1-1-2014

Children's Understanding Of Internal Conflicting Desires: Developmental Changes, Cultural Influences And Links With Socioemotional Development

Fan Yang
University of Pennsylvania, fay253@mail.harvard.edu

Follow this and additional works at: http://repository.upenn.edu/edissertations
Part of the Education Commons, and the Psychology Commons

Recommended Citation

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/edissertations/1505
For more information, please contact repository@pobox.upenn.edu.
Children's Understanding Of Internal Conflicting Desires: Developmental Changes, Cultural Influences And Links With Socioemotional Development

Abstract
Having internal conflicting desires is a frequent life experience. Despite the abundant literature on children's understanding of simple mental states, little is known about their reasoning about conflicting desires. Across six studies, from developmental, social-cognitive and cross-cultural perspectives, the present dissertation investigates the development of understanding internal conflicts, sociocultural influences in its development, as well as its links with children's socioemotional development. In Part 1, to examine the development of understanding conflicting desires, 4- to 7-year-old U.S. children were told stories in which the character had an overall goal (e.g., lose weight) and a conflicting immediate preference (e.g., like chocolate but not broccoli). When asked to predict the character's action, 6- to 7-year-olds predicted she would act according to the main goal, whereas younger children predicted she would act to satisfy the immediate desire. In Part 2, to investigate cultural influence on the development, Chinese children's understanding was examined. Five-year-old Chinese children gave goal-oriented responses to the conflicting desire stories, at least one year earlier than their American counterparts. Part 3 explored links between understanding of conflicting desires and social-emotional development. U.S. and Chinese children's key socioemotional characteristics were measured by peer nominations, teacher-ratings and self-reports. Associations between understanding of conflicting desires and positive socioemotional adjustments were found among Chinese children, but not among U.S. children. The present findings suggest that an understanding of internal conflicting desires develops during childhood, facilitated by relevant sociocultural input. In the context where dealing with internal conflicts is emphasized early in life, better understanding of internal conflicts is related with positive socioemotional development.

Degree Type
Dissertation

Degree Name
Doctor of Philosophy (PhD)

Graduate Group
Education

First Advisor
Douglas A. Frye

Keywords
cognitive development, culture, desires, internal conflicts, socioemotional development, theory of mind

Subject Categories
Education | Psychology

This dissertation is available at ScholarlyCommons: http://repository.upenn.edu/edissertations/1505
CHILDREN’S UNDERSTANDING OF INTERNAL CONFLICTING DESIRES: DEVELOPMENTAL CHANGES, CULTURAL INFLUENCES AND LINKS WITH SOCIOEMOTIONAL DEVELOPMENT

Fan Yang

A DISSERTATION

in

Education

Presented to the Faculties of the University of Pennsylvania

in

Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

2014

Supervisor of Dissertation:

Douglas A. Frye, Associate Professor of Education

Graduate Group Chairperson:

Stanton E.F. Wortham, Judy & Howard Berkowitz Professor of Education

Dissertation Committee:

Douglas A. Frye, Associate Professor of Education

Xinyin Chen, Professor of Education

Kristina Olson, Assistant Professor of Psychology
To my family

Mom, Dad, and Liang
ACKNOWLEDGEMENT

When I started to work on this dissertation, I was deeply concerned about what made life worth living. It was a time when the future seemed out of reach and the existing things were taken for granted. Despite of all the anxiety at that time, the years that followed turned out to be the most rewarding time in my life. I am grateful to my mentors, families and friends, for being with me on this journey of growth and giving me invaluable support and love.

During my graduate years, I have fortunately received guidance from three scholars that I most would like to work with even before graduate school. Enormous appreciation goes to Prof. Douglas Frye, for being the most devoted, supportive and considerate advisor. His exceptional dedication to students and open-mindedness always make me feel free to share any struggles, ignorance or crazy ideas. With insights and patience, he helps me transcend my own thoughts and grow from them, as well as feel both autonomous and supported at the same time. I also thank Prof. Xinyin Chen, who offers a complementary mentorship as Doug, for making it clear to me when it is not fine to be ignorant in research. His guidance, from the most detailed advice on drawing figures to my overall career directions, has been essential for me to become an independent and confident researcher today. I also want to thank Prof. Kristina Olson for welcoming me as a member in her lab at Yale University, which allowed me to learn much from her as well as touched by her passion, energy and efficiency in the pursuit of research.

My deepest love and gratitude go to my parents and my husband Liang. My parents, who do not have other expectations for me except of being happy and kind, have nevertheless fostered an intrinsic motivation for me to seek knowledge and to achieve. Most importantly, they have exposed me to many other beautiful things in life other than achievement, with their endless love being at the top of the list. Since I was a child, I have been certain that the best thing in my life is being my parents’ child. But I didn’t know another best thing would happen when I become an adult: meet and spend the rest of my life with Liang. We didn’t begin our relationship with Hollywood romance, and I never perceive him as a romantic person by nature. However, in his
own way, he has given me what I think is the true romance one can have in this world: to be loved and cared for consistently in numerous ordinary everyday experiences.

And my friends, how dull and difficult my life would be if I were struggling alone in graduate school without you. We are concerned about the same things and often share the same feelings. We talk about papers, professors, boyfriends, desserts, and the eternal worries about future. We do not always agree, but that always means much less to us than our friendship does. Maybe we have been similar to each other at the very beginning, but undoubtedly we have grown to be more like each other over time. I am proud to have been influenced by you. Each of you has inspired me to improve myself in distinct ways.

