying activities together. For example, the authors reported that activities like walking to school together holding hands or meeting during lunchtime to ensure the child is well fed are frequently avoided for the fear of being labelled “over-protective” or “babying”. In 2010, Lucas, Nicholson, and Maguire conducted a longitudinal investigation for the Australian Institute of Family Studies and reported that Australian parents scored high in warmth and low in overprotection and hostility<sup>25</sup> towards children. In addition, parents from individualistic cultures like Australia are more likely to encourage independence and autonomy in their children by allowing them to speak their mind and freely express themselves, which is related to better understanding of others’ beliefs (Shahaieian et al., 2014).

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<sup>25</sup> Hostility is described as parents’ emotional state (e.g., Anger) and level of frustration when dealing with the child’s challenging behaviours and discipline (Lucas et al., 2010)

Unlike parenting practices in collectivistic settings, this suggests that the PRQ dimension of Involvement in my Anglo sample may have tapped into the cultural tendency of Anglo parents mentioned above as well as the use of inductive<sup>26</sup> reasoning strategies in their everyday relationships, in turn facilitating ToM (Laya de García et al., 2016; Liu et al., 2008; Lucas et al., 2010; Peterson & Slaughter, 2017; Wellman et al., 2006; 2011; Zhang et al., 2016). Therefore, one could speculate that the level of open discussion and less controlling strategies used by Anglo parents in their relationship with their children potentially help their children to confidently practice their ToM skills to understand others' perspectives as well as contribute with insights and reflection when facing opposition (e.g., disagreement with parents). One can speculate that from a very young age, children in this cultural setting are allowed to form their own personal perspectives, ideas and think of themselves as unique mental agents, different from the other family members, while this process may be achieved in later years in children from collectivistic settings like Colombia. For example, Colombian children are commonly not held responsible for the things they say; rather, society "blames" or questions parents for any negative interpretations of what children express. Therefore, the common parental practice of restricting is typically used to comply with the parenting status of "good parent" and social conservatism until children are mature and old enough to take responsibilities.

In regards to child's self-concept dimensions, as expected, differences emerged between Colombian and Anglo-Australian children, with Colombian children scoring significantly higher in social closeness and traditionalism dimensions than Anglo-Australian children. These results support the differences between self-concepts developed in individualistic and collectivistic cultures as proposed by Ahn and Miller (2012). These

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<sup>26</sup> Inductive reasoning involves parents' open discussion with children about misbehaviour, reasons for punishment and negotiations of rules (Lucas et al., 2010)

authors stated that children from collectivistic cultures are inclined to seek more intense social contact and be more conservative with regard to norms and authority than their Anglo peers (individualistic cultures). However, Traditionalism was the only CSVQ dimension associated, negatively, with ToM in the entire sample. Nevertheless, its role as a mediator in the relationship between culture and ToM was confirmed as significant, negatively, for children in the six-year-old group, albeit not for the whole sample.

Traditionalism refers to children's tendency towards norm awareness and respect for authority, and it was therefore not surprising that this was higher among Colombian children than their Anglo-Australian counterparts. Once again, the collectivistic orientations to discipline practices, control and parental authority of Colombian parents may constitute the reason why Colombian children exhibited a greater tendency to conform to social norms and rules, instead of freely expressing their thoughts, resulting in low levels of ToM performance (Hughes & Ensor, 2006; O'Reilly & Peterson, 2014b; Pavarini et al., 2013; Ruffman, Perner, & Parkin, 1999; Shahaieian et al., 2014b Vinden, 2001; Wellman et al., 2006). In this regard, I speculate that unlike the negotiation of rules that permits reflection<sup>27</sup> on one's own and others' mental states experienced by children in Anglo settings, children in Colombia are rarely allowed this opportunity of reflection that helps in the acquisition of ToM skills earlier. In fact, regarding norms and rules, Colombian parents believe that if negotiation of rules is allowed and flexibility of punishment for misbehaviour is permitted, their authority would be lost to children's demands. Therefore, parents' authority would be questioned by other members of society and children may be perceived as being "in charge". This is greatly avoided in Colombian culture, hence parents' main

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<sup>27</sup> Example of reflection of one's own and others' mental states in a negotiation of rules scenario: how would mom feel if I do not share my toy during play time with my brother? If I share and take turns with my brother we can both enjoy the game, so I can accept to obey the rule of sharing, instead of fighting

role is to maintain order and authority which are key defining features of a “good parent” in this culture.

Consistent with the above interpretation, high levels of parental control may have been captured by the parenting confidence dimension of the PRQ for Colombian parents who obtained higher scores than Anglo-Australian parents. Whilst parenting confidence<sup>28</sup> was not a mediator, this dimension further underscores the importance of parental control when dealing with discipline and misbehaviour, decision making, and overall conformity with parenting roles and obligations. In line with this, one could argue that the cultural tendency of control and authoritarian parental practices, reflected in comparatively high Traditionalism scores on the part of Colombian parent participants, may have influenced Colombian children’s attitudes towards and perceptions of socially acceptable ways to respond to authority, resulting in their low ToM scores. In contrast, parenting practices in Australia focus on encouraging independence and induction-based discipline that allow for explanation and negotiation of the rules (Lucas et al., 2010; Yagmurlu & Sanson, 2009). These characteristics of Anglo-Australian parents may have facilitated a more flexible approach, manifested in comparatively low Traditionalism scores, and, thus, influenced the attitudes of children towards norms and rules such that they have been able to gain high ToM scores.

Overall, the outcomes support the evidence of a growing number of studies that suggest parenting practices are an important and influential mechanism in the development of ToM, particularly reflected in the suppressive impact of controlling parents on children’s

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<sup>28</sup> The Parenting Confidence (PC) dimension evaluates items like “*I remain calm when dealing with my child’s misbehaviour*”; “*my child knows the house rules*”; or “*It is easy for me to make decisions about what my child should do*” (Kamphaus & Reynolds, 2006)



sociocognitive development. However, some limitations were encountered (see section 6.3) restricting my ability to draw firm conclusions about the relationships and mediators.

## 6.2 ToM Progression in Colombian and Anglo-Australian children

In this section, I will first summarise the main findings to provide the reader with an overall picture, and, in the following sections, I will present an extensive discussion.

The results suggest that there are cultural as well as universal elements in the acquisition of ToM. First, contrary to Hypothesis four, identical order was observed in the ToM performance of Colombian and Anglo-Australian children via Guttman scalogram analysis (i.e., DD – KA – DB – HE – FB). This result contrasts with two main findings reported in other studies using the ToM Scale: 1) that children from collectivistic cultural settings perform and displayed a different order on the ToM scale subcomponents compared to children from individualistic cultures (mainly from English speaking countries; e.g., China versus USA, Iran versus Australia; Duh et al., 2016; Shahaieian et al., 2011; Shahaieian et al., 2014a; Shahaieian, 2015; Wellman et al., 2006; Wellman et al., 2011; Zhang, Shao, & Zhang, 2016); 2) that the commonly observed ToM scale performance in Anglo samples in the USA and Australia, according to the literature, is: DD > DB > KA > FB > HE (e.g., see Peterson & Slaughter, 2017; Shahaieian et al., 2011; Shahaieian et al., 2014a; Wellman, 2017; Wellman & Liu, 2004; Wellman et al., 2006; Wellman et al., 2011). The order in the ToM scale performance (via Guttman scalogram: DD – KA – DB – HE – FB) in both of my samples differed from that observed in previous studies (e.g., DD – KA – DB – FB – HE for Chinese and Iranian children and DD - DB - KA – FB – HE for Australian and American children; Calero et al., 2013; Peterson & Slaughter, 2017; Qu et al., 2013; Shahaieian et al., 2011; Shahaieian et al., 2014a; Wellman et al., 2006).

Follow-up pairwise comparison within each of my cultural samples showed that performance on the ToM scale did not follow a strictly sequential order in terms of children's performance of pairs of items. For Anglo-Australian children, DD was similar in difficulty to KA, and KA was easier than DB. However, belief reasoning constructs (e.g., DB) and higher-order construct tasks (e.g., HE and CFB) were similar in difficulty (i.e.,  $DD =^{29} KA >^{30} DB = HE = CFB$ ). For Colombian children, DD was similar in difficulty to KA, but KA was easier than DB and DB was easier than HE, although the last task (HE) did not differ in difficulty from CFB (i.e.,  $DD = KA > DB > HE = CFB$ ). This is discussed further in the Limitations section.

Another aspect of ToM performance observed was related to the differences in pass rates of all or some of the ToM subcomponents. Previous research identified that children from collectivistic cultures like China, Iran and Singapore scored significantly higher on KA than DB, while children from individualistic cultures, like USA and Australia, scored significantly higher on DB than KA (Peterson & Slaughter, 2017; Shahaeian et al., 2011; Shahaeian et al., 2014a; Wellman et al., 2006; Wellman et al., 2011). This was not observed in the present study.

Finally, it was observed that DD was not the task with the highest proportion of pass rates. My findings are therefore inconsistent with those of other studies in which children across individualistic and collectivistic cultural settings were found to successfully master DD before any other task on the scale (e.g., Duh et al., 2016; Peterson & Slaughter, 2017; Shahaeian, 2015; Wellman et al., 2006; Zhang et al., 2016). In my study, regardless of the Guttman scalogram item ordering, DD and KA tasks presented the same proportion of pass rates (.90) for the total sample. Although the universality of DD development was observed,

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<sup>29</sup> = Equal in difficulty

<sup>30</sup> > Easier than

the suggested universality of KA is a novel outcome. Adding to its novelty was the ToM performance of the Anglo-Australian children on the KA task which contrasted with the findings from previous studies on Anglo samples (e.g., Wellman & Liu, 2004; Wellman et al., 2006). In the following section, I will first discuss the performance on this subcomponent in Colombian children and then in Anglo-Australian samples.

### 6.2.1 Knowledge Access Performance

Drawing on the current understanding of collectivistic cultures, I will offer two possible explanations for the high performance of Colombian children on KA. First, early development of the ability to successfully perform KA may be attributable to the high tendency of collectivistic societies to value education as a source of socioeconomic progress and as an important family obligation factor (Fuligni, 2001). According to Knight (2009), the role of education in collectivistic cultures, more so than in individualistic cultures, is to gain higher social status and social acceptance. Tardif and Wellman (2000) and Shahaeian et al. (2011) concluded that a strong parental focus on academic education and knowledge acquisition in Iranian and Chinese parents boosts early development of KA in children. This is also common among Colombian parents who prioritise knowledge and education as important tools to gain higher status and economic progress in a financially unstable and developing country (Szalay, Vasco, & Breña, 1982). Children are enrolled in formal, structured education soon after the early age of two, and at around four years old, they start learning basic reading, writing, and mathematical problem-solving skills (Bernal, 2014; Putzi, 2008).

A second possible explanation is that parental emphasis on teaching using guided and pragmatic methods to provide children with practical knowledge (e.g., how to make the bed) leads children to believe that being knowledgeable is of great importance

(Shahaeian et al., 2011; Shahaeian et al., 2014; Tardif & Wellman, 2000; Wellman, 2017; Wellman et al., 2006). Teachers and parents from collectivistic contexts focus on teaching knowledge, while in individualistic contexts, children are expected to contribute to their learning by actively and independently formulating theories and offering solutions (Knight, 2009). In Colombian culture, children are largely considered to be immature, not self-reliant, and in constant need of parental guidance, supervision and teaching (Putzi, 2008; Szalay et al., 1982). These sociocultural traits may lead Colombian children to believe that being knowledgeable contributes to their recognition and acceptance by peers and their general social group, hence their development of KA earlier than DB.

Nevertheless, the collectivistic cultural explanations offered above regarding the early achievement of KA in my Colombian sample are not consistent with a possible cultural perspective in the Anglo-Australian culture to explain why my Anglo-Australian sample clearly mastered early KA too. The early KA development observed in Anglo-Australian children in this study has not been reported by other researchers. In fact, in studies using the ToM scale, researchers suggest that it is easier for Anglo-Australian children to successfully perform DB tasks than KA tasks (Shahaeian et al., 2014b). The present investigation is the first to report that Anglo-Australian children present higher ability to successfully perform KA than DB. Therefore, as follows in this discussion, I will present two possible observations regarding what I consider might shed light into explaining early KA in both samples in my study. I will first describe some observations I made of some of the studies using the ToM to assess KA in Anglo-Australian children, and then I will present some possible methodological implications of the KA task that might have influenced performance in both of my samples.

Firstly, closer scrutiny of the pass rates for each task in some studies where the ToM scale was used to assess Anglo-Australian children reveals higher scores for KA tasks than

DB tasks in some cohorts. For example, Farrant, Fletcher, and Maybery (2006) reported that in four-task ToM scales, typically developed Anglo-Australian children aged between four and six years achieved higher average scores on KA (1.55) than DB (1.10). Though in Farrant et al.'s (2006) study, the authors acknowledge that their sample presented the same ToM progression proposed by Wellman and Liu (2004) for Anglo samples, limited information is presented in this regard. Moreover, researchers studying Anglo-Australian children aged between three and 13 years old also reported that cohorts aged between five and seven years and five months (the middle age groups) displayed a more successful performance on KA than on DB (e.g., 100% vs. 84% in Peterson et al., 2012; and 95% vs. 84% in Shahaieian et al., 2014a). Nevertheless, Peterson et al. (2012) and Shahaieian et al. (2014a) acknowledge that the sequential order of ToM development consistently matched the predicted sequence of Wellman and Liu (2004) for Anglo samples (DD > DB > KA > FB > HE), and this was likely driven by the high scores on DB from the younger and older groups in the samples unlike the middle age groups.

Bearing the abovementioned studies in mind, the fact that some Anglo-Australian children between the ages of five and seven might present earlier successful performance of KA tasks (similar to the Anglo-Australian children in my sample) is worthy of future investigation to further clarify if, and to what extent, this may be a result of individual differences or methodological choices of researchers. The field of ToM is still relatively new to the concept of ToM progression as presented by Wellman and Liu (2004), particularly in Australia, where the concept of ToM progression has only been assessed in a handful of studies using the ToM scale over the past decade.

Secondly, it is also possible that successful performance of the KA task may have been fostered by the use of the verb “know” during early childhood in both of my samples. Studies have found that between the ages of two and six, English-speaking children

frequently refer to the mental verb “know” (Bartsch & Wellman, 1995; Shatz, Wellman, & Silber, 1983). According to Pascual, Aguado, Sotillo, and Masdeu (2008), this is also true for Spanish speakers. Use of the verb “know” in early childhood allows children the cognitive process of differentiating between the contents of their own mind and the contents of the external world, distinguishing that people can be knowledgeable or ignorant (e.g., children understand that he/she is knowledgeable because he/she knows the contents of the box, but someone who has not seen inside the box is ignorant; Bartsch & Wellman, 1995). These authors suggested the main characteristic of this verb is to make reference to factual aspects of reality (or certainty), fostering a developmental process whereby children initially use this verb to refer to their own mental state of knowledge before referring to others’ knowledge (e.g., if one knows the truth, one is not ignorant). Since children are capable of easily distinguishing between knowledgeable and ignorant at an early age, there is a possibility that this task would be easier for some.

Considering the above argument, Miller (2002) claimed that KA tasks evaluate the paradigm “access to information versus no access to information” with only two possible answers – “knowledgeable or ignorant” (or yes/no answer choices). The author explained it is easier for children to attribute knowledge to themselves when he/she has been given informational access (e.g., a toy car in the container/box is revealed to the participant) and evaluate more accurately that other people who do not have informational access will have a different mental state from their own. In the self-other knowledge tasks, children can overestimate their own knowledge and underestimate that of others, possibly inflating their chances of answering correctly (Miller, 2002). In line with this, Westra and Carruthers (2017) stated that “seeing leads to knowing” (p. 173), and, therefore, the fact that children have learned something by looking into a container might be interpreted as encouragement to tell people about their new discovery. This possibly explains how children in both of my

samples might have interpreted the KA tasks, contributing to achieving high performance in this task.

In addition to children being capable of distinguishing between knowledgeable and ignorant from a very young age, Westra and Carruther (2017) suggest that young children can encounter positively- versus negatively-biased answers to yes/no questions when resolving KA tasks, which may be a possible explanation behind better KA performance in my Anglo-Australian sample. In this particular task in Westra and Carruther's (2017) review, the protagonist of the story (e.g., Polly) was considered to not have a specific goal (unlike FB tasks, e.g., "Polly wants to find her hat"), and, in order to fulfil the task correctly, the participant must negatively respond to both the control and test questions. That is, after children are given access to information and become knowledgeable, the examiner asks "1) Does Polly know what is inside the drawer? 2) Did Polly see inside the drawer?" to which they must answer "no" in order to successfully pass the task. According to Westra and Carruthers (2017), KA tasks might be easier for older children to pass, because yes-biased answers (or answering yes to all yes/no questions) are more likely to be strongly displayed in young children. It is only after four years of age that this yes-biased tendency starts to decline (Westra & Carruthers, 2017). This is a likely explanation as to why it might have been more predominant for children in the ages of five and six than four in my study as well as in Farrant et al.'s (2006), Peterson et al.'s (2012) and Shahaieian et al.'s (2014a) research to present advanced development of KA. Moreover, although this explanation may also apply to the high scores on KA in my Colombian sample, no studies have explored the yes-biased tendency in this cultural group. That said, more research is necessary to understand this likely yet unsubstantiated maturational cognitive process captured by the ToM scale as well as the possible associations between the yes-biased tendency and ToM.