I cannot end my acknowledgement here, since I am also thankful to many others who have helped me with this work. The helpful faculty and staff in my school have provided me with assistance, support and solutions that have made my life much easier, especially in the past two years when I was commuting between Philadelphia and New Haven. This work will also not be possible without the lovely child participants and their parents and teachers. The sunny afternoons I spent with the children have awakened my own childhood and were one of my best graduate school experiences. The children are curious, friendly, and fully devoted to things that interest them. I have learned much about life from them, since oftentimes they simply know more.

Freud was right. Love and work are essential to us. As I finish this dissertation, many questions I had about life are not pressing to me any more. When I look back, the many hours spent on thinking and writing do not really spring to mind; it is the moments and experiences with you, my wonderful mentors, families and friends, that shine in memories and have made this journey most enjoyable. “I to the world am like a drop of water, that in the ocean seeks another drop”. I feel so happy that I have found many precious drops in my life. Now I’m looking forward to the beginning of new pages in my life. What I feel most grateful is, in the book of life, I have been and will be in the same page together with all of you.
ABSTRACT

CHILDREN’S UNDERSTANDING OF INTERNAL CONFLICTING DESIRES: DEVELOPMENTAL CHANGES, CULTURAL INFLUENCES AND LINKS WITH SOCIOEMOTIONAL DEVELOPMENT

Fan Yang

Douglas A. Frye

Having internal conflicting desires is a frequent life experience. Despite the abundant literature on children’s understanding of simple mental states, little is known about their reasoning about conflicting desires. Across six studies, from developmental, social-cognitive and cross-cultural perspectives, the present dissertation investigates the development of understanding internal conflicts, sociocultural influences in its development, as well as its links with children’s socioemotional development. In Part 1, to examine the development of understanding conflicting desires, 4- to 7-year-old U.S. children were told stories in which the character had an overall goal (e.g., lose weight) and a conflicting immediate preference (e.g., like chocolate but not broccoli). When asked to predict the character’s action, 6- to 7-year-olds predicted she would act according to the main goal, whereas younger children predicted she would act to satisfy the immediate desire. In Part 2, to investigate cultural influence on the development, Chinese children’s understanding was examined. Five-year-old Chinese children gave goal-oriented responses to the conflicting desire stories, at least one year earlier than their American counterparts. Part 3 explored links between understanding of conflicting desires and social-emotional development. U.S. and Chinese children’s key socioemotional characteristics were measured by peer nominations, teacher-ratings and self-reports. Associations between understanding of conflicting desires and positive socioemotional adjustments were found among Chinese children, but not among U.S. children. The present findings suggest that an understanding of internal conflicting desires develops during childhood, facilitated by relevant sociocultural input. In the context where dealing with internal conflicts is emphasized early in life, better understanding of internal conflicts is related with positive socioemotional development.
Table of Contents

ACKNOWLEDGEMENT ........................................................................................................... iii
ABSTRACT ................................................................................................................................. v
LIST OF TABLES ......................................................................................................................... vii
LIST OF FIGURES ...................................................................................................................... viii
CHAPTER 1 Introduction ........................................................................................................... 1
CHAPTER 2 Developmental Changes in Understanding Internal Conflicting Desires ................................................................................................................................. 8
  Study 1 .................................................................................................................................... 21
    Method ................................................................................................................................. 21
    Results and Discussion ....................................................................................................... 23
  Study 2 .................................................................................................................................... 25
    Method ................................................................................................................................. 26
    Results and Discussion ....................................................................................................... 27
  Study 3 .................................................................................................................................... 30
    Method ................................................................................................................................. 30
    Results and Discussion ....................................................................................................... 31
  General Discussion ............................................................................................................... 33
CHAPTER 3 The Role of Culture in the Development of Understanding Internal Conflicting Desires ................................................................................................................................. 43
  Study 4 .................................................................................................................................... 52
    Method ................................................................................................................................. 53
    Results and Discussion ....................................................................................................... 53
  Study 5 .................................................................................................................................... 58
    Method ................................................................................................................................. 58
    Results and Discussion ....................................................................................................... 59
  General Discussion ............................................................................................................... 60
CHAPTER 4 Relations between Understanding of Internal Conflicting Desires and Social-Emotional Development ................................................................................................................. 70
  Study 6 .................................................................................................................................... 87
    Method ................................................................................................................................. 88
    Results ................................................................................................................................. 93
    Discussion ........................................................................................................................... 98
CHAPTER 5 Conclusions and Discussion .................................................................................... 103
APPENDIX ................................................................................................................................. 116
BIBLIOGRAPHY ......................................................................................................................... 118
LIST OF TABLES

Table 1. *Simple and Age-Partialled Spearman Correlations among the Tasks in Study 1 and Study 2* ................................................................. 29
Table 2. *Simple and Age-Partialled Spearman Correlations among the Tasks in Study 4* .................................................................................. 56
Table 3. *Means and Standard Deviations of Understanding of Conflicting Desires and Social Variables for Chinese Boys and Girls in Study 6* .................................................. 93
Table 4. *Means and Standard Deviations of Understanding of Conflicting Desires and Social Variables for U.S. Boys and Girls in Study 6* .......................................................... 94
Table 5. *Intercorrelations among all Variables in the Chinese Sample in Study 6* ...... 96
Table 6. *Intercorrelations among all Variables in the Chinese Sample in Study 6* ...... 97
LIST OF FIGURES

Figure 1. Mean percentage of goal-oriented responses by age for the Prosocial stories in Study 1. .................................................................................................................. 23

Figure 2. Mean percentage of goal-oriented responses by age for the combined One-Character story and percentage of correct responses for the Change-of-Location story in Study 2. .......................................................................................................... 27

Figure 3. Mean percentage of goal-oriented responses by age for the Novel Desire story in Study 3.............................................................................................................. 31

Figure 4. Mean percentage of goal-oriented responses by age for the conflicting desire stories and percentage of correct responses for the Change-or-Location false belief story in Study 4. ........................................................................................................... 55

Figure 5. Mean percentage of goal-oriented responses by age for the Novel Desire story in Study 5.............................................................................................................. 60
CHAPTER 1

Introduction

"I arise in the morning torn between a desire to improve the world and a desire to enjoy the world. This makes it hard to plan the day." -- E. B. White

Desire is one of the most fundamental mental states of human beings. At its best, desire can be the motivational power underlying the creation of Starry Night and the Theory of Relativity. At its worst, desire can be the devastating force leading to addiction and crime. Regardless of whether we view desire as a friend or enemy, one basic fact is undeniable: desire is the norm of life, not the exception. From the time we are born, we are constantly engaged in actions to satisfy various desires everyday. Simply asking people about their experiences several times a day may reveal the prevalence of desires in our life. This is what Wilhelm Hofmann and colleagues recently did with hundreds of adults in Germany (Hoffmann, Baumeister, Förster, G., & Vohs, 2012). They gave participants beepers and asked them to report any feelings of desire when the beepers went off, at random intervals several times a day. The findings were surprising: people felt some sort of desire about half of their waking time. Moreover, people were not only busy with fulfilling desires, but also were constantly engaged in resisting desires. Of all the desires reported, about half of those were described as conflicting, such as trying to stay focused on work and feeling the urge to play video games. That is, people spend a quarter of their waking hours trying to manage these internal conflicts--about four hours per day. This reality paints a vivid picture of our subjective life: desire is a frequent theme in life, with conflicts in desires and the accompanied inner struggles being a constant feature.

Luckily, we are not just filled with desires, but we are also equipped with strategies to deal with them. Instead of being the most advanced human achievement, managing desires is actually one of our fundamental abilities, possibly rooted in the evolution. There are numerous successful cases of resistance to temptations around us every day. The simplest example might
be, no matter how hungry people are when waiting for lunch, we rarely see one person grab another’s food. If given strong incentives, such as getting two marshmallows later, even children as young as 3 or 4 years are able to wait for about 15 minutes without touching the immediately available reward (e.g., Mischel & Ebbesen, 1970). In fact, in similar situations, even chimpanzees have been found to voluntarily delay immediate gratification and wait for more food (Beran, 2002). This ability of inhibiting immediate desires to satisfy long-term and bigger goals may be in the natural behavioral repertoire of chimpanzees. In the wild, even hungry chimpanzees do not always feed on any fruit tree as soon as they find one. Instead, they often examine the tree for its ripeness and then return later when the fruits become more ripe and abundant (Wrangham, 1977). Therefore, in the face of multiple conflicting desires, it seems that adults and young children often respond similarly with one important strategy—harming immediate desires to achieve more important goals, a behavior that we also share with our closest primate relatives.

Given that young children and even chimpanzees are capable of dealing with internal conflicts in similar ways as adults do, does it mean that we also have similar awareness about the existence of conflicting desires and the strategies for dealing with them? In other words, at the cognitive level, do young children and adults have similar understanding about internal conflicts and their implications for actions, or does the understanding change during development? Although we often know and understand what we do, displaying the behaviors does not necessarily imply understanding. For example, babies may not need to understand the relations between force and movement in order to learn to walk. As adults, we not only experience and manage conflicting desires, but it seems we also understand the relations among different desires as well as their relations to actions. More specifically, we appreciate that the existence of some desires (e.g., an overall goal) can cancel other desires (e.g., basic and immediate preferences). This appreciation enables us to understand and predict that when a person has internal conflicts, he or she may act selectively to satisfy the most important desire and inhibit the desires that contradict it. For example, if we know a person likes chocolates but also has a goal of losing weight, we may predict that it is likely that the person will try to stay away from chocolates. As has
been mentioned, young children are spontaneously able to inhibit immediate desires to obtain bigger rewards. Does this choice mean they also understand that the pursuit of some desires may inhibit the satisfaction of other ones? Or does this cognitive understanding follow its own developmental trajectory?

Understanding desires and their relation to actions is a fundamental part of our mental state reasoning, or “theory of mind”. As humans, we are able to attribute mental states such as beliefs, desires, intentions, knowledge and emotions to others and ourselves (Premack & Woodruff, 1978). We also use these mental states to understand and predict people’s behaviors. That is, we do not perceive people only in terms of behaviors; instead, we think of people in terms of their psychological states. Because these mental states are often unobservable and also have explanatory and predictive power for actions, our thinking about them is analogous to a theory (Premack & Woodruff, 1978). In the past several decades, research on theory of mind has greatly advanced our understanding about its development, especially about age-related changes in understanding different mental states (see Flavell, 1995 for a review). Researchers have understood that we are not born with a fully matured theory of mind, but gradually develop reasoning ability about the mind through childhood. Interestingly, the understanding of different mental states seems to develop in particular orders rather than all at once or randomly (e.g., Wellman & Liu, 2004). Discovering this developmental sequence not only helps us understand our metalizing abilities at different stages, but also reveals important information about our social cognitive abilities in general.