### 6.2.2 Performance of Higher-Order ToM Scale Subcomponents: Hidden Emotions and False Belief

Based on Wellman et al.'s (2001) meta-analysis and Banerjee's (1997), Tenenbaum et al.'s (2004) and Sidera et al.'s (2008, 2011, 2012) studies, it was hypothesised that Anglo-Australian children would achieve above-chance levels in higher-order ToM tasks (i.e., FB and HE tasks) compared to their Colombian counterparts (see Hypothesis five in Chapter 3). Performance in two out of the three higher-order ToM scale subcomponents, namely CFB and HE, was at above-chance levels in Anglo-Australian children. Moreover, CFB performance in the six-year-old Anglo-Australian group was close to mastery as compared with their Colombian peers. This level of performance in Anglo-Australian children is in line with outcomes previously reported in the literature (e.g., de Rosnay, 2017; Harris & Gross, 1988; Harris et al., 1989; Miller, 2012; Slaughter & Perez-Zapata, 2014; Wellman et al., 2001). The fact that performance of higher-order ToM subcomponents in Colombian children remained at chance levels may indicate their slow acquisition of the ability to understand advanced ToM tasks. Similar findings in regard to Spanish-speaking children were also documented in previous studies (e.g., Arias-Vega, 2008; Bermúdez-Jaimes, 2010; Bermúdez-Jaimes & Sastre-Gómez, 2010; Calero et al., 2013; Bermúdez-Jaimes & Sastre-Gómez, 2015; Guiberson & Rodriguez, 2013; Maldonado-Gonzales & Navarro-Matajira, 2012; Moreno-Montoya et al., 2014; Padilla-Mora et al., 2009; Quintanilla & Sarria, 2003; Resches & Perez-Pereira, 2007; Villanueva, 1998).

In a recent review by Hughes and Devine (2017), the authors attributed early acquisition of higher-order sociocognitive development to parental "mind-mindedness" (i.e., seeing the child as an active mental agent), parental sensitivity (i.e., the ability to emotionally attune and respond to the child's needs) and parental mental state talk (i.e., talk about others in terms of beliefs, emotions, thoughts and intentions). This topic has been



widely studied in individualistic cultures, particularly in children and parents from Anglo and European backgrounds (Ereky-Stevens, 2008; Farrant, Murray, & Fletcher, 2012; Hughes, Devine, & Wang, 2017; Huges & Ensor, 2006; Meins, Fernyhough, Russell, & Clark-Carter, 1998; Pavarini et al., 2013; Peterson & Slaughter, 2003; Ruffman, Slade, & Crowe, 2002). The growing interest in explaining sociocultural differences in ToM performance has led researchers to study the relationship between these higher-order ToM constructs and parental mind-mindedness and mental state talk in cross-cultural studies. According to Huges and Devine (2017), “mind-mindedness... captures parental cognitions, which are increasingly recognised as key influences on parental style” (p. 46), and “mental state talk captures a key feature of parents’ actual interactions with children” (p. 46).

Emerging cross-cultural investigations into mind-mindedness and mental state talk have found that parents from collectivistic cultures (e.g., Pakistan, China and Hong Kong) display maternal sensitivity (mind-mindedness) and maternal mental state talk when communicating with their children. However, contrary to Anglo parents, the use of these parental abilities appears to be a restricted or less prominent practice in some care-giving systems (Hughes et al., 2017; Liu et al., 2016; Lu et al., 2008; Nawaz & Lewis, 2017; Tenenbaum et al., 2004). In line with this, Harwood et al. (2002) explained that Latin American families “place greater emphasis on the child’s obligations to the family and the larger group, and less emphasis on centering interactions around the child’s own wishes, thoughts, and desires” (p. 31). It was therefore not surprising that Colombian children in this study were less able to perform at above-chance levels on HE and FB tasks than their Anglo-Australian peers.

On the other hand, it has been well documented that individualistic-influenced parental mind-mindedness and mental state talk, as well as parental practices that encourage open communication are more significant in Anglophonic than in non-Anglophonic

parents, and that these facilitate faster development of ToM (e.g., Hughes et al., 2017; Shahaieian et al., 2014b). According to the work of Dunn and colleagues (Dunn, 1995; Dunn, 2000; Dunn, Brown, & Beardsall, 1991; Dunn, Brown, & Maguire, 1995; Dunn, Cutting, & Demetriou, 2000), family talks about emotions (e.g., discussing feelings during conflict resolution with siblings) foster acquisition of higher-order ToM constructs in Anglo children. Farrant, Devine, Mayberry, and Fletcher (2012) observed that parental abilities to attune emotionally with their children (maternal sensitivity) facilitates prosocial behaviour which, in turn, influences ToM and earlier understanding of more sophisticated sociocognitive abilities like empathy and emotional perspective in Anglo-Australian children. Therefore, it is possible that parental mind-mindedness and mental state talk, although not explored in this study, might also be a reason behind higher levels of ToM performance, as found in my Anglo-Australian sample.

To summarise, the ways in which mothers from non-Anglophonic collectivistic countries communicate and interact with their children could influence the pace at which ToM is developed. There may therefore be aspects of collectivistic and individualistic sociocultural influences on parent-child relationships that require further examination to determine whether they contribute to differences in ToM. Thus, I recommend future cross-cultural investigations explore the potential mediating roles of mind-mindedness, mental state talk and parental demands on the relationship between culture and ToM.

In the following section, I will discuss the limitations that may have influenced my findings and I will also present suggestions of future investigations.

### 6.3 Limitations and Future Directions

One limitation of the current study was the fact that significant mediations were only evident in the six year old groups. This may indicate the possibility that cultural

influences only manifest themselves when children are older, after some years of enculturation and socialisation when their ToM abilities consolidate. At the age of six, children enter middle childhood, and with it advances in sociocognitive development become more evident. For example, they develop more sophisticated social skills, better understanding of friendship (e.g., consolidation of friendships), a higher quality and quantity of peer interactions, and better understanding of social rules and consequences (Cole, Hakkarainen, Bredikyte, 2010; Collins, Harris, & Susman, 1995; Hartup, 1992; Kliewer, Fearnow, & Miller, 1996; Konner, 2010). Moreover, at this age, children show a much clearer conceptual change in some ToM subcomponents and are better able to give adult-like responses to some ToM tasks (e.g., content FB) than their younger peers. Some authors have concluded that there is a reciprocal relationship between socialisation and ToM (Carlson et al., 2013; de Rosnay, 2017; Flavell, 1999; Keçeli Kaysili & Acarlar, 2011; Hughes & Leekham, 2004; Miller, 2012; Moses & Flavell, 1990; Schwanenflugel, Fabricius, & Noyes, 1996; Wimmer & Perner, 1983); therefore, it could be argued that after some years of enculturation (or socialisation), older children tend to manifest better acquisition of ToM abilities. Future cross-cultural studies of middle-childhood and school-age children will help to consolidate our understanding of the potential role of sociocultural mechanisms in ToM and broaden the findings and interpretations of this study.

Another possible limitation is related to the sociocultural measures used. Small and weak correlations, and small but significant mediation effects were observed in only three (two parenting and one child's self-concept) variables and certain age groups which limited interpretation of the results. The psychometric assessment of the CSVQ dimensions indicated low internal reliability of scores on the Social Potency and Achievement dimensions (individualistic framework), which limited the conclusions drawn, in that I was restricted to analysing the Social Closeness and Traditionalism (collectivist framework)

dimensions. This meant that the self-concept dimensions in the individualistic framework (Achievement and Self Potency) were unexplored. However, this tool was chosen for this study because it was considered by Eder (1990) to be a reliable measure for assessing child's self-concept and had been used in a previous cross-cultural ToM study (see Ahn & Miller, 2012). To date, the literature is limited on this subject, and future research, using a different self-concept measure, is therefore required to fully investigate the self-concept issue and clarify these results.

The findings also revealed few correlations between PRQ dimensions and ToM, as mediation was only confirmed in one age group (six year olds) and for one PRQ dimension (Involvement). This could indicate deficiencies on the part of the PRQ to measure and assess the cultural aspects of parent-child relationships in ToM. Nevertheless, the questionnaire was used in this study for two reasons. Firstly, the PRQ covered different aspects of parenting across multiple factors, and good psychometric properties had been reported in previous studies with typically developed children in different cultures (Bloomquist et al., 2012; Kamphaus & Reynolds, 2006; Oades-Sese & Li, 2011; Rubinic & Schwickrath, 2010; Wiggins et al., 2009; Wise, 2012). Secondly, this tool was chosen because the PRQ assessed various parenting relationship dimensions, distinct from the dichotomous – and limited - “authoritarian versus authoritative parenting styles” commonly assessed in previous studies. Despite the lack of associations evidenced between ToM and the PRQ dimensions in the present study, this measurement (the PRQ) presented good internal reliability scores. Nonetheless, I believe there is a need for this tool to be cross-culturally validated or for an appropriate tool to be developed for capturing cultural differences in parent-child relationships that comprehensively assess several dimensions, like the PRQ.

In regards to the ToM scale, the findings of the present study were too limited to confidently present the outcomes in terms of ToM scale progressions. In this research, the stability and scalability of the sequences were not confirmed (e.g., Green's index of consistency), indicating that the order of the ToM scale may not always be stable (or homogeneous), and children's performance of the scale is sometimes heterogeneous. Although the psychometric properties of the scale have not been questioned before, a number of studies that used the ToM scale reported low consistency indices, raising questions about the stability and scalability of this tool. Closer scrutiny of studies using the scale with children from collectivistic cultures (e.g., Iran, China) revealed that the majority of the authors relied on reporting the Green's reproducibility coefficient (i.e., Rep.) rather than the index of consistency (i.e., *I*), possibly because the latter is an optional step in the calculation (e.g., Green, 1956; Shahaieian et al., 2011). As in my findings, a limited number of other studies reporting on the index of consistency in children from collectivistic dominant cultures revealed an index below significance, indicating that performance of the scale was also heterogeneous (e.g., see Duh et al., 2016; Shahaieian et al., 2011; Wang, 2010; Wellman et al., 2011; Wellman et al., 2006). Thus, one could suggest that the performance of children on the scale is not always consistent especially that of children from collectivistic dominant cultures. In fact, following the importance placed by Green (1956) on significant consistency indices, it is possible that the ToM scale is a consistent and suitable measure for English-speaking children only (e.g., see Peterson et al., 2005; Shahaieian et al., 2014a; Wellman & Liu, 2004).

Furthermore, the findings of the present study showed that not only was there not a clear sequence but, that children did not progress in a predicted order. Therefore, the lack of scale consistency (or stability and scalability) in this study could be rooted in the similarities between pairs of tasks as well as differences (e.g.,  $DD = KA > DB > HE =$

CFB) observed in the ToM Scale subcomponents among age groups. For example, although the Guttman scalogram conformity (i.e., Rep.) was above significance per age group, indices of consistency (*I*) were negative (non-significant and significant), indicating what Green (1956) termed as negative inter-item correlations. Hence, a possible indicator was the high percentage of children presenting “other ToM patterns” in the present study. This is further evidence for the heterogeneous performance, suggesting that ToM development in a group of children from the same culture is not always strictly universal, but instead influenced by individual factors.

The heterogeneity of performance on the ToM scale could shed light on individual cognitive and contextual differences influencing children’s ToM development and is worthy of future mono-cultural and cross-cultural investigations. In the present study, the percentages of children in each cultural group who conformed to the predicted order of ToM constructs were considerably smaller than those reported in previous studies. While only 41.4% of the Colombian participants and 53% of the Anglo-Australian participants in this study displayed the expected ToM sequence, 74% of Iranian children in Shahaieian et al.’s (2011) study, 68% of Chinese children in Wellman et al.’s (2006) research, 66% of Singaporean children in Peterson and Slaughter’s (2017) study, and 87% of Anglo-Australian children in Peterson and Wellman’s (2009) research were reported to conform to the predicted sequences. Furthermore, the ToM Scale performance of approximately more than half of the children evaluated in this study showed different ToM patterns. According to White and Saltz (1974), “lack of reproducibility in a response matrix is just as likely to be due to heterogeneity in the population tested” (p. 193). Hence, one could conclude that it is due to the broad assessment spectrum of the ToM scale that the tool could effectively capture individual differences in ToM development as children’s abilities to

understand mental states “would not be consistent from one child to the next, depending on different individual experiences” (Wellman & Liu, 2004, p. 528).

However, considering individual differences in the present study is not consistent with Wellman and Peterson’s (2009) study because the high percentage of children conforming to the predicted ToM scale order was also observed in an Anglo-Australian sample. Wellman and Peterson’s (2009) sample presumably was from Brisbane in Queensland while, the sample in the present study was from the city of Perth in Western Australia. Therefore, one may suggest the possibility of contextual influences because little is known about regional differences in countries. Nevertheless, this is less likely because my Anglo-Anglo-Australian sample was small and not randomly selected and therefore, the outcomes may not be generalisable to ToM performance of other Anglo samples and have to be interpreted with caution. That said, I believe it is a useful consideration for future researchers to investigate ToM in a national representative sample to explore regional differences in Anglo-Australian children or assess a larger sample in Western Australia to confirm the outcomes herein presented.

Another limitation is that finding an unexpected ToM order of subcomponents (i.e., DD - KA - DB - HE – FB) in my Anglo sample. This finding was difficult to interpret because it challenges Wellman and Liu’s (2004) proposed order for Anglo samples. Moreover, pairwise comparison within each cultural sample indicated that task difficulties on the ToM scale did not conform to a strictly sequential order (e.g., Australia: DD = KA > DB = HE = CFB; Colombia: DD = KA > DB > HE = CFB), but this is not necessarily a negative implication. These results may suggest stages<sup>31</sup> of ToM development (Diges,

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<sup>31</sup> Australian children presented two levels of performance that required low (DD = KA) versus high ToM abilities (DB = HE = CFB), while Colombian children presented three levels of performance that required low (DD = KA), medium (DB) and high (HE = CFB) ToM skills.

Moreno, & Pérez-Mata, 2014). That is, the findings may indicate that despite the similarities in performance across samples, Anglo-Australian children experience faster ToM development through fewer (two) steps compared to some of their collectivistic peers (three steps for the Colombian sample). However, this too requires further examination, since the findings from this research are atypical compared to previously documented outcomes. Although this level of interpretation differs substantially from the model proposed by Wellman and Liu (2004), it helps us view children's ToM development through a broader lens rather than from a limited perspective (e.g., FB only), and captures cultural, individual and universal ToM acquisition across cultures.

Although the validity of Wellman and Liu's (2004) ToM progression and the ToM scale per se may be questionable based on the findings of this study, several recent studies have confirmed its validity via longitudinal, logistic mixed-effect model, Bayesian and microgenetic methods (see Asakura & Inui, 2016; Hiller, Weber, & Young, 2014; Rhodes & Wellman, 2013; Wellman, Fang, & Peterson, 2011, Wellman, 2017). The limitations presented here are noteworthy for future research because it is important to identify whether inconsistencies are due to unexplained confounding influences, methodological issues or individual cognitive and contextual differences across the samples. I agree with Wellman (2012) that the ToM scale is a sensitive tool for capturing cultural variability in ToM. In fact, a good methodological approach proposed by Wellman (2017) is to conduct microgenetic cross-cultural research using a longitudinal approach to more accurately identify conceptual changes in performance on the ToM scale in children from different cultural backgrounds. In addition, replication of the present study using larger samples in which administration of the ToM scale is undertaken in conjunction with other measures (e.g., PRQ) is highly recommended to provide further insights into sociocultural influences on ToM.



## 6.4 Conclusions, Implications and Contributions

The findings from this study were mixed and suggested that ToM has both universal and culture-specific elements. Universal components (via Guttman scalogram) were reflected in earlier achievement of Diverse Desires and later development of Hidden Emotions and False Belief across both cultural groups, which is consistent with the findings of recent studies (e.g., Peterson & Slaughter, 2017). In contrast, culture differences were identified in: 1) the role of parental control and children's responses to authority and social norms and their relation to high or low levels of ToM performance; 2) in ToM performance in Colombian children compared to Anglo samples in the literature (e.g., Wellman & Liu, 2004); and 3) Anglo-Australian children's achievement of higher total ToM scale scores and above-chance levels of performance in CFB and HE tasks compared to Colombian children. This third and last aspect of ToM signals support for the general claim that children from individualistic dominant cultures tend to present more advanced ToM abilities than their counterparts from collectivistic dominant cultures.

Nevertheless, the most intriguing finding from this study was that the order of the ToM scale (via Guttman scalogram) in Anglo-Australian children in my sample mimics the performance of the Colombian and other collectivistic samples, like in Hong Kong (Wang, 2010) or China (Duh et al., 2016; Wellman et al, 2006). One could argue that the findings from this study did not fully address ToM universality, despite broad matching of the samples according to sociodemographic characteristics, controlling for verbal IQ, professional back-translation of some of the instruments, and use of the instruments as recommended in the manuals to avoid methodological confounds. These cross-cultural outcomes like the one observed in the present study may question the use of Anglo children's (e.g., USA, UK) ToM development as the criterion against which to evaluate ToM development in children from other cultural backgrounds (e.g., Switzerland, Italy,

Japan). It may be the case that no single particular culture should be regarded as a reference for evaluating how well or badly the rest are performing, because so much unexplained variability across cultures obscures a clear picture of what could be called “normal” developmental cultural standards (e.g., Chinese children lagging or outperforming Anglo peers - see Chapter 2). The findings from my study may encourage future researchers to evaluate the possibility that children across different cultures possess different maturational ToM timetables, and children within the same cultural sample (e.g., subcultural or age cohorts) may experience diverse order and pace of ToM development.