Simple desire is one of the earliest acquired mental state concepts (e.g., Wellman & Wooley, 1990). However, theory of mind research has mostly focused on the development of simple mental and epistemic states (e.g., beliefs), and our understanding about the development of advanced and motivational mental states is far from sufficient. An investigation of how the reasoning of internal conflicting desires develops will contribute to a more extensive understanding of our theory of mind development.
In the existing theory of mind literature, attributing mental states and using them to predict or explain behaviors are viewed as the central aspects of theory of mind ability. For example, in investigating the development of understanding simple desires and beliefs, children have often been presented with information indicating a person’s desires or beliefs about certain targets (e.g., likes object A but not object B, believes it is in location A but not in location B), and asked to predict what the person will do (e.g., Wellman & Woolley, 1990; Wimmer & Perner, 1983). In this approach, mental states such as beliefs and desires are viewed and tested as causes underlying people’s actions (Wellman & Woolley, 1990). What this approach does not take into consideration, however, is the role of agency in people’s actions. Intuitively, we often feel ourselves to be agents, in the sense that when we act according to our desires and beliefs, we often actively choose to act in that way, instead of simply being controlled by our subjective states. To state it more precisely, as an agent, the person “could have done otherwise” for a given action (Nichols, 2004). In contrast, non-agents such as inanimate objects are not free to choose their course of actions and are completely governed by causal forces.

Although agency is an important part of the folk view of the mind, little attention has been paid to it in theory of mind studies. When a child successfully predicts that a person will eat an apple instead of an orange based on his preference for the former, we know the child understands that desires may guide actions. However, we do not know whether the child considers that the person voluntarily chooses to fulfill this desire, or is only passively led to the action by his desire without other options. Situations in which people deal with internal conflicting desires may highlight the role of agency in actions. Because conflicting desires usually cannot be satisfied at the same time, people often have to inhibit a desire and refrain from satisfying it, which requires the ability to actively choose one’s actions. Therefore, studying children’s understanding of internal conflicting desires may also shed light on children’s understanding of agency of the mind.

Information about age-related changes is informative for understanding the different stages of our theory of mind development, but to gain more insights about its progression, it is
also important to investigate how the ability develops. In particular, three main factors may underlie theory of mind development: maturational processes based on innate modules, general cognitive gains (e.g., executive functioning), and learning processes based on relevant experiences (Wellman, Fang, Liu, Zhu, & Liu, 2006). One way to examine the influence of these different factors in our theory of mind development is to compare children’s performance in different cultures. Significant cross-cultural differences will suggest the importance of learning processes in the development of mental state reasoning. Alternatively, if children from different cultures nonetheless perform similarly on the tasks, then innate modules or domain-general cognitive abilities might play more dominant roles in the development. Most theory of mind research has been conducted in Western societies, and the existing studies in other cultures mostly focus on children’s understanding of simple mental states. Consequently, little is known about whether children’s understanding of conflicting mental states is influenced by learning processes shaped by social-cultural values and inputs. To answer this question, in the present investigation on children’s understanding of internal conflicting desires, development in American and Chinese children will be compared to explore the developmental mechanisms.

Theory of mind is an ability that we need to use everyday in social interactions, and thus intuitively, it may have important links with our social functioning and adjustment in life. On one hand, in order to successfully interact and communicate with others, we often need to understand and predict other people’s behaviors based on their mental states. Therefore, children’s ability to reason about people’s mental states may influence the quality of their social interactions and relationships. Researchers have also been aware that theory of mind is a powerful social tool, which may serve crucial social functions in both cooperative and competitive interactions (Frye & Moore, 1991). Empirically, the important role of theory of mind in our social life has been found to be particularly evident in its absence, from the severe social impairment of children with autism (e.g., Baron-Cohen, 2008).

On the other hand, children’s social functioning and experiences may also influence the development of mental state reasoning. According to Piaget (1932/1965), children’s social
relationships, especially their relationships with peers provide unique opportunities for them to experience and discuss conflicting views, which contributes to the development of fundamental cognitive abilities such as perspective-taking. Conceivably, children who have more opportunities to interact with peers may also have more advanced understanding of desires, goals and thoughts of others, compared to children who lack such opportunities due to shyness, being rejected, or other maladaptive social functioning and adjustment. However, these intriguing possibilities have not been adequately examined empirically. Traditionally, research on theory of mind has focused on its age-related changes. Like many other areas in children’s cognitive development, theory of mind has often been studied separately from social development, with different research methods and goals in the two fields (Olson & Dweck, 2008).

In the past decade, researchers have started to pay more attention to the empirical links between theory of mind development and social-emotional development in typically developing children (Astington, 2001). The majority of this line of research has focused on the real-world consequences of false belief understanding in western societies. Contributing to the growing body of this literature, one aim of this dissertation is to investigate how the understanding of motivational states, particularly desires in conflicts, may be linked with different aspects of children’s social-emotional functioning and adjustment, in both western and non-western cultures.

In summary, the present dissertation aims to investigate three main research questions:

1. What is the developmental sequence of understanding internal conflicting desires and their role in actions? Are there age-related changes in this understanding?
2. How does the understanding of internal conflicts in desires develop? Do social-cultural values and inputs influence its development?
3. What are the relations among understanding internal conflicting desires and children’s social functioning and adjustment? Does cultural context play a role in moderating the links?