In light of the above, my findings suggest that more needs to be done to further explore ToM. Future investigations could examine cultural differences in ToM performance more comprehensively by unpacking the influence of collectivist and individualist cultural constructs on sociocultural and individual factors affecting ToM development. I would like to acknowledge that in the present study the cultural dimensions of individualism and collectivism were not measured and therefore this is an assumption albeit one based on solid evidence of socio-cultural factors. However, this is a fairly simple way to understand cultural variation (east versus west, individualism versus collectivism) that might not capture more complex cultural variation and, as such it has been criticized in regards to its usefulness or applicability (Kuntoro et al., 2017; Miller, 2002; Voronov & Singer, 2002). In fact, some authors have argued that individual differences or preferences may emerge when members of the same cultural group strongly reject the cultural ideas dominant in their broad cultural group, resulting in wide differences (Kuntoro et al., 2017; Leung & Cohen, 2011; Shweder, 1973). Hence, this broad cultural approach of collectivism and individualism continues to generate limited and inconsistent results, and clear answers will remain elusive until specific sociocultural factors and individual preferences are further investigated. Conducting more cross-cultural studies to explore specific sociocultural

factors related to collectivistic and individualistic frameworks will help to bridge the current gap in the literature.

Therefore, to bridge the current gap in the literature I consider that a systematic (or integrative) approach might benefit future research in ToM development. To date, as also found in this study, we know parenting is a major factor influencing ToM (Miller, 2016). However, parenting cognitions are affected by individual parenting preferences and attitudes, intergenerational effects, individual ideas about developmental timetables, learnings, perceptions and expectations (Bornstein, 2013; Goodnow, 1986; 2006; Kuntoro et al., 2017; Miller, 2016). We also know that variables unrelated to the collectivistic and individualistic sociocultural frameworks, like socioeconomic status, language, and number of siblings influence ToM performance (e.g., Devine & Hughes, 2018; Miller, 2016). Therefore, “it is not easy to determine which of the various aspects of the cultures investigated is primarily responsible” (Goodnow, 1986, p. 232). Thus, Galende, de Miguel, and Arranz (2014), and Mizokawa and Komiya (2014) encourage exploring the relationships between independent microsystems (also known as mesosystems) like family, neighbours, religious environments and schooling, which have rarely been studied in the field of ToM, ecosystems (e.g., family income, SES) and macrosystems (e.g., culture, language) and their influences on ToM development.

To sum up, although the results of this study may raise questions about how Anglo-Australian children in my sample interpreted the ToM scale, the observed similarities in ToM scale progression between my Anglo-Australian sample and other collectivistic samples (e.g., Iran, Hong Kong, China) are difficult to explain or justify. It is not possible to link these as rooted in cultural influences. However, my research demonstrates there is still more to discover in the field of ToM in relation to cultural variability. The richness of the unexpected outcomes in my Anglo-Australian sample may forge new directions in ToM

development research. On a personal note, I was unprepared for the results from my Anglo-Australian sample, and now more than before, I believe we are missing pieces of the puzzle. It is my hope that future research will further build the body of knowledge.

#### 6.4.1 Contributions of Research

The overall contribution of this study is in highlighting that FB alone does not capture ToM. Despite the fact that FB has been the definitive developmental marker for ToM over the past 30 years, our understanding in this study would have been limited by assessing only FB tasks. The richness gained from using a multi-faceted tool like the ToM scale and the inclusion of easy versus higher-order ToM constructs, helped me find that cultural influences contributed in some respects to ToM differences in children from individualistic and collectivistic cultural orientated countries and demonstrated the potential role of some mediating mechanisms.

This investigation supports growing evidence of the influence of sociocultural factors influencing ToM and opens new horizons for future research. It clearly supports that collectivistic and individualistic orientations in parenting involvement styles and children's norm awareness (traditional self-concept tendencies) are potential cultural transmission mechanisms in ToM, possibly more evident in children after some years of enculturation. The ways in which different parental systems influence ToM are a key but relatively unexplored factor in the literature on ToM. I believe this study will encourage researchers to invite parents to participate in future investigations, as they play an essential role as nurturers of ToM in different cultural settings. Additionally, broadening the methodological approach and scope of future research will help to consolidate our knowledge about the influences of parenting and cultural transmission in ToM. This will

not only advance the field of ToM, but also enrich research in other disciplines, such as education.

On basis of the work herein presented, I believe that the development of ToM can be regarded as fundamental, because its development has been associated with all of other areas of development such as language development, executive function abilities, and social skills. Accordingly, failure to master it has been observed to affect several areas of development (e.g., social development) and has been linked to developmental disorders such as Autism (Hughes & Leekam, 2004). Moreover, it is also important to understand how ToM is influenced by culture, where culture, creates a context for children to interactively learn the “accepted” social rules and cultural values with primary socialisation agents (i.e., enculturation). Therefore, I believe that ToM is an ability that deserves to continue receiving research attention, but the research community would benefit from a more integrative approach to advance our understanding of its complex development.

## References

Ahn, S., & Miller, S. A. (2012). Theory of Mind and Self-Concept: A Comparison of Korean and American Children. *Journal of Cross-Cultural Psychology*, 43(5), 671-686. doi: 10.1177/0022022112441247

Alampay, L. P. (2014). Parenting in the Philippines. In H. Selin (Ed.), *Parenting across cultures: Childrearing, motherhood and fatherhood in non-Western cultures* (Vol. 7., pp. 105-121). Dordrecht, The Netherlands: Springer.

Al-Hilawani, Y. A., Easterbrooks, S. R., & Marchant, G. J. (2002). Metacognitive ability from a theory-of-mind perspective: a cross-cultural study of students with and without hearing loss. *American annals of the deaf*, 147(4), 38-47. doi: 10.1353/aad.2012.0230

Arias Vega, L. (2009). *Teoría de la Mente y Emoción: predicción emocional según deseos y creencias*. (Doctoral dissertation, Universidad Nacional de Educación a Distancia). Retrieved from: <http://e-spacio.uned.es/fez/eserv/tesisuned:Psicologia-Larias/Documento.pdf>

Arranz, E., Artamendi, J., Olabarrieta, F., & Martín, J. (2002). Family context and theory of mind development. *Early Child Development and Care*, 172(1), 9-22. <https://doi.org/10.1080/03004430210880>

Asakura, N., & Inui, T. (2016). A Bayesian Framework for False Belief Reasoning in Children: A Rational Integration of Theory-Theory and Simulation Theory. *Frontiers in psychology*, 7. doi: 10.3389/fpsyg.2016.02019

Astington, J. W., & Barriault, T. (2001). Children's theory of mind: How young children come to understand that people have thoughts and feelings. *Infants & Young Children*, 13(3), 1-12. ISSN: 0896-3746.

Australian Bureau of Statistics. (2006). *Census 2006*. Retrieved from <http://abs.gov.au/websitedbs/censushome.nsf/home/historicaldata2006>.

Australian Bureau of Statistics. (2011). Census 2011. Retrieved from [http://www.censusdata.abs.gov.au/census\\_services/getproduct/census/2011/quickstat/5GPER](http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/5GPER).

Avis, J., & Harris, P.L. (1991). Belief-Desire Reasoning among Baka Children: Evidence for a Universal Conception of Mind. *Child Development*, 62(3), 460-467. doi: 10.2307/1131123

Banerjee, M. (1997). Hidden emotions: Preschoolers' knowledge of appearance-reality and emotion display rules. *Social cognition*, 15(2), 107-132. <https://doi.org/10.1521/soco.1997.15.2.107>

Baron-Cohen, S. (2001). Theory of mind in normal development and autism. *Prisme*, 34(1), 74-183. Retrieved from [https://www.researchgate.net/publication/238603356\\_Theory\\_of\\_Mind\\_in\\_normal\\_development\\_and\\_autism](https://www.researchgate.net/publication/238603356_Theory_of_Mind_in_normal_development_and_autism)

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of mind"? *Cognition*, 21(1), 37-46. doi: 10.1016/0010-0277(85)90022-8

Barrett, H. C., Broesch, T., Scott, R. M., He, Z., Baillargeon, R., Wu, D., ... & Laurence, S. (2013). Early false-belief understanding in traditional non-Western societies. *Proceedings of the Royal Society of London B: Biological Sciences*, 280 (1755), 20122654. doi: 10.1098/rspb.2012.2654

Bartsch, K., & Wellman, H. M. (1995). *Children talk about the mind*. Oxford University Press. ISBN 9781602566200.

Bensalah, L., Olivier, M., & Stefaniak, N. (2012). Acquisition of the concept of teaching and its relationship with theory of mind in French 3- to 6-year olds. *Teaching and Teacher Education*, 28(3), 303-311. doi: 10.1016/j.tate.2011.10.008

Bermúdez-Jaimes, M. E., & Sastre-Gómez, L. V. (2010). False Belief and Semantic Language Development in Children Aged 2 to 4 Years. *Universitas Psychologica*, 9(3), 849-861. ISSN 1657-9267. (In Spanish)

Bermúdez-Jaimes, M. E., & Gómez, V. S. (2015). Teorías infantiles de la mente y desarrollo semántico en niños de Buenos Aires y Bogotá. *Uaricha*, 12(27), 13-31. ISSN: 2007-7343. (In Spanish)

Bermúdez-Jaimes, M. E. (2010). Apego, comprensión y competencia social: medios digitales como forma de acceso al desarrollo social en la niñez. Bogotá: Universidad de los Andes. doi: 10.13140/RG.2.1.2482.7040. (In Spanish)

Bernal, R. (2014). Diagnóstico y recomendaciones para la atención de calidad a la primera infancia en Colombia [Diagnosis and recommendations for quality care during early childhood in Colombia]. *Cuadernos de Fedesarrollo*, 50(1). ISBN: 978-958-58393-1-1.

Berthoud-Papandropoulou, I., & Kilcher, H. (2003). Is a false belief statement a lie or a truthful statement? Judgments and explanations of children aged 3 to 8. *Developmental Science*, 6(2), 173-177. doi: 10.1111/1467-7687.00268

Blijd-Hoogewys, E. M. A., Van Geert, P. L. C., Serra, M., & Minderaa, R. B. (2008). Measuring Theory of Mind in Children: Psychometric Properties of the ToM Storybooks. *Journal of Autism and Developmental Disorders*, 38(10), 1907-1930. doi: 10.1007/s10803-008-0585-3

Bloomquist, M. L., August, G. J., Lee, S. S., Piehler, T. F., & Jensen, M. (2012). Parent participation within community center or in-home outreach delivery models of the early risers conduct problems prevention program. *Journal of Child and Family Studies*, 21(3), 368-383. doi: 10.1007/s10826-011-9488-6

Bornstein, M. H., & Cote, L. R. (2004). Mothers' parenting cognitions in cultures of origin, acculturating cultures, and cultures of destination. *Child Development*, 75(1), 221-235. doi: 10.1111/j.1467-8624.2004.00665.x

Bornstein, M. H. (2012). Cultural approaches to parenting. *Parenting*, 12(2-3), 212-221. doi: 10.1080/15295192.2012.683359



Bornstein, M. H. (2013). Parenting and child mental health: a cross-cultural perspective. *World Psychiatry*, 12(3), 258-265. doi: 10.1002/wps.20071.

Bozbiyık, B. (2016). The effect of maternal mental state talk on preschool children's theory of mind abilities (Doctoral dissertation, Bilkent University). Retrieved from: <http://repository.bilkent.edu.tr/handle/11693/29137>

Bradmetz, J., & Gauthier, C. (2005). The development of interindividual sharing of knowledge and beliefs in 5-to 9-year-old children. *The Journal of genetic psychology*, 166(1), 45-53.

Brislin, R. W. (1970). Back-Translation for Cross-Cultural Research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216. doi: 10.1177/135910457000100301

Brown, G. L., Mangelsdorf, S. C., Agathen, J. M., & Ho, M. H. (2008). Young children's psychological selves: Convergence with maternal reports of child personality. *Social Development*, 17(1), 161-182. doi: 10.1111/j.1467-9507.2007.00421.x

Brown, G. L., Mangelsdorf, S. C., Neff, C., Schoppe-Sullivan, S. J., & Frosch, C. A. (2009). Young children's self-concepts: Associations with child temperament, mothers' and fathers' parenting, and triadic family interaction. *Merrill-Palmer quarterly* (Wayne State University Press), 55(2), 184. Retrived from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4429799/pdf/nihms585485.pdf>

Calero, C. I., Salles, A., Semelman, M., & Sigman, M. (2013). Age and gender dependent development of Theory of Mind in 6- to 8-years old children. *Frontiers in Human Neuroscience*, 7, 281. <http://doi.org/10.3389/fnhum.2013.00281>

Callaghan, T., Rochat, P., Lillard, A., Claux, M. L., Odden, H., Itakura, S., & Singh, S. (2005). Synchrony in the Onset of Mental-State Reasoning: Evidence from Five Cultures. *Psychological Science*, 16(5), 378-384. doi: 10.1111/j.0956-7976.2005.01544.x

Caputi, M., Lecce, S., Pagnin, A., & Banerjee, R. (2012). Longitudinal effects of theory of mind on later peer relations: the role of prosocial behavior. *Developmental psychology*, 48(1), 257-270. doi: 10.1037/a0025402

Carlson, S. M., Koenig, M. A., & Harms, M. B. (2013). Theory of mind. *Cognitive Science*, 4(4), 391-402. doi: 10.1002/wcs.1232

Carlson, J., Kurato, Y., Ruiz, E., Ng, K. M., & Yang, J. (2004). A multicultural discussion about personality development. *The Family Journal*, 12(2), 111-121. doi: 10.1177/1066480703261932

Cauce, A. M., & Rodriguez, M. D. (2002). Latino families: Myths and realities. In J. M. Contreras., K. A. Kerns., & A. M. Neal-Barnett. (Eds.), *Latino children and families in the United States: Current research and future directions* (pp. 3-26). Westport, CT: Praeger Publishers.

Chasiotis, A., Bender, M., Kiessling, F., & Hofer, J. (2010). The emergence of the independent self: Autobiographical memory as a mediator of false belief understanding and sociocultural motive orientation in Cameroonian and German preschoolers. *Journal of Cross-Cultural Psychology*, 41(3), 368-390. doi: 10.1177/0022022110361705

Chasiotis, A., Kiessling, F., Hofer, J., & Campos, D. (2006). Theory of mind and inhibitory control in three cultures: Conflict inhibition predicts false belief understanding in Germany, Costa Rica and Cameroon. *International Journal of Behavioral Development*, 30(3), 249-260. doi: 10.1177/01650254060666759

Chen, M. J., & Lin, Z. X. (1994). Chinese preschoolers' difficulty with theory-of-mind tests. *Bulletin of the Hong Kong Psychological Society*, 32-33: 34-46.

Chenari, M. (2009). Hermeneutics and theory of mind. *Phenomenology and the Cognitive Sciences*, 8(1), 17-31. doi: 10.1007/s11097-008-9107-1

Cheung, H., Hsuan-Chih, C., Creed, N., Ng, L., Ping Wang, S., & Mo, L. (2004). Relative roles of general and complementation language in theory-of-mind development: evidence from

Cantonese and English. *Child development*, 75(4), 1155-1170. doi: 10.1111/j.1467-8624.2004.00731.x

Cheung, C. (2006). English- and Cantonese-speaking children's understanding of emotions and false belief. Unpublished master's thesis. University of Toronto, Canada

Cheung, H., Chen, H. C., & Yeung, W. (2009). Relations between mental verb and false belief understanding in Cantonese-speaking children. *Journal of Experimental Child Psychology*, 104(2), 141-155. <https://doi.org/10.1016/j.jecp.2009.05.004>

Cheung, H., Yan Mak, W., Luo, X., & Xiao, W. (2010). Sociolinguistic awareness and false belief in young Cantonese learners of English. *Journal of experimental child psychology*, 107(2), 188-194. <https://doi.org/10.1016/j.jecp.2010.05.001>

Cole, M., Hakkarainen, P., & Bredikyte, M. (2010). Culture and Early Childhood Learning. Encyclopedia on Early Childhood Development. Retrived from: <http://www.child-encyclopedia.com/sites/default/files/dossiers-complets/en/culture.pdf#page=18>

Collins, W. A., Harris, M. L., & Susman, A. (1995). Parenting during middle childhood. In M. H. Bornstein (Ed.), *Handbook of parenting*, Vol. 1. Children and parenting (pp. 65-89). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cross, S. E., Gore, J. S., & Morris, M. L. (2003). The relational-interdependent self-construal, self-concept consistency, and well-being. *Journal of personality and social psychology*, 85(5), 933. doi: 10.1037/t01038-000

Curenton, S. M. (2004). The association between narratives and theory of mind for low-income preschoolers. *Early Education and Development*, 15(2), 124-146. doi: 10.1207/s15566935eed1502\_1

de Castro Menezes, A. B., Da Silva Cruz, M. M., Veloso Correa, H. V., & Brito, R. (2014). Perception and development of Theory of Mind Reasoning in Asurini children, from Amazonia, Brazil. *Revista de Etologia*, 13(2), 30-37. ISSN 1517-2805

de la Cruz, M. T., Protacio, E., Balanon, F., Yacat, J., & Francisco, C. (2001). Trust and power: Child abuse in the eyes of the child and the parent. Manila, Philippines: Save the Children UK and the United Nations Children's Fund.

de Rosnay, M. (2017). Introduction: How we should conceptualise contextual influences on young children's theory of mind development? In Slaughter, V., & de Rosnay, M. (Eds.). (2017). Theory of mind development in context. London: Routledge, Taylor & Francis Group.

Deneault, J., & Ricard, M. (2013). Are emotion and mind understanding differently linked to young children's social adjustment? Relationships between behavioral consequences of emotions, false belief, and SCBE. *The Journal of genetic psychology*, 174(1), 88-116. <http://dx.doi.org/10.1080/00221325.2011.642028>

Dennett, D. C. (1978). Beliefs about beliefs [P&W, SR&B]. *Behavioral and Brain Sciences*, 1(04), 568-570. doi:10.1017/S0140525X00076664.

Devine, R. T., & Hughes, C. (2018). Family correlates of false belief understanding in early childhood: A meta-analysis. *Child development*, 89(3), 971-987. doi: 10.1111/cdev.12682

Devine, R. T., & Hughes, C. (2017). Let's Talk: Parents' Mental Talk (Not Mind-Mindedness or Mindreading Capacity) Predicts Children's False Belief Understanding. *Child Development*. 1-18. <https://doi.org/10.1111/cdev.12990>

Diges, M., Moreno, A., & Pérez-Mata, N. (2010). Efectos de sugestión en preescolares: capacidades mentalistas y diferencias individuales en sugestionabilidad. *Infancia y aprendizaje*, 33(2), 235-254. doi: 10.1174/021037010791114634

Duh, S., Paik, J. H., Miller, P. H., Gluck, S. C., Li, H., & Himelfarb, I. (2016). Theory of mind and executive function in Chinese preschool children. *Developmental psychology*, 52(4), 582 - 591. <http://dx.doi.org/10.1037/a0040068>

Dunn, J. (1995). Children as psychologists: The later correlates of individual differences in understanding of emotions and other minds. *Cognition & Emotion*, 9(2-3), 187-201. doi:10.1080/02699939508409008.

Dunn, J. (2000). Mind-reading, emotion understanding, and relationships. *International Journal of Behavioral Development*, 24(2), 142-144. doi: 10.1080/016502500383241.

Dunn, J., Brown, J. R., & Maguire, M. (1995). The development of children's moral sensibility: Individual differences and emotion understanding. *Developmental Psychology*, 31(4), 649-659. <http://dx.doi.org/10.1037/0012-1649.31.4.649>.

Dunn, J., Brown, J., & Beardsall, L. (1991). Family talk about feeling states and children's later understanding of others' emotions. *Developmental Psychology*, 27(3), 448-455. doi: 10.1037/0012-1649.27.3.448

Dunn, J., Brown, J., & Beardsall, L. (1991). Family talk about feeling states and children's later understanding of others' emotions. *Developmental Psychology*, 27(3), 448-455. <http://dx.doi.org/10.1037/0012-1649.27.3.448>

Dunn, J. (2000). Mind-reading, emotion understanding, and relationships. *International Journal of Behavioral Development*, 24(2), 142-144. doi: 10.1080/016502500383241.

Eder, R. A. (1990). Uncovering young children's psychological selves: individual and developmental differences. *Child Development*, 61(3), 849. doi: 10.2307/1130969

Ensor, R. & Hughes, C. (2008). Content or connectedness? Motherchild talk and early social understanding. *Child Development*, 79(1), 201-201. doi: 10.1111/j.1467-8624.2007.01120.x

Ereky-Stevens, K. (2008). Associations between mothers' sensitivity to their infants' internal states and children's later understanding of mind and emotion. *Infant and Child Development*, 17(5), 527-543. doi: 10.1002/icd.572

Esteban, M., Sidera, F., Serrano, J., Amadó, A., & Rostan, C. (2010). Improving social understanding of preschool children: Evaluation of a training program. *Electronic Journal of Research in Educational Psychology*, 8(21), 841-860

Farhadian, M., Gazanizad, N., & Shakerian, A. (2011). Theory of mind and siblings among preschool children. *Asian Social Science*, 7(3), 224 - 231. <http://dx.doi.org/10.5539/ass.v7n3p224>

Farrant, B. M., Devine, T. A., Maybery, M. T., & Fletcher, J. (2012). Empathy, perspective taking and prosocial behaviour: The importance of parenting practices. *Infant and Child Development*, 21(2), 175-188. doi: 10.1002/icd.740.

Farrant, B. M., Fletcher, J., & Maybery, M. T. (2006). Specific language impairment, theory of mind, and visual perspective taking: Evidence for simulation theory and the developmental role of language. *Child development*, 77(6), 1842-1853. Retrieved from <http://www.jstor.org/stable/4139278>

Farrant, B. M., Maybery, M. T., & Fletcher, J. (2012). Language, cognitive flexibility, and explicit false belief understanding: longitudinal analysis in typical development and specific language impairment. *Child Development*, 83(1), 223-235. doi: 10.1111/j.1467-8624.2011.01681.x

Farrar, M. J., Lee, H., Cho, Y. H., Tamargo, J., & Seung, H. (2013). Language and false belief in Korean-speaking and English-speaking children. *Cognitive Development*, 28(3), 209-221. doi:10.1016/j.cogdev.2013.01.010

Fernández, C. (2011). Mindful storytellers: Emerging pragmatics and theory of mind development. *First Language*, 33(1), 20-46. doi: 10.1177/0142723711422633

Ferres, L. A. (2003). Children's early theory of mind: exploring the development of the concept of desire in monolingual Spanish children. *Developmental Science*, 6(2), 159-165. doi: 10.1111/1467-7687.00266

Field, A. P. (2009). *Discovering statistics using IBM SPSS statistics* 4th edition. London: SAGE.

Flavell, J. H. (1999). Cognitive development: Children's knowledge about the mind. *Annual Review of Psychology*, 50, 21. doi: 10.1146/annurev.psych.50.1.21

Flavell, J. H. (2004). Theory-of-Mind Development: Retrospect and Prospect. *Merrill-Palmer Quarterly*, 50(3), 274-290. doi: 10.1353/mpq.2004.0018

Flavell, J. H., Flavell, E. R., Green, F. L., & Moses, L. J. (1990). Young children's understanding of fact beliefs versus value beliefs. *Child development*, 61(4), 915-928. doi: 10.2307/1130865

Flavell, J. H., Zhang, X. D., Zou, H., Dong, Q., & Qi, S. (1983). A comparison between the development of the appearance-reality distinction in the People's Republic of China and the United States. *Cognitive Psychology*, 15(4), 459-466. [https://doi.org/10.1016/0010-0285\(83\)90015-4](https://doi.org/10.1016/0010-0285(83)90015-4)

Flinn, M.V., Quinlan, R.J., Coe, K., & Ward, C.V. (2008). Evolution of the Human Family: Cooperative males, Long Social childhoods, Smart Mothers and Extended kin networks. In C. A. Salmon, & T. K. Shackelford, (Eds.). *Family relationships: An evolutionary perspective* (pp. 18-35). New York: Oxford University Press. doi: 10.1093/acprof:oso/9780195320510.001.0001

Flynn, E., Pine, K., & Lewis, C. (2006). The microgenetic method: Time for change. *The Psychologist*, 19(3), 152-155. Retrieved from <http://ezproxy.ecu.edu.au/login?url=https://search-proquest-com.ezproxy.ecu.edu.au/docview/211767527?accountid=10675>

Fonagy, P., Gergely, G., & Target, M. (2007). The parent–infant dyad and the construction of the subjective self. *Journal of Child Psychology and Psychiatry*, 48(3-4), 288-328. doi: 10.1111/j.1469-7610.2007.01727.x

Fonagy, P., Target, M., Steele, H., & Steele, M. (1998). Reflective-Functioning manual: Version 5 for application to adult attachment interviews. Unpublished manual. London: University College.

Franco, F., Fogel, A., Messinger, D. S., and Frazier, C. A. (1996). Cultural Differences in Physical Contact Between Hispanic and Anglo Mother–Infant Dyads Living in the United States.

*Early Development and Parenting*, 5(3),119–127. doi:10.1002/(SICI)1099-0917(199609)5:3<119::AID-EDP123>3.0.CO;2-Y

Fuligni, A. J. (2001). Family obligation and the academic motivation of adolescents from Asian, Latin American, and European backgrounds. *New Directions for Child and Adolescent Development*, 2001(94), 61-76. doi: 10.1002/cd.31

Galende, N., de Miguel, M. S., & Arranz, E. (2011). The Role of Physical Context, Verbal Skills, Non-parental Care, Social Support, and Type of Parental Discipline in the Development of ToM Capacity in Five-Year-Old Children. *Social Development*, 20(4), 845-861. doi: 10.1111/j.1467-9507.2011.00625.x

Galende, N., de Miguel, M. S., & Freijo, E. B. A. (2014). Family Context And Theory Of Mind Development In Early Childhood. *Contemporary Perspectives on Research in Theory of Mind in Early Childhood Education*, 365-379.

Gardner, D., Harris, P. L., Ohmoto, M., & Hamazaki, T. (1988). Japanese children's understanding of the distinction between real and apparent emotion. *International Journal of Behavioral Development*, 11(2), 203-218. <https://doi.org/10.1177/016502548801100204>

Ghrear, S. E., Birch, S. A., & Bernstein, D. M. (2016). Outcome knowledge and false belief. *Frontiers in psychology*, 7,118. doi: 10.3389/fpsyg.2016.00118

Gnepp, J. (1983). Children's social sensitivity: Inferring emotions from conflicting cues. *Developmental Psychology*, 19(6), 805. ISSN:1939-0599

Goetz, P. J. (2003). The effects of bilingualism on theory of mind development. *Bilingualism: Language and Cognition*, 6(1), 1-15. doi: 10.1017/S1366728903001007

Goodnow, J. J. (1986). Cultural conditions and individual behaviours: Conceptual and methodological links. *Australian journal of psychology*, 38(3), 231-244. doi: 10.1080/00049538608259011



Goodnow, J. J., Cashmore, J., Cotton, S., & Knight, R. (1984). Mothers' developmental Timetables In Two Cultural Groups. *International journal of Psychology*, 19(1-4), 193-205. doi: 10.1080/00207598408247526

Gopnik, A., & Slaughter, V. (1991). Young children's understanding of changes in their mental states. *Child development*, 62(1), 98-110. doi: 10.1111/j.1467-8624.1991.tb01517.x

Gosselin, P., Warren, M., & Diotte, M. (2002). Motivation to hide emotion and children's understanding of the distinction between real and apparent emotions. *The Journal of Genetic Psychology*, 163(4), 479-495. doi: 10.1080/00221320209598697

Gracia, E., & Musitu, G. (2003). Social isolation from communities and child maltreatment: a cross-cultural comparison. *Child abuse & neglect*, 27(2), 153-168. doi: 10.1016/S0145-2134(02)00538-0

Grazzani, I., & Ornaghi, V. (2012). How do use and comprehension of mental-state language relate to theory of mind in middle childhood?. *Cognitive Development*, 27(2), 99-111. <https://doi.org/10.1016/j.cogdev.2012.03.002>

Green, B. F. (1956). A method of scalogram analysis using summary statistics. *Psychometrika*, 21(1), 79-88.

Gross, D., & Harris, P. L. (1988). False beliefs about emotion: Children's understanding of misleading emotional displays. *International Journal of Behavioral Development*, 11(4), 475-488. doi: 10.1177/016502548801100406

Guiberson, M., & Rodriguez, B. L. (2013). False Belief Understanding in Language Impaired and Typically Developing Spanish-Speaking Preschoolers from Lower Income Backgrounds. *Early Education & Development*, 24(4), 517-535. doi: 10.1080/10409289.2012.693429

Hala, S., & Carpendale, J. (1997). All in the mind: Children's understanding of mental life. In S. Hala (Ed.), *The development of social cognition* (pp. 189–239). Hove: Psychology Press.

Harris, P. L., Donnelly, K., Guz, G. R., & Pitt-Watson, R. (1986). Children's understanding of the distinction between real and apparent emotion. *Child development*, 57(4), 895-909. doi: 10.2307/1130366

Hartup, W. W. (1992). Peer relations in early and middle childhood. In *Handbook of social development* (pp. 257-281). Springer, Boston, MA. [https://doi.org/10.1007/978-1-4899-0694-6\\_11](https://doi.org/10.1007/978-1-4899-0694-6_11)

Harwood, R., Leyendecker, B., Carlson, V., Asencio, M., & Miller, A. (2002). Parenting Among Latino Families in the U.S. In M.H. Bornstein (Ed.), *Handbook of parenting: Vol. 4. Social conditions and applied parenting* (2nd ed., pp. 21 – 47). Mahwah, New Jersey: Erlbaum.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication monographs*, 76(4), 408-420. doi: 10.1080/03637750903310360

Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-Based approach* (Methodology in the social sciences). New York, NY: Guilford Press.

Herz, L., & Gullone, E. (1999). The Relationship between Self-Esteem and Parenting Style: A Cross-Cultural Comparison of Australian and Vietnamese Australian Adolescents. *Journal of Cross-Cultural Psychology*, 30(6), 742-761. doi: 10.1177/0022022199030006005

Hiller, R. M., Weber, N., & Young, R. L. (2014). The validity and scalability of the Theory of Mind Scale with toddlers and preschoolers. *Psychological assessment*, 26(4), 1388- 1393. Retrieved from: <http://psycnet.apa.org/buy/2014-55468-001>

Hofstede, G. H. (2001). *Culture's consequences: International differences in work-related values*. Beverly Hills, Calif: Sage Publications.

Holloway, S. D. (1988). Concepts of ability and effort in Japan and the United States. *Review of Educational Research*, 58(3), 327–345. <https://doi.org/10.3102/00346543058003327>

Holmes, H. A., Black, C., & Miller, S. A. (1996). A cross-task comparison of false belief understanding in a Head Start population. *Journal of Experimental Child Psychology*, 63(2), 263-285. doi: 10.1006/jecp.1996.0050

Hölzel, M., & Keck, V. (2013). Of Biscuits, Soap and Stones. Representational Change and False Belief Understanding among Yupno Children in Papua New Guinea. In J. Wassmann, B. Träuble, & J. Funke, (Eds.). *Theory of mind in the Pacific: reasoning across cultures* (pp. 143-192). Heidelberg: Winter.

Hong, Y. Y., Morris, M. W., Chiu, C. Y., & Benet-Martínez, V. (2000). Multicultural minds: A dynamic constructivist approach to culture and cognition. *The American psychologist*, 55(7), 709-720. doi: 10.1037/0003-066X.55.7.709

Hsu, H. C., & Lavelli, M. (2005). Perceived and observed parenting behavior in American and Italian first-time mothers across the first 3 months. *Infant Behavior and Development*, 28(4), 503-518. <https://doi.org/10.1016/j.infbeh.2005.09.001>

Hughes, C., & Devine, R.T. (2017). Family influences on theory of mind: A review. In Slaughter, V., & de Rosnay, M. (Eds.). (2017). *Theory of mind development in context*. London: Routledge, Taylor & Francis Group.

Hughes, C., & Ensor, R. (2006). Behavioural problems in 2 year olds: links with individual differences in theory of mind, executive function and harsh parenting. *Journal of Child Psychology and Psychiatry*, 47(5), 488-497.

Hughes, C., & Leekam, S. (2004). What are the Links Between Theory of Mind and Social Relations? Review, Reflections and New Directions for Studies of Typical and Atypical Development. *Social Development*, 13(4), 590-619. doi: 10.1111/j.1467-9507.2004.00285.x

Hughes, C., Devine, R. T., Ensor, R., Koyasu, M., Mizokawa, A., & Lecce, S. (2014). Lost in Translation? Comparing British, Japanese, and Italian Children's Theory-of-Mind Performance. *Child Development Research*, (2014), 1–10. doi:10.1155/2014/893492

Hughes, C., Devine, R. T., & Wang, Z. (2017). Does Parental Mind-Mindedness Account for Cross-Cultural Differences in Preschoolers' Theory of Mind?. *Child Development*, 1 - 15. doi: 10.1111/cdev.12746

Jenkins, J. M., Turrell, S. L., Kogushi, Y., Lollis, S., & Ross, H. S. (2003). A longitudinal investigation of the dynamics of mental state talk in families. *Child development*, 74(3), 905-920. doi: 10.1111/1467-8624.00575

Jester, M., & Johnson, C. J. (2016). Differences in theory of mind and pretend play associations in children with and without specific language impairment. *Infant and Child Development*, 25(1), 24-42. doi: 10.1002/icd.1912

Joshi, M. S., & MacLean, M. (1994). Indian and English children's understanding of the distinction between real and apparent emotion. *Child development*, 65(5), 1372-1384. doi: 10.1111/j.1467-8624.1994.tb00822.x

Kallberg-Schroff, M., & Miller, J. M. (2014). Culture and the development of Theory of Mind. In Saracho, O. (Ed.). (2014). *Contemporary Perspectives on Research in Theory of Mind in Early Childhood Education*, Information Age Publishing, INC., 343-364.

Kamphaus, R. W., & Reynolds, C. R. (2006). *Parenting Relationship Questionnaire*. Minneapolis, MN: NCS Pearson.

Keçeli Kaysili, B., & Acarlar, F. (2011). The Development of Theory of Mind According to False Belief Performance of Children Ages 3 to 5. *Kuram ve Uygulamada Eğitim Bilimleri*, 11(4), 1821-1826.