In Chapter 2, three studies are reported that examine the development of understanding internal conflicting desires among 4- to 7-year-old American children. In Chapter 3, to explore
whether culture plays a role in influencing this development, the understanding of internal conflicting desires was examined among a sample of Chinese children. In Chapter 4, links among the understanding of internal conflicting desires and socioemotional adjustment were investigated with both American and Chinese 4- and 5-year-olds. Finally, in Chapter 5, results from the studies, their theoretical and practical implications for developmental psychology and education, as well as limitations and future directions are discussed. By being one of the few studies on children’s understanding of internal conflicts, the results will contribute to the existing theory of mind literature on children’s understanding of advanced mental states, shedding light on the cognitive abilities involved as well as its developmental trajectory. The cross-cultural investigation will allow us to better understand the role of culture in theory of mind development. Finally, the current findings will also give us a better understanding of the underexplored links between children’s understanding of advanced mental states and their socioemotional development in life.
Desire is a fundamental mental state that motivates our actions. Children, like adults, may constantly have various desires in life. The desires could be simple, such as to play with an attractive toy or to eat an ice cream. Often times the child’s desires also conflict with other desires. When preschoolers interact with each other, conflicts in desires are relatively frequent, involving issues such as the possession of objects or adopting specific play roles (Shantz, 1987). Under certain situations, children may also have conflicts in desires within themselves or internal conflicting desires. In the classic "Marshmallow test" (e.g., Mischel, Ebbesen, & Zeiss, 1972), for example, individual 3- and 4-year-olds were put in a conflict about eating one marshmallow immediately or having two marshmallows later. Therefore, similar to adults, young children could potentially experience simple desires, conflicting desires between people, or conflicting desires within themselves. Having an understanding of these desires may facilitate children’s social interactions and their pursuit of goals. The question is, then, are there developmental changes in understanding these different types of desires and their role in actions?

Precursors to Theory of Mind in Infancy

Since the earliest research on children’s understanding of the mind (Piaget, 1929), researchers have made much progress in understanding when children know what about mental states. Piaget (1929, 1952, 1954) believed that early in life, children are egocentric and asocial creatures, and not until age 6 or 7 years do children acquire a mentalistic understanding of human actions. However, later studies have shown that even in infancy, babies already have some implicit social understanding that may be important precursors to conceptions of desires and other mental states (e.g., Meltzoff, 1995; Spelke, Phillips, & Woodward, 1995; Repacholi & Gopnik, 1997). From the beginning of their life, infants appear to perceive people as self-propelled and goal directed agents (Premack, 1990), and they interact differently with people than they do with objects. For example, infants are surprised when an object, but not a person moves
without external forces (Poulin-Dubois & Shultz, 1988; Spelke, et al., 1995). They also imitate facial displays of adults, but not similar looking actions of an object (Legerstee, 1991). Moreover, although infants distinguish people from objects, they are quite able to detect the similarities and make connections between themselves and others. Even newborns can spontaneously imitate adult facial gestures such as mouth opening and tongue protrusion (e.g., Meltzoff & Moore, 1983). They also recognize when another person acts like them and they display positive affect towards that person (Meltzoff, 2007). Based on these findings, Meltzoff (2005, 2007) proposed that infants might develop an understanding of other people’s minds through a “like me” process. Infants may have daily experiences regarding the relations between their own actions and their internal states. When they observe other people share similar actions with them, they might register the person as “like me” and thus infer that other people may also share similar internal states as themselves. The ability to connect the visible actions of others to infants’ own internal states might provide the basis for developing an understanding of other people’s mental states.

In addition to perceiving the differences between people and objects as well as the similarities between other people and the self, another crucial precursor to mental state reasoning develops by the end of the first year of life: understanding how people relate to objects psychologically (Flavell, 1999). A person may relate to objects intentionally, such as wants it, attends to it, or thinks about it. As manifested in their emerging joint attention, gaze following, and social referencing behaviors, one-year-old infants start to understand that pointing (Leung & Rheingold, 1981), gazing (Bates, Camaioni, & Volterra, 1975), or facial expression (Hornik, Risenhoover, & Gunnar, 1987) convey information about objects or events. They also have at least some implicit notions of the relations between a person’s intention and his action. For example, when a person looks at one object with positive affect and ignores the other one, 12-month-olds expect the person to reach for the former rather than the latter (Spelke, et al., 1995). When they reach the age of 18 months, infants already have a working understanding of the intentional and goal-directed nature of people’s actions. Even when they never see the target
actions of a person, infants are able to infer the intended behaviors from the person’s unsuccessful attempts (Meltzoff, 1995).

Particularly relevant to the present discussion, however, is the evidence that around age 18 months, infants also start to show implicit understanding of desires. Using a nonverbal task, Repacholi and Gopnik (1997) investigated children’s understanding of desires as subjective mental states as well as the understanding that different people might have different desires towards the same object. Children aged 14 and 18 months watched an experimenter responded positively or negatively towards particular foods and were subsequently asked to provide food to the experimenter. They found that 18- but not 14-month-olds offered a food desired by the experimenter as indicated by her displayed affect even if that food was unlikely to appeal to the infant. This study provides the first empirical evidence that at age 18 months infants are able to reason implicitly and nonegocentrically about other people’s desires.

**Children’s Understanding of Simple Desires**

The implicit mind reading abilities achieved during the first 1.5 years of life provide important basis for children to understand simple desires and their role in actions. Genuine understanding of simple desires becomes evident around the end of infancy. Children’s everyday talk about the mind during this period is a natural source of information about their understanding of the mind. By the end of the first year of life, children begin to talk spontaneously about their own desires and those of other people through terms like “want” and “like”. Almost as soon as young children start to produce these words, they use these terms in intentional and psychological senses like adults do (Bartsch & Wellman, 1995).

When children reach their second birthday, they evidence a coherent understanding of the psychological factors underlying people’s actions, especially about how simple desires relate to actions and emotions. They know people will search for a desired object until they find it, and people will be happy if they find it and be sad if only find something else (Wellman & Wooley, 1990). In fact, 2-year-olds may be like “desire psychologists” (Wellman & Wooley, 1990), who often predict people’s actions and emotions based on the fulfillment of desires. They think people
act to fulfill desires, and they attribute desires but not yet knowledge of the world (e.g., beliefs) to people. It is not until age 3 that children become aware that beliefs also play a crucial role in shaping actions. Although the 2-year-old’s theory of mind is still limited in this respect, their simple desire psychology serves explanatory functions and allows them to make sense of human actions in terms of internal states. This ability of predicting and explaining people’s behaviors based on desires remains important throughout life.