Keller, H. (2017). Culture and development: a systematic relationship. *Perspectives on psychological science*, 12(5), 833-840. <https://doi.org/10.1177/174569161770409>

Keller, H. (2007). *Cultures of infancy. The foundation of developmental pathways*. Universität Osnabrück, Germany. Retrived from: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.903.2650&rep=rep1&type=pdf>

Keller, H., Lohaus, A., Kuensemüller, P., Abels, M., Yovsi, R., Voelker, S., ... & Mohite, P. (2004). The bio-culture of parenting: Evidence from five cultural communities. *Parenting: Science and Practice*, 4(1), 25-50. doi:10.1207/s15327922par0401\_2

Ketelaars, M. P., van Weerdenburg, M., Verhoeven, L., Cuperus, J. M., & Jansonius, K. (2010). Dynamics of the theory of mind construct: A developmental perspective. *European Journal of Developmental Psychology*, 7(1), 85-103. <https://doi.org/10.1080/17405620903482081>

Kim H. Y. (2013). Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics*, 38(1), 52-4. doi: 10.5395/rde.2013.38.1.52

Kliewer, W., Fearnow, M. D., & Miller, P. A. (1996). Coping socialization in middle childhood: Tests of maternal and paternal influences. *Child development*, 67(5), 2339-2357. doi: 10.1111/j.1467-8624.1996.tb01861.x

Knight, N. (2008). Yukatek Maya children's attributions of belief to natural and non-natural entities. *Journal of Cognition and Culture*, 8(3), 235-243. doi: 10.1163/156853708X358164

Knight, A. (2009). Individualism and Collectivism: What Does this Cultural Dimension Have to Do with Education?. Small Planet Studio. Retrived from: <http://smallplanetstudio.com/individualism-and-collectivism-what-does-this-cultural-dimension-have-to-do-with-education/>

Knight, N., Sousa, P., Barrett, J. L., & Atran, S. (2004). Children's attributions of beliefs to humans and God: Cross-cultural evidence. *Cognitive Science* ,28(1), 117-126. doi:10.1016/j.cogsci.2003.09.002

Kobayashi, C., Glover, G. H., & Temple, E. (2007). Cultural and linguistic effects on neural bases of 'Theory of Mind' in American and Japanese children. *Brain research*, 1164, 95-107. doi:10.1016/j.brainres.2007.06.022

Konner, M. (2010). *The evolution of childhood: Relationships, emotion, mind*. Harvard University Press.

Kuntoro, I. A., Peterson, C. C., & Slaughter, V. (2017). Culture, Parenting, and Children's Theory of Mind Development in Indonesia. *Journal of Cross-Cultural Psychology*, 48(9), 1389-1409. doi: 10.1177/0022022117725404

Kuntoro, I., Saraswati, L., Peterson, C., & Slaughter, V. (2013). Micro-cultural influences on theory of mind development: A comparative study of middle-class and pemulung children in Jakarta, Indonesia. *International Journal of Behavioral Development*, 37(3), 266-273. doi: 10.1177/0165025413478258

Lane, J. D., Wellman, H. M., Olson, S. L., Miller, A. L., Wang, L., & Tardif, T. (2013). Relations between temperament and theory of mind development in the United States and China: biological and behavioral correlates of preschoolers' false-belief understanding. *Developmental psychology*, 49(5), 825-836. doi: 10.1037/a0028825

Laya De Gracia, M. R. L., Peterson, C. C., & de Rosnay, M. (2016). A Cultural Conundrum: Delayed False-Belief Understanding in Filipino Children. *Journal of Cross-Cultural Psychology*, 47(7), 929-940. <https://doi.org/10.1177/0022022116655790>

Lecce, S., & Hughes, C. (2010). 'The Italian job?': comparing theory of mind performance in British and Italian children. *The British Journal Of Developmental Psychology*, 28(4), 747-766. doi:10.1348/026151009X479006

Lecce, S., Caputi, M., & Hughes, C. (2011). Does sensitivity to criticism mediate the relationship between theory of mind and academic achievement?. *Journal of Experimental Child Psychology*, 110(3), 313-331. <https://doi.org/10.1016/j.jecp.2011.04.011>

Lee, C. S., Anderson, J. R., Horowitz, J. L., & August, G. J. (2009). Family Income and Parenting: The Role of Parental Depression and Social Support. *Family Relations*, 58(4), 417-430. doi: 10.1111/j.1741-3729.2009.00563.x

Lee, K., Olson, D. R., & Torrance, N. (1999). Chinese children's understanding of false beliefs: the role of language. *Journal Of Child Language*, 26(1), 1-21. doi: 10.1017/S0305000998003626

Leung, A. K. Y., & Cohen, D. (2011). Within-and between-culture variation: individual differences and the cultural logics of honor, face, and dignity cultures. *Journal Of Personality And Social Psychology*, 100(3), 507-526. <http://dx.doi.org/10.1037/a0022151>

Lewis, C., Freeman, N. H., Kyriakidou, C., Maridaki-Kassotaki, K., & Berridge, D. M. (1996). Social influences on false belief access: Specific sibling influences or general apprenticeship?. *Child Development*, 67(6), 2930-2947. doi:10.1111/j.1467-8624.1996.tb01896.x

Lewis, C., Huang, Z., & Rooksby, M. (2006). Chinese preschoolers' false belief understanding: is social knowledge underpinned by parental styles, social interactions or executive functions?. *Psychologia*, 49(4), 252-266. doi:org/10.2117/psysoc.2006.252

Licata, M., Kristen, S., & Sodian, B. (2016). Mother–child interaction as a cradle of theory of mind: the role of maternal emotional availability. *Social Development*, 25(1), 139-156. doi: 10.1111/sode.12131

Lichtenberger, E. O., & Kaufman, A. S. (2004). Essentials of WPPSI-III assessment. New York: John Wiley & Sons Inc.

Lillard, A. (1998). Ethnopsychologies: cultural variations in theories of mind. *Psychological bulletin*, 123(1), 3-32. doi: 10.1037/0033-2909.123.1.3

Lim, A. K., Williams, J. M., Cebula, K. R., & Annaz, D. (2010). Cross-cultural variations in naïve psychology among 2-year-olds: a comparison of children in the United Kingdom and Singapore. *Journal of Cognition and Culture*, 10(3), 221-251. doi: 10.1163/156853710X531177

Liszkowski, U. (2013). Using Theory of Mind. *Child Development Perspectives*, 7(2), 104-109. doi: 10.1111/cdep.12025

Liu, Y., Wang, Y., Luo, R., & Su, Y. (2016). From the external to the internal: Behavior clarifications facilitate theory of mind (ToM) development in Chinese children. *International Journal of Behavioral Development*, 40(1), 21-30. <https://doi.org/10.1177/0165025414562484>

Liu, D., Wellman, H. M., Tardif, T., & Sabbagh, M. A. (2008). Theory of mind development in Chinese children: a meta-analysis of false-belief understanding across cultures and languages. *Developmental Psychology*, 44(2), 523-531. doi: 10.1037/0012-1649.44.2.523

Lockl, K., & Schneider, W. (2007). Knowledge about the mind: Links between theory of mind and later metamemory. *Child Development*, 78(1), 148-167. doi: 10.1111/j.1467-8624.2007.00990.x

Lu, H., Su, Y., & Wang, Q. (2008). Talking about others facilitates theory of mind in Chinese preschoolers. *Developmental Psychology*, 44(6), 1726 – 1736. doi: 10.1037/a0013074

Lucas, A. J., Lewis, C., Pala, F. C., Wong, K., & Berridge, D. (2013). Social-cognitive processes in preschoolers' selective trust: Three cultures compared. *Developmental Psychology*, 49(3), 579 - 590. doi: 10.1037/a0029864

Lucas, N., Nicholson, J. M., & Maguire, B. (2010). The Longitudinal Study of Australian Children Annual Statistical Report 2010. *Canberra: Australian Government, Australian Institute of Family Studies*, 2011. Retrieved from: <https://aifs.gov.au/publications/parenting-australian-families/6-conclusion>

Luis, T. M., Varela, R. E., & Moore, K. W. (2008). Parenting practices and childhood anxiety reporting in Mexican, Mexican American, and European American families. *Journal of Anxiety Disorders*, 22(6), 1011-1020. doi: 10.1016/j.janxdis.2007.11.001

Maldonado-González, L. C., & Navarro-Matajira, M.A. (2012). Estructura familiar y desarrollo de la comprensión social en niños de 3 a 5 años: un estudio empírico. Bogota: Pontificia Universidad Javeriana. Available from: <http://repository.javeriana.edu.co/handle/10554/7941>. (In Spanish)



Maridaki-Kassotaki, K., Lewis, C., & Freeman, N. H. (2003). Lexical choice can lead to problems: What false-belief tests tell us about Greek alternative verbs of agency. *Journal of Child Language*, 30(1), 145-164. doi: 10.1017/S0305000902005421

Markel, C., Major, A., & Pelletier, J. (2012). Relations among children's theory of mind, family factors, language development, and story comprehension in L1 and L2 preschoolers. *International Journal of Research Studies in Psychology*, 2(1), 1 -18. doi: 10.5861/ijrsp.2012.157

Markus, H. R., & Kitayama, S. (1991). Culture and the Self: Implications for Cognition, Emotion, and Motivation. *Psychological Review*, 98(2), 224-253. doi: 10.1037/0033-295X.98.2.224

Matsui, T., Yamamoto, T., & McCagg, P. (2006). On the role of language in children's early understanding of others as epistemic beings. *Cognitive Development*, 21(2), 158-173. <https://doi.org/10.1016/j.cogdev.2005.10.001>

Matsui, T., Rakoczy, H., Miura, Y., & Tomasello, M. (2009). Understanding of speaker certainty and false-belief reasoning: a comparison of Japanese and German preschoolers. *Developmental Science*, 12(4), 602-613. doi: 10.1111/j.1467-7687.2008.00812.x

Matsumoto, D., & Juang, L. (2016). *Culture and psychology* (Sixth edition. ed.). Boston, MA: Cengage Learning.

Mayer, A., & Träuble, B. (2013). Synchrony in the onset of mental state understanding across cultures? A study among children in Samoa. *International Journal of Behavioral Development*, 37(1), 21-28. doi: 10.1177/0165025412454030

Mayer, A., & Träuble, B. (2015). The Weird World of Cross-Cultural False Belief Research: A True and False Belief Study Among Samoan Children Based on Commands. *Journal of Cognition and Development*, 16(4), 650-665. doi:10.1080/15248372.2014.926273

Mayer, A. (2013). Opacity of other minds, empathy, and 'mindreading' in Samoa: a Samoan case study (Doctoral dissertation, Heidelberg University). Retrieved from: <http://archiv.ub.uni-heidelberg.de/volltextserver/15606/>

McClelland, D. C. (1987). Human motivation. Cambridge, UK: Cambridge University Press.

Meins, E., Fernyhough, C., Russell, J., & Clark-Carter, D. (1998). Security of attachment as a predictor of symbolic and mentalising abilities: A longitudinal study. *Social Development*, 7(1), 1-24. doi: 10.1111/1467-9507.00047

Miller, P. J., & Goodnow, J. J. (1995). Cultural practices: Toward an integration of culture and development. *New Directions for Child and Adolescent Development*, 1995(67), 5-16. doi: 10.1002/cd.23219956703

Miller, S. A. (2000). Children's understanding of preexisting differences in knowledge and belief. *Developmental Review*, 20(2), 227-282. doi:10.1006/drev.1999.0501

Miller, J. G. (2002). Bringing culture to basic psychological theory--beyond individualism and collectivism: comment on Oyserman et al. (2002). *Psychological Bulletin*, 128 (1), 97-109. doi: 10.1037//0033-2909.128.1.97

Miller, Scott A. (2012). Theory of Mind: Beyond the Preschool Years. Retrieved from <http://www.ebilib.com>

Miller, S. A. (2016). Parenting and Theory of Mind. Oxford University Press.

Misailidi, P. (2006). Young children's display rule knowledge: Understanding the distinction between apparent and real emotions and the motives underlying the use of display rules. *Social Behavior And Personality: An International Journal*, 34(10), 1285-1296. doi: <https://doi.org/10.2224/sbp.2006.34.10.1285>

Mizuno, A., & Koyasu, M. (2012). Children's understanding of hidden emotion, theory of mind, and peer relationship. *Proceedings of the Cognitive Science Society*, 34(34), 2025-2030.

Mizokawa, A., & Lecce, S. (2017). Sensitivity to criticism and theory of mind: A cross cultural study on Japanese and Italian children. *European Journal of Developmental Psychology*, 14(2), 159-171. <https://doi.org/10.1080/17405629.2016.1180970>

Mizokawa, A. (2015). Theory of mind and sensitivity to teacher and peer criticism among Japanese children. *Infant and Child Development*, 24(2), 189-205. doi: 10.1002/icd.1877

Mizokawa, A., & Komiya, A. (2014). Social ecology and theory of mind. *Psychologia*, 57(2), 133-151. <https://doi.org/10.2117/psysoc.2014.133>

Mizokawa, A., & Koyasu, M. (2007). Young children's understanding of another's apparent crying and its relationship to theory of mind. *Psychologia*, 50(4), 291-307. <https://doi.org/10.2117/psysoc.2007.291>

Moreno-Montoya, L., Botero-Suaza, J. C., Tamayo-Arboleda, A. M., & Chaves-Castaño, L. (2014). Dimensiones temperamentales y teoría de la mente en niños: un estudio correlacional. *Revista de Psicología Universidad de Antioquia*, 6(2), 95-110. ISSN: 22561102. (In Spanish)

Moses, L. J., & Flavell, J. H. (1990). Inferring false beliefs from actions and reactions. *Child Development*, 61(4), 929-945. doi: 10.1111/j.1467-8624.1990.tb02832.x

Mowder, B.A., Shamah, R., & Zeng, T. (2010). Current Measures for Assessing Parenting of Young Children. *Journal of Early Childhood and Infant Psychology*, 6, 99-115. Retrieved from <http://ezproxy.ecu.edu.au/login?url=https://search.proquest.com/docview/1197058879?accountid=10675>

Naito, M., & Koyama, K. (2006). The development of false-belief understanding in Japanese children: Delay and difference? *International Journal of Behavioral Development*, 30, 290-304. doi: 10.1177/0165025406063622

Naito, M., & Seki, Y. (2009). The relationship between second-order false belief and display rules reasoning: the integration of cognitive and affective social understanding. *Developmental Science*, 12(1), 150-164. doi: 10.1111/j.1467-7687.2008.00748.x

Naito, M. (2003). The relationship between theory of mind and episodic memory: Evidence for the development of auto-noetic consciousness. *Journal of Experimental Child Psychology*, 85(4), 312-336. doi:10.1016/S0022-0965(03)00075-4

Naito, M., Komatsu, S. I., & Fuke, T. (1994). Normal and autistic children's understanding of their own and others' false belief: A study from Japan. *British Journal of Developmental Psychology*, 12(3), 403-416. doi: 10.1111/j.2044-835X.1994.tb00643.x

Nawaz, S., Hanif, R., & Lewis, C. (2015). 'Theory of mind' development of Pakistani children: Do preschoolers acquire an understanding of desire, pretence and belief in a universal sequence?. *European Journal of Developmental Psychology*, 12(2), 177-188. <https://doi.org/10.1080/17405629.2014.973843>

Nawaz, S., & Lewis, C. (2017). Mother-child conversation and social understanding in Pakistan. *International Journal of Behavioral Development*, 1-10. doi: 10.1177/0165025417741365

Niles, F. S. (1998). Individualism-collectivism revisited. *Cross-Cultural Research*, 32(4), 315-341. doi: 10.1177/106939719803200401

O'Reilly, J., & Peterson, C. C. (2014a). Scaling Theory of Mind Development in Indigenous and Anglo-Australian Toddlers and Older Children. *Journal of Cross-Cultural Psychology*, 45(9), 1489-1501. doi: 10.1177/0022022114542285

O'Reilly, J., & Peterson, C. C. (2014b). Theory of mind at home: linking authoritative and authoritarian parenting styles to children's social understanding. *Early Child Development And Care*, 184(12), 1934-1947. doi:10.1080/03004430.2014.894034

Oades-Sese, G. V., & Li, Y. (2011). Attachment relationships as predictors of language skills for at-risk bilingual preschool children. *Psychology In The Schools*, 48(7), 707-722. doi: 10.1002/pits.20583.

Oberle, E. (2009). The development of theory of mind reasoning in Micronesian children. *Journal of Cognition and Culture*, 9(1), 39-56. doi: 10.1163/156853709X414629

Oh, S., & Lewis, C. (2008). Korean preschoolers' advanced inhibitory control and its relation to other executive skills and mental state understanding. *Child Development*, 79(1), 80-99. doi: 10.1111/j.1467-8624.2007.01112.x

Ohtsubo, Y. (2007). Japanese children's development of false belief understanding. *Psychological Reports*, 100(1), 87-97. doi: 10.2466/pr0.100.1.87-97

Ojalehto, B. L., & Medin, D. L. (2015). Perspectives on culture and concepts. *Annual Review Of Psychology*, 66, 249-275. doi: 10.1146/annurev-psych-010814-015120

Ornaghi, V., Brockmeier, J., & Gavazzi, I. G. (2011). The role of language games in children's understanding of mental states: A training study. *Journal of cognition and development*, 12(2), 239-259. doi: 10.1080/15248372.2011.563487

Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking Individualism and Collectivism: Evaluation of Theoretical Assumptions and Meta-Analyses. *Psychological Bulletin*, 128(1), 3-72. doi: 10.1037/0033-2909.128.1.3

Padilla-Mora, M., Cerdas González, A. I., Rodríguez Villagra, O., & Fornaguera Trías, J. (2009). Teoría de la mente en niños preescolares: diferencias entre sexos y capacidad de memoria de trabajo. *Revista Electrónica" Actualidades Investigativas en Educación"*, 9(2), 1 -21.