**Children’s Understanding of Conflicting Desires between People**

If 2-year-olds understand desires as a basic mental state, we may further ask a deeper question: do they also understand desires as a subjective mental state? Although young children acknowledge different desires of other people and themselves in their everyday talk, it does not necessarily imply that they also understand the subjectivity of desires. It is possible that children only understand “desirability” and treat desires as objective features of things or events, without understanding desires as a subjective matter of personal preference. Indeed, as adults, we may also consider some things (e.g., a well cooked turkey) as more desirable than others (a burned turkey), and we are often able to predict people’s behaviors towards the objects based on information about their desirability, without knowing anything about the particular person. The subjectivity of desires, in contrast, does not imply that some objects are more desirable than others to most people, but that different people may hold conflicting and even opposite desires towards the same object or situation. These situations may be familiar to young children. Many conflicts between young children and their peers are about different desires or attitudes about food or playing roles (Shantz, 1987). Studying their understanding about these conflicts in desires between people may reveal useful information about their understanding of the subjective nature of desires.

There is evidence that this understanding may be achieved quite early. From as young as 2.5 years, subjective contrastives about desires appear in young children’s talk. In recorded conversations with adults or peers, young children often express their preferences about food or activities that contradict those of their partners (Bartsch & Wellman, 1995). As reviewed above,
Repacholi and Gopnik (1997) found that 18-month-olds were able to ascribe preferences to other people even if they themselves did not have similar preferences. Other researchers have also found similar results that by 3 years of age, children understand that other people may desire something different from themselves (Flavell, Flavell, Green, & Moses, 1990; Rakoczy, Warneken, & Tomasello, 2007), and are able to predict the actions of another person based on his or her explicit desire, even if that desire conflicts with their own (Cassidy et al., 2005).

Despite these early competencies, young children’s ability to appreciate conflicting desires between people is susceptible to the influence of cognitive processing factors. When the child’s own desire is strong or unfulfilled, for example, children under age 5 may not appreciate other people’s conflicting desires under these situations (e.g., Atance, Belanger, & Meltzoff, 2010; Moore et al., 1995; Rieffe, Terwogt, Koops, Stegge, & Oomen, 2001). Moore and his colleagues (1995) found that when two stickers were equally attractive, even 3-year-olds understand a person may like a different sticker than they do. However, when told that a protagonist encountered an event that led him to prefer a less attractive sticker to a bigger and more attractive one, only 5-year-olds recognized this unusual desire. The authors argued that 3-year-olds might have difficulty in inhibiting their own strong desires, which contributed to their poor performance in judging the other person’s conflicting desire. Similarly, Rieffe and colleagues (2001) also found that when children’s own desire for snacks became increasingly different from the other person’s desire, 3- and 4-year-olds, but not 5-year-olds became less able to use information about the other’s desire fulfillment to predict his emotions. In addition, if a protagonist holds a non-traditional desire (e.g., a boy wanted a doll), preschoolers were less accurate in making predictions about his emotions in terms of the fulfillment of the desire.

Atance et al. (2010) argued that children’s attention to their own desires might limit the available cognitive resources to identify conflicting desires in other people. They found supporting evidence that when 3- to 5-year-old’s own desires were fulfilled, they performed better in determining the appropriate gift for their mother than otherwise. Taken together, these findings indicate that children appreciate the subjectivity of desires by age 3, as evidenced by their ability
to understand conflicting desires between people. Therefore, even young children’s understanding of desires are not only limited to objective desirability of things, but are genuinely subjective. As children’s cognitive processing ability develops between 3 and 5, children’s understanding of interpersonal conflicting desires also becomes increasingly less affected by their own strong preferences, urges or stereotypical beliefs.

**Children’s Understanding of Internal Conflicting Desires**

The majority of the previous research on children’s understanding of desires has focused on simple desires and conflicts in desires between people. However, the conflicting desires we routinely encounter in life are not necessarily external; in fact, many of them come from within, such as to choose between doing more work and playing video games. Relevant theories and findings suggest two possibilities for the development of children’s understanding about internal conflicting desires.

First, it is possible that children develop an understanding of internal conflicting desires early in life. Theoretically, as some researchers have argued (e.g., Perner, 1991), the representation of desires might be relatively simple, at least when compared to the representation of beliefs. Although both desire and belief are major mental states concepts and can both be construed as propositional attitudes, they differ in terms of their relations to the world (Searle, 1983). Desires have a world-to-mind direction of fit, namely that they aim at changing the world to fulfill their content. In contrast, beliefs have a mind-to-world direction of fit, so any mismatch can only be solved by changing the beliefs rather than the world. These differences lead to differences in their representational complexities. Beliefs can represent, and often falsely represent the world. Therefore, in order to understand beliefs, and especially false beliefs, one needs to understand the representational relation between beliefs and their content. For example, to understand that a person mistakes a sponge as a rock, the child needs to conceive that the person represents the rock as a sponge in his mind. However, a conception of representational relations may not be necessary in understanding desires (Perner, 1991). For example, to understand a protagonist wants an object, the child may simply construe the object as desirable.
to the protagonist, rather than that the protagonist also holds a mental representation of the object in his mind. Therefore, children may understand desires, but not false beliefs when they have no concept of misrepresentation, and thus the understanding of desires may be developed earlier than that of false beliefs.

Consistent with this view, it is well documented in the literature that children understand simple desires and interpersonal conflicting desires before they understand false beliefs, an understanding not acquired until about 4 years of age (e.g., Wimmer & Perner, 1983). It is conceivable that the understanding of internal conflicting desires might also develop around this age, since they also do not involve false representations of the world. Like simple desires and conflicting desires between people, the experience of internal conflicts may also be familiar to preschool children. As illustrated by the “marshmallow paradigm”, 3- and 4-year-old preschoolers have no difficulty in understanding the delay of gratification conditions, and they are even able to spontaneously resist temptations (e.g., Mischel & Ebbesen, 1970). Therefore, theoretical analyses of the representation of desires, empirical findings on children’s understanding of other types of desires, together with their ability to deal with internal conflicts suggest that children may conceptually grasp intrapersonal conflicting desires early in life, possibly during preschool years.

Other relevant theories and findings, however, suggest this development may not occur until middle childhood. According to Piagetian and Neo-Piagetian perspectives (e.g., Fischer, 1980; Piaget, 1954), children under the ages 7 or 8 are not capable of integrating multiple dimensions of a single situation simultaneously. Conservation tasks may be the best known of Piaget’s examples supporting this view. For example, young children often think when water is poured from a wide, short cup into a thin, tall one, that there is more water in the latter due to the higher water level. When they reach the age of 7 or 8, children start to realize that the increase in height is accompanied by a decrease in width, so the amount of water stays the same (Piaget, 1969). Although these theories have been generally based on cognitive changes in children’s understanding of physical laws like conservation, intuitively, they might also apply to
simultaneous multiple mental states. That is, young children may also focus on only one mental state and ignore other ones that are present at the same time.

Supporting this view, research on children’s understanding of mixed emotions found that children under age 7 are not able to generate situations that would elicit mixed emotions (e.g., Harter, 1983), and they often deny that different emotions could coexist simultaneously (Harris, 1983; Harter & Buddin, 1987). Using more sensitive tasks and forced choices, Kestenbaum and Gelman (1995) found that by age 5 children might have some partial knowledge about the existence of mixed emotions, but their performance was much better when the two emotions were separated into two faces (on two-headed aliens) than when they coexisted in a normal person. Like mixed emotions, internal conflicting desires are simultaneous subjective mental states towards the same target in the same mind. Therefore, understanding of internal conflicting desires might require the ability of integrating multiple dimensions of the same situation, which might be particularly difficult for preschoolers.

Direct empirical research on children’s understanding of intrapersonal conflicting desires has been very limited. To our best knowledge, Choe, Keil, and Bloom (2005) was the only study that investigated when children understand the coexistence of intrapersonal conflicting desires, or as they call it, “the Ulysses conflict”. In two studies, they presented 4- to 7-year-olds and adults with movies in which the main character expressed the desire toward a target, but then acted to inhibit that desire. Participants were asked to explain (Study 1) or to choose from forced choices (Study 2) what the character’s mind was like when the person suppressed that desire. Only adults and 7-year-olds, but not younger children, acknowledged that the character’s action was due to having conflicting desires in mind. These results provide the first evidence that the ability of attributing internal conflicting desires might not be developed until age 7. Because in this study children were asked to explain the behaviors of the character, it remains unknown whether children would be able to predict people’s behaviors based on internal conflicting desires around similar or different ages.
Understanding Internal Conflicting Desires and Delay of Gratification

Although the understanding of internal conflicting desires has not been thoroughly investigated, several other types of developmental findings may be relevant to the recognition of internal conflicts. For example, research on delay of gratification has shown that although children demonstrate the ability to inhibit their immediate desires around age 4, their ability and strategies to resist temptation actually improves greatly between preschool years and early elementary school years (e.g., Mischel et al., 1972; Mischel, Shoda, & Rodriguez, 1989). At the beginning of elementary school, children are more able to resist a less desirable immediate goal for a more attractive later one compared to younger children. Whether there is a corresponding cognitive change in understanding of internal conflicts or just a change in strategies is an open question.

Despite children’s better ability to spontaneously delay consumption in these tasks, it remains to be determined whether they explicitly understand such self-regulative behavior, and how accurate their predictions of people’s behavior are in these situations.

Understanding Internal Conflicting Desires and Metacognition

Research on metacognition also reveals relevant findings. Children aged 4 to 7 often display "utilization deficiency" (Bjorklund, Miller, Coyle, & Slawinski, 1997; Miller, 1994; Woody-Ramsey & Miller, 1988) in that they can spontaneously produce some strategies in memory tasks and learning, but compared to older children, they often fail to use or benefit from these strategies. Consistent with these results, it has been shown that although preschool children possess meta-memory knowledge, such as recognizing the relative difficulty between tasks, and know that longer study time may lead to better performance (Wellman, 1977), only at about 9 years or older do children regulate themselves and allocate more study time for learning hard versus easy materials (Dufresne & Kobasigawa, 1989; Lockl & Schneider, 2004). Arguably, to select the most appropriate strategies, the child needs to understand when there is more than one option available, a more useful strategy may deter the use of a more pleasant but less useful option, and a person should behave in a way that is better for achieving the goal. Conceivably, younger children’s difficulties with metacognitive strategies may be related to their difficulty in
understanding of relations between internal conflicting desires. Lockl and Schneider (2007) found that children’s understanding of epistemic states, such as false beliefs, contributed to their later metamemory knowledge. It has not been studied whether children’s understanding of motivational states is similarly related to metacognition, mainly because the existing measures on children’s understanding of simple desires or interpersonal conflicting desires seem to be irrelevant for aspects of metacognition. However, in situations where children need to select among competing strategies to accomplish a goal, children’s understanding of internal conflicting desires might be particularly relevant and thus worth investigating.