Pascual, B., Aguado, G., Sotillo, M., & Masdeu, J. C. (2008). Acquisition of mental state language in Spanish children: a longitudinal study of the relationship between the production of mental verbs and linguistic development. *Developmental Science*, 11(4), 454-466. doi: 10.1111/j.1467-7687.2008.00691.x

Pavarini, G., de Hollanda Souza, D., & Hawk, C. (2013). Parental Practices and Theory of Mind Development. *Journal of Child and Family Studies*, 22(6), 844-853. doi: 10.1007/s10826-012-9643-8

Perner, J., Leekam, S. R., & Wimmer, H. (1987). Three-year-olds' difficulty with false belief: The case for a conceptual deficit. *British Journal of Developmental Psychology*, 5(2), 125-137. doi: 10.1111/j.2044-835X.1987.tb01048.x

Peterson, C., & Slaughter, V. (2003). Opening windows into the mind: Mothers' preferences for mental state explanations and children's theory of mind. *Cognitive Development*, 18(3), 399-429. doi:10.1016/S0885-2014(03)00041-8.

Peterson, C., & Slaughter, V. (2017). Culture and the sequence of developmental milestones towards theory of mind mastery. In Slaughter, V., & de Rosnay, M. (Eds.). (2017). *Theory of mind development in context*. London: Routledge, Taylor & Francis Group.

Peterson, C. C., & Wellman, H. M. (2009). From fancy to reason: Scaling deaf and hearing children's understanding of theory of mind and pretence. *British Journal of Developmental Psychology*, 27(2), 297-310. doi: 10.1348/026151008X299728

Peterson, C. C., Wellman, H. M., & Slaughter, V. (2012). The mind behind the message: Advancing theory-of-mind scales for typically developing children, and those with deafness, autism, or Asperger syndrome. *Child Development*, 83(2), 469-485. doi: 10.1111/j.1467-8624.2011.01728.x

Peterson, C. C., Wellman, H. M., & Liu, D. (2005). Steps in Theory-of-Mind Development for Children with Deafness or Autism. *Child Development*, 76(2), 502-517. doi: 10.1111/j.1467-8624.2005.00859.x

Piekny, J., Grube, D., & Maehler, C. (2013). The relation between preschool children's false-belief understanding and domain-general experimentation skills. *Metacognition And Learning*, 8(2), 103-119. doi: 10.1007/s11409-013-9097-4

Pons, F., Harris, P. L., & de Rosnay, M. (2004). Emotion comprehension between 3 and 11 years: Developmental periods and hierarchical organization. *European Journal Of Developmental Psychology*, 1(2), 127-152. doi:10.1080/17405620344000022

Posada, G., Jacobs, A., Richmond, M. K., Carbonell, O. A., Alzate, G., Bustamante, M. R., & Quiceno, J. (2002). Maternal caregiving and infant security in two cultures. *Developmental Psychology*, 38(1), 67-78. doi: 10.1037/0012-1649.38.1.67

Posada, G., Jacobs, A., Richmond, M. K., Carbonell, O. A., Alzate, G., Bustamante, M. R., & Quiceno, J. (2002). Maternal caregiving and infant security in two cultures. *Developmental Psychology*, 38(1), 67-78. doi: 10.1037/0012-1649.38.1.67

Putzi, S. (Ed.). (2008). *A to Z World Lifecycles : 175 Countries: Birth, Childhood, Coming of Age, Dating and Courtship, Marriage, Family and Parenting, Work Life, Old Age and Death*. Petaluma, CA, USA: World Trade Press. Retrieved from <http://www.ebrary.com>

Qu, L., & Shen, P. (2013). Development of Theory of Mind in Preschoolers Who Grow up in Two Conflicting and Unbalanced Cultures. *Child Studies in Diverse Contexts* (3)2, 123-137. doi: 10.5723/csdc.2013.3.2.123

Qu, L., Shen, P., & Qianqian, F. (2013). Development of Theory of Mind in English-speaking Chinese Singaporean Preschoolers. *International Association for Cross-Cultural Psychology*, 85 - 94

Quintanilla, L., & Sarriá, E. (2003). Realismo, animismo y teoría de la mente: características culturales y universales del conocimiento mental. *Estudios de Psicología*, 24(3), 313-335. <http://dx.doi.org/10.1174/021093903770411201>

Ramirez, C., Zuluaga, M., & Perilla, C. (2010). *Perfil Migratorio de Colombia: OIM Colombia*. Bogota: Organización Internacional para las Migraciones. Retrieved from [http://publications.iom.int/bookstore/free/PERFIL\\_27ABRIL\\_IMPUESTAS.PDF](http://publications.iom.int/bookstore/free/PERFIL_27ABRIL_IMPUESTAS.PDF).

Rakoczy, H. (2010). Executive function and the development of belief–desire psychology. *Developmental Science*, 13(4), 648-661. doi: 10.1111/j.1467-7687.2009.00922.x

Rao, N., McHale, J. P., & Pearson, E. (2003). Links between socialization goals and child-rearing practices in Chinese and Indian mothers. *Infant and Child Development*, 12(5), 475-492. doi: 10.1002/icd.341

Resches, M., & Perez-Pereira, M. (2007). Referential communication abilities and theory of mind development in preschool children. *Journal of Child Language*, 34(1), 21-52. doi:10.1017/S0305000906007641

Rhodes, M., & Wellman, H. (2013). Constructing a new theory from old ideas and new evidence. *Cognitive Science*, 37(3), 592-604. doi: 10.1111/cogs.12031

Robberts, M. (2008). Theory of mind development: A comparison of children with autism spectrum disorders and typically developing South African children. Unpublished honours thesis, University of Cape Town, South Africa.

Rochat, P., Dias, M. D., Liping, G., Broesch, T., Passos-Ferreira, C., Winning, A., & Berg, B. (2009). Fairness in distributive justice by 3-and 5-year-olds across seven cultures. *Journal of Cross-Cultural Psychology*, 40(3), 416-442. <https://doi.org/10.1177/0022022109332844>

Rubin, K.H., Hemphill, S.A., Chen, X., Hastings, P., Sanson, A., Lo Coco, A., Cui, L. (2006). A cross-cultural study of behavioral inhibition in toddlers: East-West-North-South. *International Journal of Behavioral Development*, 30(3), 219-226. doi: 10.1177/0165025406066723

Rubinic, D., & Schwickrath, H. (2010). Test Review: Kamphaus, R. W., & Reynolds, C. R. (2006). Parenting Relationship Questionnaire. Minneapolis, MN: NCS Pearson. *Journal of Psychoeducational Assessment*, 28(3), 270-275. doi: 10.1177/0734282909346718

Rubio-Fernández, P., & Geurts, B. (2013). How to pass the false-belief task before your fourth birthday. *Psychological Science*, 24(1), 27-33. <https://doi.org/10.1177/0956797612447819>



Rudy, D., & Grusec, J. E. (2006). Authoritarian parenting in individualist and collectivist groups: Associations with maternal emotion and cognition and children's self-esteem. *Journal of Family Psychology*, 20(1), 68 - 78. doi: 10.1037/0893-3200.20.1.68

Ruffman, T., & Taumoepeau, M. (2017). Behaviour to beliefs. In Slaughter, V., & de Rosnay, M. (Eds.). (2017). *Theory of mind development in context*. London: Routledge, Taylor & Francis Group.

Ruffman, T., Perner, J., & Parkin, L. (1999). How parenting style affects false belief understanding. *Social Development*, 8(3), 395-411. doi: 10.1111/1467-9507.00103

Ruffman, T., Slade, L., & Crowe, E. (2002). The Relation between Children's and Mothers' Mental State Language and Theory-of-Mind Understanding. *Child Development*, 73(3), 734-751. doi: 10.1111/1467-8624.00435.

Sabbagh, M. A., & Seamans, E. L. (2008). Intergenerational transmission of theory-of-mind. *Developmental Science*, 11(3), 354-360. doi: 10.1111/j.1467-7687.2008.00680.x

Sabbagh, M. A., Xu, F., Carlson, S. M., Moses, L. J., & Lee, K. (2006). The development of executive functioning and theory of mind. A comparison of Chinese and U.S. preschoolers. *Psychological Science*, 17(1), 74-81. doi: 10.1111/j.1467-9280.2005.01667.x

Schwanenflugel, P. J., Fabricius, W. V., & Noyes, C. R. (1996). Developing organization of mental verbs: Evidence for the development of a constructivist theory of mind in middle childhood. *Cognitive Development*, 11(2), 265-294. [https://doi.org/10.1016/S0885-2014\(96\)90005-2](https://doi.org/10.1016/S0885-2014(96)90005-2)

Shahaeian, A. (2013). *Developing an understanding of mind: a view across cultures*. (Doctoral dissertation, University of Queensland Australia). Retrived from: <https://espace.library.uq.edu.au/view/UQ:314880>

Shahaeian, A. (2015). Sibling, family, and social influences on children's theory of mind understanding: New evidence from diverse intracultural samples. *Journal of Cross-Cultural Psychology*, 46(6), 805-820. doi: 10.1177/0022022115583897

Shahaeian, A., Henry, J. D., Razmjooee, M., Teymoori, A., & Wang, C. (2015). Towards a better understanding of the relationship between executive control and theory of mind: an intra-cultural comparison of three diverse samples. *Developmental Science*, 18(5), 671-685. doi: 10.1111/desc.12243

Shahaeian, A., Nielsen, M., Peterson, C. C., & Slaughter, V. (2014). Iranian mothers' disciplinary strategies and theory of mind in children: A focus on belief understanding. *Journal of Cross-Cultural Psychology*, 45(7), 1110-1123. doi: 10.1177/0022022114534772

Shahaeian, A., Nielsen, M., Peterson, C. C., Aboutalebi, M., & Slaughter, V. (2014b). Knowledge and belief understanding among Iranian and Australian preschool children. *Journal of Cross-Cultural Psychology*, 45(10), 1643-1654. doi: 10.1177/0022022114548484

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

Shahaeian, A., Nielsen, M., Peterson, C. C., & Slaughter, V. (2014a). Cultural and Family Influences on Children's Theory of Mind Development: A Comparison of Australian and Iranian School-Age Children. *Journal of Cross-Cultural Psychology*, 45(4), 555-568. doi: 10.1177/0022022113513921

Shatz, M., Diesendruck, G., Martinez-Beck, I., & Akar, D. (2003). The influence of language and socioeconomic status on children's understanding of false belief. *Developmental Psychology*, 39(4), 717-729. doi: 10.1037/0012-1649.39.4.717

Shatz, M., Wellman, H. M., & Silber, S. (1983). The acquisition of mental verbs: A systematic investigation of the first reference to mental state. *Cognition*, 14(3), 301-321. [https://doi.org/10.1016/0010-0277\(83\)90008-2](https://doi.org/10.1016/0010-0277(83)90008-2)

Shweder, R. (1973). The between and within of cross-cultural research. *Ethos*, 1(4), 531-545. doi: 10.1525/eth.1973.1.4.02a00150

Sidera, F., Amadó, A., & Serrat, E. (2013). Are you really happy? Children's understanding of real vs. pretend emotions. *Current Psychology*, 32(1), 18-31. doi:10.1007/s12144-012-9159-9

Sidera, F., Marti, E., & Gabucio, F. (2008). The distinction between real and apparent emotion in pretend play and deception situations. *Psicologia*, 22(2), 33-49. ISSN 0874-2049

Sidera, F., Serrat, E., Rostan, C., & Sanz-Torrent, M. (2011). Do children realize that pretend emotions might be unreal?. *The Journal Of Genetic Psychology*, 172(1), 40-55. <https://doi.org/10.1080/00221325.2010.504761>

Sidera, F., Serrat, E., Rostan, C., & Serrano, J. (2012). Children's attribution of beliefs about simulated emotions. *Studia Psychologica*, 54(1), 67- 80.

Slaughter, V., & Perez?Zapata, D. (2014). Cultural Variations in the Development of Mind Reading. *Child Development Perspectives*, 8(4), 237-241. doi: 10.1111/cdep.12091

Slaughter, V., Peterson, C. C., & Mackintosh, E. (2007). Mind what mother says: Narrative input and theory of mind in typical children and those on the autism spectrum. *Child Development*, 78(3), 839-858. doi: 10.1111/j.1467-8624.2007.01036.x

Szalay, L. B., Vasco, E. V., & Breña, M. N. (1982). A Colombian-US Communication Lexicon of Images, Meanings, Cultural Frames of Reference. Washington D.C: Institute of Comparative Social and Cultural Studies. Retrived from: <http://eric.ed.gov/?id=ED228111>

Tardif, T., & Wellman, H. M. (2000). Acquisition of mental state language in Mandarin- and Cantonese-speaking children. *Developmental Psychology*, 36(1), 25-43. doi: 10.1037//0012-1649.36.1.25

Tardif, T., Wing-Chee So, C., & Kaciroti, N. (2007). Language and false belief: evidence for general, not specific, effects in cantonese-speaking preschoolers. *Developmental Psychology*, 43(2), 318. <http://dx.doi.org/10.1037/0012-1649.43.2.318>

Tardif, T., Wellman, H. M., & Cheung, K. (2004). False belief understanding in Cantonese-speaking children. *Journal Of Child Language*, 31(4), 779-800. doi: 10.1017/S0305000904006580

Tardif, T., Wellman, H. M., Fung, K. Y. F., Liu, D., & Fang, F. (2005). Preschoolers' understanding of knowing-that and knowing-how in the United States and Hong Kong. *Developmental psychology*, 41(3), 562 - 573. <http://dx.doi.org/10.1037/0012-1649.41.3.562>

Taumoepeau, M. (2015). From talk to thought: strength of ethnic identity and caregiver mental state talk predict social understanding in preschoolers. *Journal of Cross-Cultural Psychology*, 46(9), 1169-1190. <https://doi.org/10.1177/0022022115604393>

Tenenbaum, H. R., Visscher, P., Pons, F., & Harris, P. L. (2004). Emotional understanding in Quechua children from an agro-pastoralist village. *International Journal of Behavioral Development*, 28(5), 471-478. doi: 10.1080/01650250444000225

Tietz, A., & Völkel, S. (2013). Theory of mind in Tonga: The onset of representational change and false belief understanding in Tongan children. In J. Wassmann, B. Träuble, & J. Funke, (Eds.). *Theory of mind in the Pacific: reasoning across cultures* (pp. 39-78). Heidelberg: Winter.

Trommsdorff, G., & Kornadt, H. J. (2003). Parent-child relations in cross-cultural perspective. In L. Kuczynski (Ed.). *Handbook of dynamics in parent-child relations* (pp. 271-306). London: Sage.

Tsuji, H. (2011). Development of mentalizing ability in Japanese children. *Psychological Studies*, 56(2), 167-175. doi: 10.1007/s12646-011-0083-0

Villanueva Badenes, L. (1998). El rechazo entre iguales y la comprensión infantil de los estados mentales. (Doctoral dissertation, Universitat Jaume I ). Retrived from: <http://www.tdx.cat/handle/10803/10517>

Vinden, P. G. (1999). Children's understanding of mind and emotion: A multi-culture study. *Cognition & Emotion*, 13(1), 19-48. doi: 10.1080/026999399379357

Vinden, P. G. (2002). Understanding minds and evidence for belief: A study of Mofu children in Cameroon. *International Journal of Behavioral Development*, 26(5), 445-452. doi: 10.1080/01650250143000391

Vinden, P. G. (1996). Junín Quechua children's understanding of mind. *Child Development*, 67(4), 1707-1716. doi: 10.1111/j.1467-8624.1996.tb01822.x

Vinden, P. G. (2001). Parenting attitudes and children's understanding of mind. *Cognitive Development*, 16(3), 793-809. doi: 10.1016/S0885-2014(01)00059-4

Von Poser, A., & Ubl, B. (2013). Investigating the understanding of false belief among the Bosmun of northeast Papua New Guinea. In J. Wassmann, B. Träuble, & J. Funke, (Eds.). *Theory of mind in the Pacific: reasoning across cultures* (pp. 193-232). Heidelberg: Winter.

Voronov, M., & Singer, J. A. (2002). The myth of individualism-collectivism: A critical review. *The Journal of Social Psychology*, 142(4), 461-480. <https://doi.org/10.1080/00224540209603912>

Wahi, S., & Johri, R. (1994). Questioning a universal theory of mind: Mental-real distinctions made by Indian children. *The Journal of Genetic Psychology*, 155(4), 503-510. doi:10.1080/00221325.1994.9914798

Walker-Schwab, K. W. (2013). Individualism-collectivism and power distance cultural dimensions: how each influences parental disciplinary methods. *Journal of International Education and Leadership* 3(3). Retrived from <http://www.jielusa.org/wp-content/uploads/2012/01/CultDiscMethPubVersion.pdf>

Wang, Z. (2010). Mindful learning: Children's developing theory of mind and their understanding of the concept of learning (Doctoral dissertation, University of Pennsylvania). Retrieved from:

<https://search.proquest.com/openview/173327e1b7848a073b03bf759edcb92b/1?pq-origsite=gscholar&cbl=18750&diss=y>

Wang, Z., Devine, R. T., Wong, K. K., & Hughes, C. (2016). Theory of mind and executive function during middle childhood across cultures. *Journal of Experimental Child Psychology*, 149, 6-22. <https://doi.org/10.1016/j.jecp.2015.09.028>

Wang, B., Hadi, N. S. A., & Low, J. (2015). Limits on efficient human mindreading: Convergence across Chinese adults and Semai children. *British Journal of Psychology*, 106(4), 724-740. doi: 10.1111/bjop.12121

Wang, B., Low, J., Jing, Z., & Qinghua, Q. (2012). Chinese preschoolers' implicit and explicit false-belief understanding. *British Journal of Developmental Psychology*, 30(1), 123-140. doi: 10.1111/j.2044-835X.2011.02052.x

Wang, Y., & Su, Y. (2009). False belief understanding: Children catch it from classmates of different ages. *International Journal of Behavioral Development*, 33(4), 331-336. <https://doi.org/10.1177/0165025409104525>

Wang, Z., Wang, X. C., & Chui, W. Y. (2017). Young Children's Understanding of Teaching and Learning and Their Theory of Mind Development: A Causal Analysis from a Cross-Cultural Perspective. *Frontiers in Psychology*, 8 (725), 1-10. doi: 10.3389/fpsyg.2017.00725

Wang, L., Zhu, L., & Wang, Z. (2017). Parental mind-mindedness but not false belief understanding predicts Hong Kong children's lie-telling behavior in a temptation resistance task. *Journal of experimental child psychology*, 162, 89-100. <http://dx.doi.org/10.1016/j.jecp.2017.04.023>

Wechsler, D. (2002). Wechsler Preschool and Primary Scale of Intelligence Third Edition (WPPSI III) Technical and Interpretative Manual. Australia: Pearson.

Welch-Ross, M. K., Fasig, L. G., & Farrar, M. J. (1999). Predictors of preschoolers' self-knowledge: Reference to emotion and mental states in mother-child conversation about past events. *Cognitive Development*, 14(3), 401-422. [https://doi.org/10.1016/S0885-2014\(99\)00012-X](https://doi.org/10.1016/S0885-2014(99)00012-X)

Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development*, 75(2), 523-541. doi: 10.1111/j.1467-8624.2004.00691.x

Wellman, H. M., & Woolley, J. D. (1990). From simple desires to ordinary beliefs: The early development of everyday psychology. *Cognition*, 35(3), 245-275.

Wellman, H. M. (2012). Theory of mind: Better methods, clearer findings, more development. *European Journal of Developmental Psychology*, 9(3), 313-330. doi:10.1080/17405629.2012.680297

Wellman, H. M., Fang, F., & Peterson, C. C. (2011). Sequential progressions in a theory-of-mind scale: Longitudinal perspectives. *Child Development*, 82(3), 780-792. doi: 10.1111/j.1467-8624.2011.01583.x

Wellman, H. M., Fang, F., Liu, D., Zhu, L., & Liu, G. (2006). Scaling of theory-of-mind understandings in Chinese children. *Psychological Science*, 17(12), 1075-1081. doi: 10.1111/j.1467-9280.2006.01830.x

Wellman, H. M. (2012). Theory of mind: Better methods, clearer findings, more development. *European Journal of Developmental Psychology*, 9(3), 313-330. doi:10.1080/17405629.2012.680297

Wellman, H. M. (2017). Learning a theory of mind. In Slaughter, V., & de Rosnay, M. (Eds.). (2017). *Theory of mind development in context*. London: Routledge, Taylor & Francis Group.

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-Analysis of theory-of-mind development: The truth about false belief. *Child Development*, 72(3), 655-684. doi: 10.1111/1467-8624.00304

Wellman, H. M., Fang, F., & Peterson, C. C. (2011). Sequential progressions in a theory-of-mind scale: Longitudinal perspectives. *Child Development*, 82(3), 780-792. doi: 10.1111/j.1467-8624.2011.01583.x

Wellman, H. M., Fang, F., Liu, D., Zhu, L., & Liu, G. (2006). Scaling of theory-of-mind understandings in Chinese children. *Psychological Science*, 17(12), 1075-1081. doi: 10.1111/j.1467-9280.2006.01830.x

Wellman, H. M., Phillips, A. T., & Rodriguez, T. (2000). Young children's understanding of perception, desire, and emotion. *Child Development*, 71(4), 895-912. doi: 10.1111/1467-8624.00198.

Westra, E., & Carruthers, P. (2017). Pragmatic development explains the theory-of-mind scale. *Cognition*, 158, 165-176. <https://doi.org/10.1016/j.cognition.2016.10.021>

White, B. W., & Saltz, E. (1974). Measurement of reproducibility. *Scaling: A sourcebook for behavioral scientists*, 172-196.

Wiggins, T. L., Sofronoff, K., & Sanders, M. R. (2009). Pathways Triple P-positive parenting program: effects on parent-child relationships and child behavior problems. *Family Process*, 48(4), 517-530. doi: 10.1111/j.1545-5300.2009.01299.x

Williams, P., Williams, A., Lopez, M., & Tayko, N. (2000). Mothers' developmental expectations for young children in the Philippines. *International Journal of Nursing Studies*, 37, 291-301.

Wimmer, H., & Harlt, M. (1991). Against the Cartesian view on mind: Young children's difficulty with own false beliefs. *British Journal of Developmental Psychology*, 9(1), 125-138. doi: 10.1111/j.2044-835X.1991.tb00866.x

Wise, K. J. (2012). Gender differences in the parent/child relationship. Unpublished Doctor of Philosophy thesis, Winder University, United States.



Wu, Z., & Su, Y. (2014). How do preschoolers' sharing behaviors relate to their theory of mind understanding?. *Journal of Experimental Child Psychology*, 120, 73-86. doi:10.1016/j.jecp.2013.11.007

Wu, X., Wang, Y., & Liu, A. (2017). Maternal emotional expressiveness affects preschool children's development of knowledge of display rules. *Social Behavior and Personality: an international journal*, 45(1), 93-103. doi: <https://doi.org/10.2224/sbp.5783>

Yagmurlu, B., & Sanson, A. (2009). Acculturation and parenting among Turkish mothers in Australia. *Journal of Cross-Cultural Psychology*, 40(3), 361-380. doi: 10.1177/0022022109332671

Yang, F. (2014). Children's understanding of internal conflicting desires: Developmental changes, cultural influences and links with socioemotional development. (Doctoral dissertation, University of Pennsylvania). Retrived from: <https://search.proquest.com/openview/79d34545e3fab48a748ec6f14f859b39/1?pq-origsite=gscholar&cbl=18750&diss=y>

Yazdi, A. A., German, T. P., Defeyter, M. A., & Siegal, M. (2006). Competence and performance in belief-desire reasoning across two cultures: The truth, the whole truth and nothing but the truth about false belief. *Cognition*, 100(2), 343-368. doi: 10.1016/j.cognition.2005.05.004

Zhang, T., Shao, Z., & Zhang, Y. (2016). Developmental steps in theory of mind of typical Chinese children and Chinese children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 23, 210-220. <https://doi.org/10.1016/j.rasd.2015.10.005>

Ziv, M., & Frye, D. (2004). Children's understanding of teaching: The role of knowledge and belief. *Cognitive Development*, 19(4), 457-477. <https://doi.org/10.1016/j.cogdev.2004.09.002>

# Appendices

## Appendix 1. Socio-demographic Survey

**SOCIO-DEMOGRAPHIC DATA SURVEY**

This survey is for the purpose of identifying relevant background information related to the parents/main carer.  
Please remember that this information will remain confidential.

---

**Part I: Mother's Information**

---

**A. Information about you**

1. Country of origin (The country you come from)

2. Did you come from this country to Australia?  
Yes  No

If not, where from?

3. For how many years did you live in that country?

4. What is the main language you speak at home?

5. With which cultural or ethnic group do you identify?

Latin American   
(Origin: from a South American country)

Anglo - Australian   
(Anglo: from an English speaking country)

6. If you migrated to Australia please answer the following questions. If not please continue with question number 10

7. How long ago did you migrate to Australia?  
(Approximate number of years)

8. Do you have contact with your family overseas?  
YES  NO

9. How often do you visit South America?  
\_\_\_\_\_ Per year or every \_\_\_\_\_

Or I haven't visited South America since setting  
In Australia?

**B. Other information**

10. Age

11. Marital Status:

Married  Single   
De facto  Widow   
Divorced

12. Number of children

13. Highest education level achieved

No education  Primary Education   
Year 10  High school (year 12)   
Vocational qualification  Bachelor degree   
(E.g. TAFE certificate)

Master's degree  Doctorate degree

14. Employment Type

Part time  Full time   
Casual  Unemployed

Demographic survey based on Chasiotis, Kiessling, and Campos  
(2006); Census ABS (2011)

### SOCIO-DEMOGRAPHIC DATA SURVEY

This survey is for the purpose of identifying relevant background information related to the parents/main carer.  
Please remember that this information will remain confidential.

15. Average Family and Household Income per week  
between: *(Based on the ABS 2011 Census, Family and  
Household Income Ranges)*

- |                 |                          |                 |                          |
|-----------------|--------------------------|-----------------|--------------------------|
| \$1-\$199       | <input type="checkbox"/> | \$200-\$299     | <input type="checkbox"/> |
| \$300-\$399     | <input type="checkbox"/> | \$400-\$599     | <input type="checkbox"/> |
| \$600-\$799     | <input type="checkbox"/> | \$800-\$999     | <input type="checkbox"/> |
| \$1,000-\$1,249 | <input type="checkbox"/> | \$1,250-\$1,499 | <input type="checkbox"/> |
| \$1,500-\$1,999 | <input type="checkbox"/> | \$2,000-\$2,499 | <input type="checkbox"/> |
| \$2,500-\$2,999 | <input type="checkbox"/> | \$3,000-\$3,499 | <input type="checkbox"/> |
| \$3,500-\$3,999 | <input type="checkbox"/> | \$4,000-\$4,999 | <input type="checkbox"/> |
| \$5,000 or more | <input type="checkbox"/> |                 |                          |

### C. Background Information

#### i. Information about your parents

16. Your father's country of birth

17. Your mother's country of birth

Demographic survey based on Chasiotis, Kiessling, and Campos  
(2006); Census ABS (2011)

## SOCIO-DEMOGRAPHIC DATA SURVEY

This survey is for the purpose of identifying relevant background information related to the parents/main carer.  
Please remember that this information will remain confidential.

### Part II: Father's Data

#### A. Information about you

18. Country of origin (The country you come from)

19. Did you come from this country to Australia?

Yes  No

If not, where from?

20. For how many years did you live in that country?

21. What is the main language you speak at home?

22. With which cultural or ethnic group do you identify?

Latin American  
(Origin: from a South American country)

Anglo - Australian  
(Origin: from an English speaking country)

23. If you migrated to Australia please answer the following questions. If not please continue with question number 27

24. How long ago did you migrate to Australia?  
(Approximate number of years)

25. Do you have contact with your family overseas?

YES  NO

26. How often do you visit South America?  
\_\_\_\_\_ Per year or every \_\_\_\_\_

Or I haven't visited South America since setting  
In Australia?

#### B. Other information

27. Age

28. Marital Status:

Married  Single

De facto  Widower

Divorced

29. Number of children

30. Highest education level achieved

No education  Primary Education

Year 10  High school (year 12)

Vocational qualification  
(E.g. TAFE certificate)  Bachelor degree

Master's degree  Doctorate degree

31. Employment Type

Part time  Full time

Casual

Demographic survey based on Chasiotis, Kiessling, and Campos  
(2006); Census ABS (2011)

### SOCIO-DEMOGRAPHIC DATA SURVEY

This survey is for the purpose of identifying relevant background information related to the parents/main carer.  
Please remember that this information will remain confidential.

32. Average Family and Household Income per week between: *(Based on the ABS 2011 Census, Family and Household Income Ranges)*

Note: Do not need to answer this question if already provided an answered in question 15.

- |                 |                          |                 |                          |
|-----------------|--------------------------|-----------------|--------------------------|
| \$1-\$199       | <input type="checkbox"/> | \$200-\$299     | <input type="checkbox"/> |
| \$300-\$399     | <input type="checkbox"/> | \$400-\$599     | <input type="checkbox"/> |
| \$600-\$799     | <input type="checkbox"/> | \$800-\$999     | <input type="checkbox"/> |
| \$1,000-\$1,249 | <input type="checkbox"/> | \$1,250-\$1,499 | <input type="checkbox"/> |
| \$1,500-\$1,999 | <input type="checkbox"/> | \$2,000-\$2,499 | <input type="checkbox"/> |
| \$2,500-\$2,999 | <input type="checkbox"/> | \$3,000-\$3,499 | <input type="checkbox"/> |
| \$3,500-\$3,999 | <input type="checkbox"/> | \$4,000-\$4,999 | <input type="checkbox"/> |
| \$5,000 or more | <input type="checkbox"/> |                 |                          |

### C. Background Information

#### i. Information about your parents

33. Your father's country of birth

34. Your mother's country of birth

### SOCIO-DEMOGRAPHIC DATA SURVEY

This survey is for the purpose of identifying relevant background information related to the parents/main carer.  
Please remember that this information will remain confidential.

---

#### Part III: Child 's Data

---

##### A. Information about your child

35. Country of birth

35. If not Australia, for how many years does your child lived in Australia?

36. Has your child been to South America? If yes, how many times?

Yes  No  explain

##### B. Other information

37. Date of birth

38. Birth Order: (E.g. first, second, third...)

Only child  or

39. Number of siblings

40. First language spoken at home

##### C. Schooling Information

41. School grade

##### D. Health Information

42. Has your child been diagnosed with learning or cognitive problems? (e.g., Autism, Asperger, Dyslexia)

Yes  No

If yes, please explain


43. Have you or the teachers identified any socialization difficulties at school with your child?

Yes  No

If yes, please explain


Demographic survey based on Chasiotis, Kiessling, and Campos (2006); Census ABS (2011)

Appendix 2. Table of Correlation Coefficients between CSVQ Dimensions –Social Potency and Achievement- and ToM per Age Groups

<b>Age Group</b>		Social Potency	Achievement
<b>4 (n = 47)</b>	ToM	-.201	-.119
<b>5 (n = 57)</b>	ToM	-.095	-.106
<b>6 (n = 53)</b>	ToM	-.065	-.043
<b>Total Sample (n = 157)</b>	ToM	-.225**	-.085

(\*p < 0.05, \*\*p < .001).



### Theory of Mind and Cultural Influence

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CRICOS 00279B

I, \_\_\_\_\_, hereby state that I accept my child's and my own participation in this study, being aware that:

- I have been provided with a copy of the Information Letter, explaining the research study, which I have read and understand
- I have been given the opportunity to ask questions regarding the research and any questions have been answered to my satisfaction
- I am aware that I can contact the researcher and/or her supervisor(s) at any time if required
- I understand that participation in the research project will involve completion of:
  - Socio-demographic Survey
  - Parent-child questionnaire
- I understand that the participation of my child in the research project will involve:
  - Verbal skills evaluation
  - Child self-concept questionnaire completion
  - Theory of mind scale completion
- I understand that only children who meet the criteria for the study will be included and therefore, I understand that I will be informed of this after the socio-demographic survey and verbal skill test are completed
- I understand that the information will be kept confidential.
- I understand that the information provided will only be used for the purposes of this research project, and in case of a publication no identifying information will be disclosed.
- I understand that I will be given the opportunity to be provided with a brief report that will summarize an overview of the individual results and that this will only be provided upon request by contacting the researcher via email.



- I understand that any reports and summaries of the results of the study will be available after completing the study in the first term of 2016.
- I understand that my child and I are free to withdraw from further participation at any time, without any penalty.
- I understand that if my child refuses to participate, his or her decision will be respected even after having my previous authorization to participate.
- I give permission for the contribution that my child and I make to this research to be published in a journal articles or conferences, provided that my child, the school and I are not identified in any way.
- I freely agree to participate in this research project

**Consent for my child to participate in the research project:** I am willing for my child to become involved in the project, as described.

Name of Child (printed): \_\_\_\_\_

Name of Parent/Carer (printed): \_\_\_\_\_

Signature of Parent: \_\_\_\_\_

Date: / /

**Consent to participate in the research project:** I am willing to become involved in the research project, as described.

Name of Parent/Carer (printed): \_\_\_\_\_

Signature of Parent: \_\_\_\_\_

Date: / /

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## Theory of Mind and Cultural Influence

- I know I have a choice whether or not I want to help in this project
- I know that I can take a brake if I need to
- I know that I can stop whenever I want
- I know that I can stop helping in this project whenever I want
- I know that I will be told some stories using puppets and pictures and I will answer some questions
- I know that I need to write down my name and draw a circle around the word YES in on this page before I can help with the project.

**YES**

**NO**

I would like to help with  
the project

I do not want to help  
with the project

Name of child:

Today's Date: / /

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## Appendix 4. Normality Check: Skewness, Kurtosis and Z-Scores

Due to the likelihood of Skewness and Kurtosis being different from 0, Field (2013) suggests calculating Z-scores to determine if the data is significantly different from 0 or not (or likely to be normal), by dividing the Skewness and Kurtosis scores by its standard (Std.) error. According to Kim (2013) for medium-sized samples ( $50 < n < 300$ ) if the result is greater than 3.29, it suggests that the data are not normal.

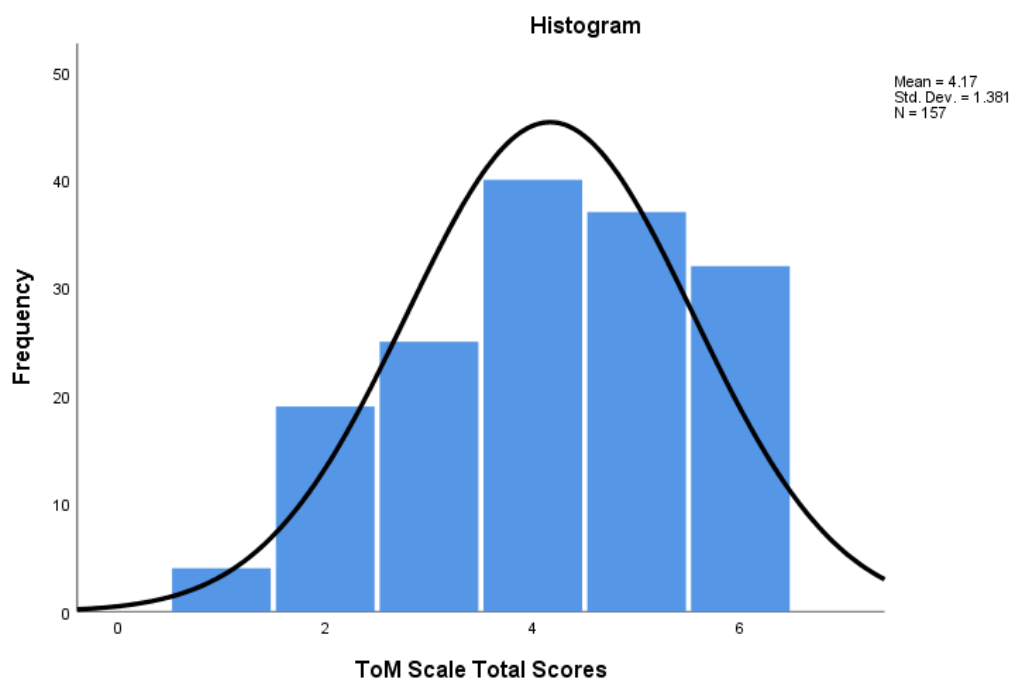
Below, I will present the Skewness and Kurtosis scores, the calculated Z-scores as well as histograms for each of the variables used in the inferential analyses for the total sample (N = 157).

### 1. ToM Scale Total Scores

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		<u>Z-Scores</u>
Skewness	-.346	-1.78
Std. Error of Skewness	.194	
Kurtosis	-.779	-2.02
Std. Error of Kurtosis	.385	

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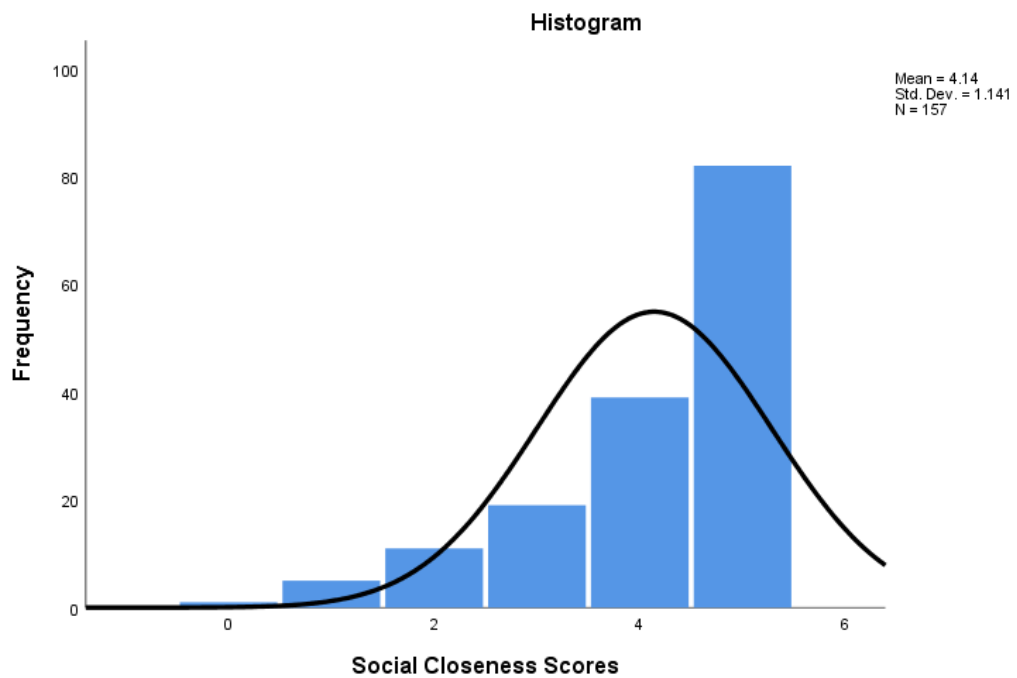


## 2. Social Closeness CSVQ Dimension

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		<u>Z-Scores</u>
Skewness	-1.356	-6.98
Std. Error of Skewness	.194	
Kurtosis	1.224	3.17
Std. Error of Kurtosis	.385	

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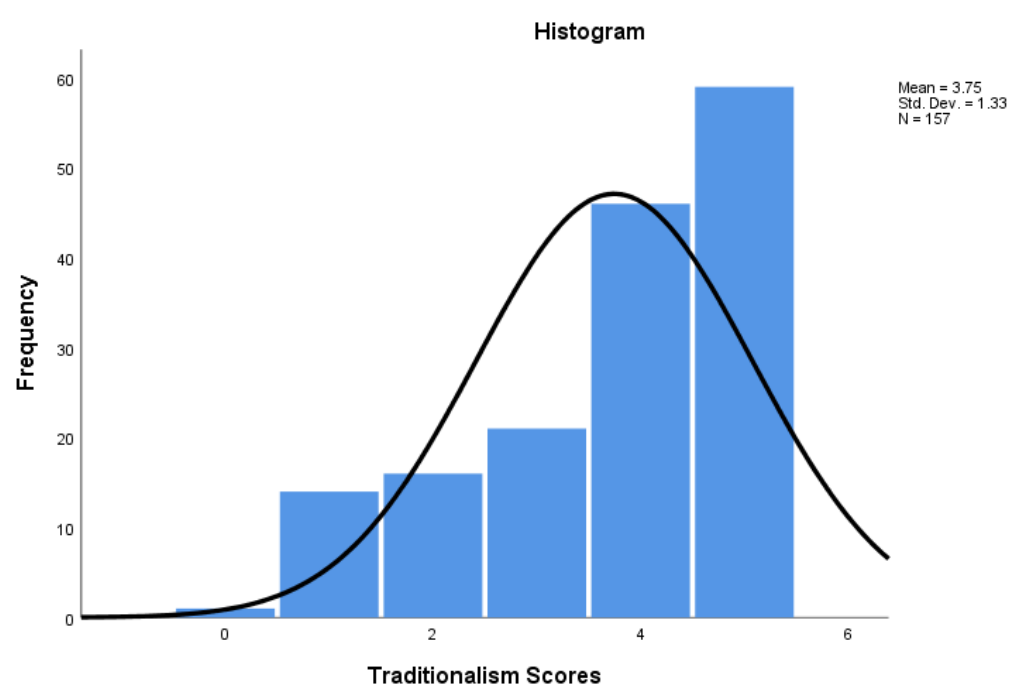


### 3. Traditionalism CSVQ Dimension

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		<u>Z-Scores</u>
Skewness	-.880	-4.53
Std. Error of Skewness	.194	
Kurtosis	-.302	-0.78
Std. Error of Kurtosis	.385	

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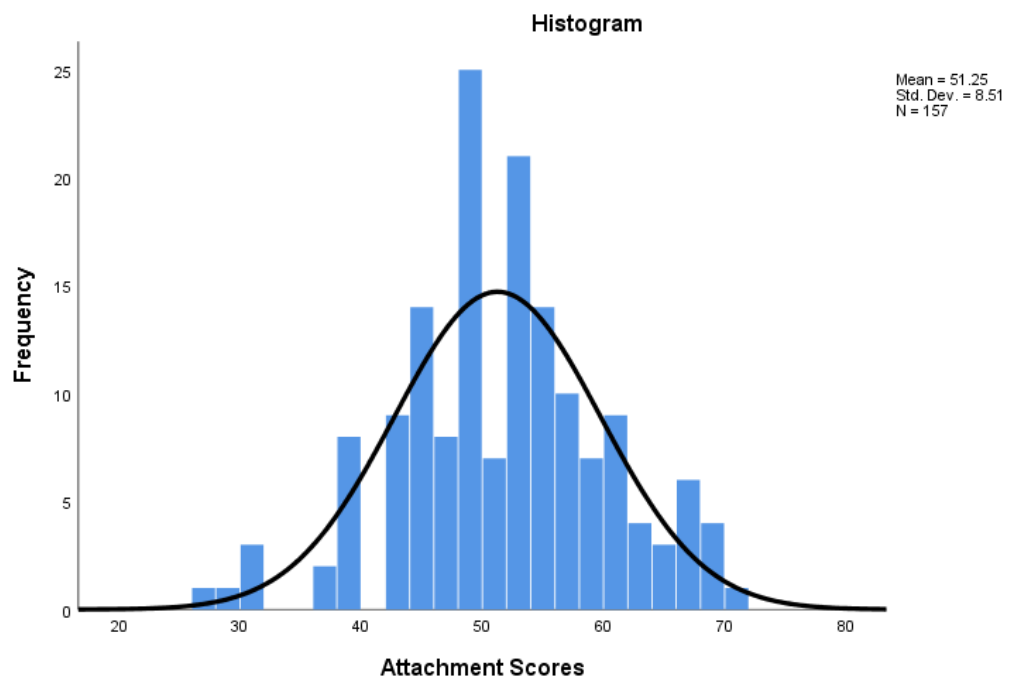


#### 4. PRQ Attachment Dimension

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		<u>Z-Scores</u>
Skewness	-.122	-0.62
Std. Error of Skewness	.194	
Kurtosis	.087	0.22
Std. Error of Kurtosis	.385	

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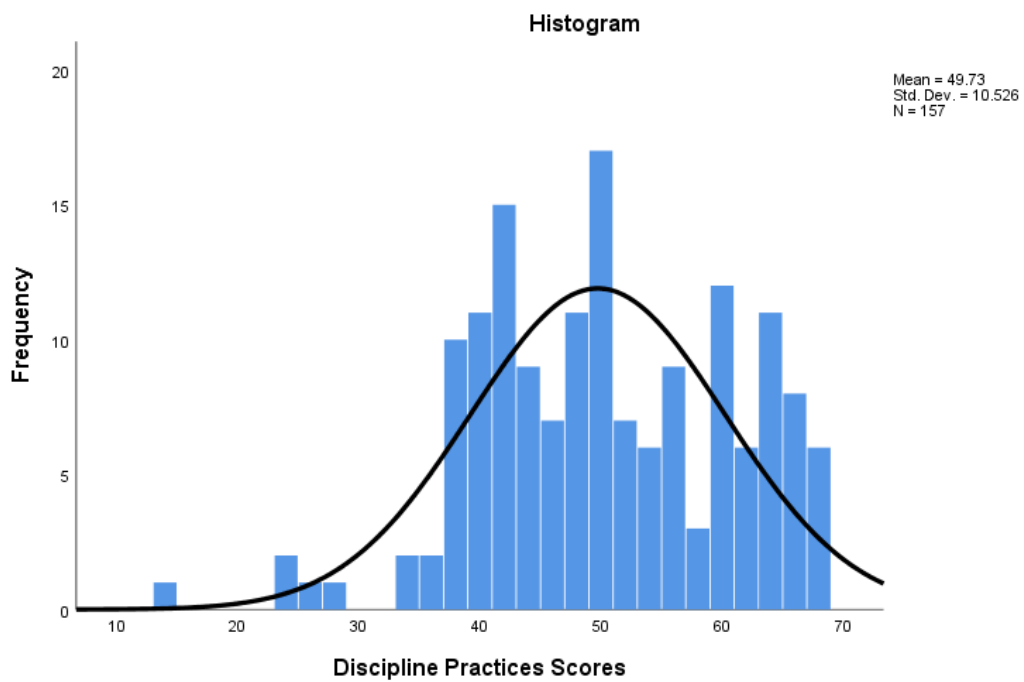


## 5. PRQ Discipline Practices Dimension

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		<u>Z-Scores</u>
Skewness	-.333	-1.71
Std. Error of Skewness	.194	
Kurtosis	-.112	-0.29
Std. Error of Kurtosis	.385	

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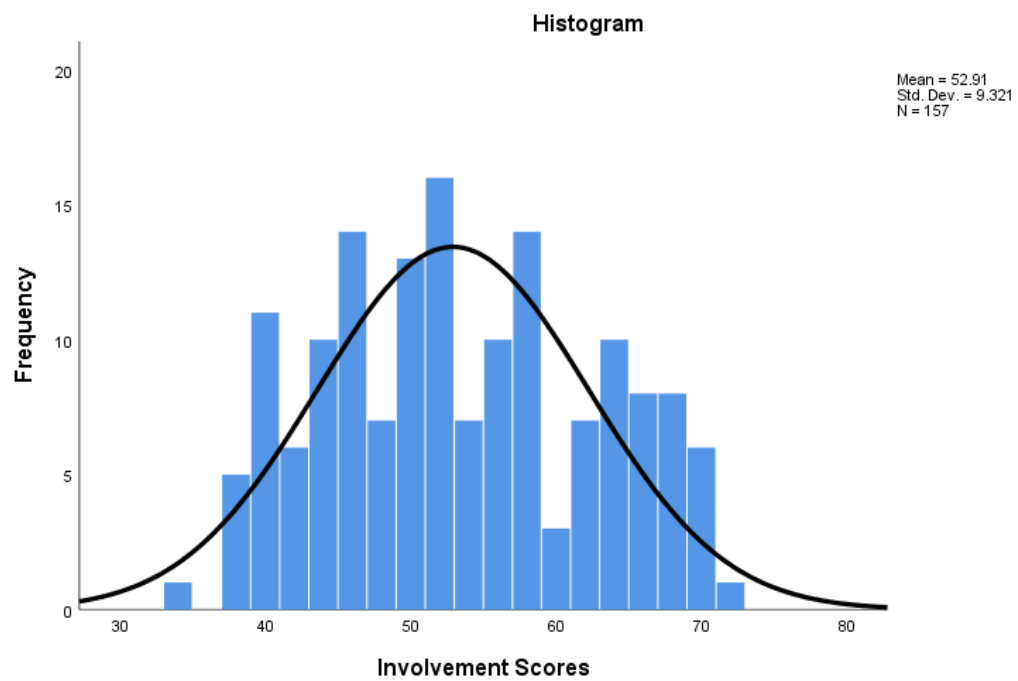


## 6. PRQ Involvement Dimension

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		<u>Z-Scores</u>
Skewness	.135	0.69
Std. Error of Skewness	.194	
Kurtosis	-.936	-2.43
Std. Error of Kurtosis	.385	

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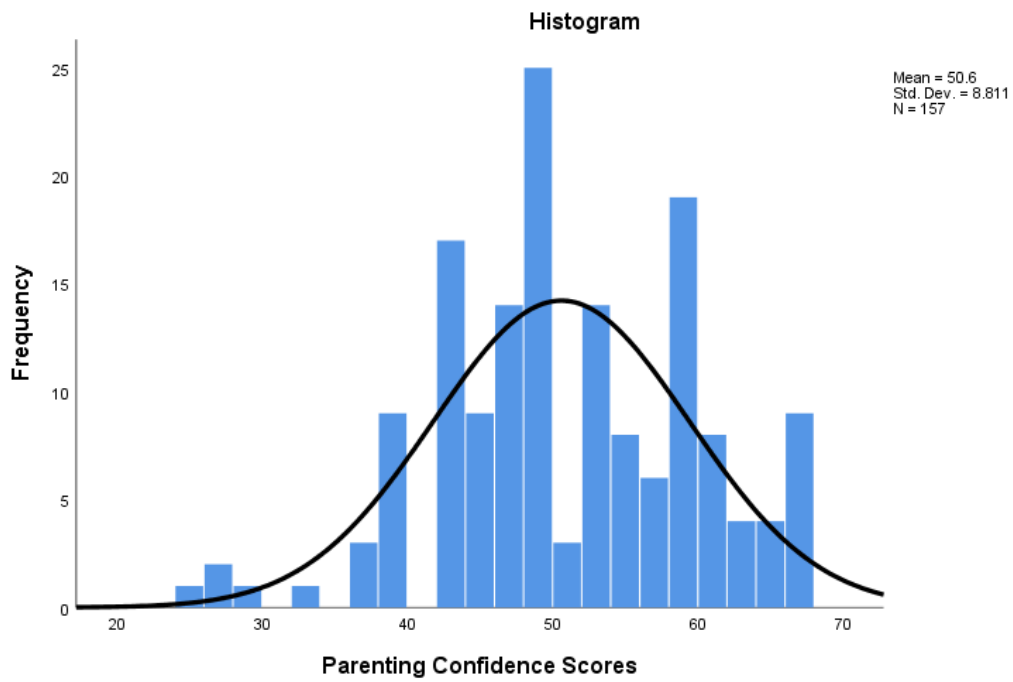


## 7. PRQ Parenting Confidence Dimension

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		<u>Z-Scores</u>
Skewness	-.215	-1.10
Std. Error of Skewness	.194	
Kurtosis	-.009	-0.02
Std. Error of Kurtosis	.385	

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## 8. PRQ Relational Frustration Dimension

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		<u>Z-Scores</u>
Skewness	.325	1.67
Std. Error of Skewness	.194	
Kurtosis	-.203	-0.52
Std. Error of Kurtosis	.385	

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