Understanding Internal Conflicting Desires and Understanding Agency

In addition to children’s delay of gratification ability and metacognitive strategies, understanding internal conflicting desires may also be related to a crucial aspect of the mind-agency. The sense of agency lies in our feelings of choice in carrying out many everyday actions. As adults, we attribute choices to people and see them as guiding people’s behaviors, especially when the objective situation offers more than one options. For example, when a person blows out a candle, we think he chooses to do so, and we can easily imagine that he may act in many other ways if he wishes, such as let it burn. In contrast, if the wind blows out a candle, we will not think it is the wind’s choice. As illustrated by this example, both agents and non-agents may have the power to cause certain actions or bring about state changes, but only agents have the power of not to perform the action. The ability of “could have done otherwise” for a given action, is thus unique to agents and makes agents to be perceived as fundamentally different from inanimate objects (Nichols, 2004). Perceiving agency or choices in people’s actions is an important part of our folk understanding of the mind. However, traditional theory of mind research focuses on children’s understanding of actions as caused by mental states, and their understanding about the role of agency in actions has not been examined. Only until recently have researchers started to pay attention to when and how children acquire an understanding of agency, mainly through studying children’s concept of choices or free will (e.g., Chernyak, Kushnir, Sullivan, & Wang, 2011; Chernyak, Kushnir, & Wellman, 2010; Kushnir, Wellman, & Chernyak, 2009; Nichols, 2004;
Nichols (2004) conducted the first study that directly examined whether children think an agent could have done otherwise. Four- and 5-year-olds watched an experimenter open a box and then either stick his hand inside or drop a ball inside the box. Children were asked whether the experimenter or the ball had to touch the bottom of box, or could either of them have done something else instead. Children uniformly said that the experimenter, but not the ball, could have done something else. Kushnir et al. (2009) also found that 4- and 5-year-olds acknowledged that a character who performed a desired action (e.g., step off the stool and go to the ground) could have done otherwise (e.g., stay on the stool). Moreover, children distinguished possible choices from impossible choices, by attributing freedom of choice only to physically possible actions rather than physically impossible actions. Consistent with these findings, other studies (Chernyak et al., 2011; Chernyak et al., 2010) have found that children are not only sensitive to physical constrains on a person’s ability to choose to do otherwise, but also understand freedom to act can be restricted by intangible constrains. Preschool children tend to say they do not have the choice to act against perceptual knowledge, conformity, their own preference, or moral and conventional rules.

The results of these studies show that by age 5 children already have a concept of choice, and they understand the role of physical, social and psychological factors in constraining people's freedom of choice. However, as agents we are not just constrained by external and internal factors, we can also act against restrictions. Preschoolers have been found to consistently deny they have the choice to act immorally, such as draw an object hated by another person (Chernyak et al., 2010). However, all the crimes happening in the world speak against their perceptions. Although external or internal rules may constrain our choices and actions, they may do so only to a certain extent. In fact, our agency and freedom of choice involve the ability to act against constraints, not simply according to them. Is it possible that preschool children only understand people’s choice as limited, but do not yet recognize how powerful it can be in terms of overriding restrictions?
Analyzing children’s understanding of internal conflicts may provide answers to this question. As Piaget (1981) argued, to speak of will, there must be a conflict between two impulses, and in an act of will, the initially weaker one may become the stronger of the two. Along these lines, Wente et al. (2013) investigated children’s understanding of free will, as indicated by the freedom of acting in the face of one’s own desires. Four- and 6-year-old American children were asked whether they could do things that they disliked and refrain from performing actions they liked. They found that both age groups acknowledged that a person could perform undesired actions, but when it comes to inhibiting a desired action, only 6-year-olds acknowledged this possibility. These results provide the first evidence that children may develop intuitions of people’s ability to act against desires around age 6, after they understand choices as constrained by desires and other external or internal factors.

In this study, children were simply asked whether a person has to perform a desired action (e.g., eat the yummy food) or could choose not to do it, without being given a reason for why the person may act otherwise. It is possible that if given information about the possibility of other choices (e.g., the yucky food is healthy), even younger children could attribute freedom of choice to the person. Moreover, it remains unknown that in addition to beliefs about the possibility of choice, whether children’s developing sense of free will also influences their expectations about the content of choice. When having more than one option, people normally act to fulfill the strongest desire. However, under certain circumstances, the act of will also enables a person to choose the less preferred option, such as to drink plain water instead of delicious juice. Compared to children who do not have an understanding of agency or free will, those who have such a notion may be more likely to understand the possibility of such choices. Studying children’s intuitions of people’s choices in the context of internal conflicting desires may shed light on this possibility.

The Present Study

The present dissertation aims to investigate children’s understanding of the relations among internal conflicting desires. Past research on children’s understanding of mental states
has focused more on epistemic states like beliefs than motivational states like desires, and the majority of the existing studies on children’s reasoning about desires are about simple desires or conflicting desires between people. Extending these previous approaches, this dissertation explores children’s understanding of conflicting desires within a single mind. More specifically, we were particularly interested in children’s understanding of the hierarchical relations between internal conflicting desires and their roles in actions. A person may simultaneously have multiple desires, but often may only choose to act in a single way. The key to understanding or predicting the chosen behavior in this situation is to understand the hierarchical relations between the conflicting desires: the existence of some desires could cancel the fulfillment of others. The development of this understanding constitutes an important part of the child’s understanding of motivational mental states and is possibly connected to a range of other cognitions and behaviors, such as children’s understanding of agency and choice, self-control behaviors and metacognitive strategies.

To examine children’s understanding of the relations between internal conflicting desires, across three studies, we presented 4- to 7-year-old American children with stories in which a character has to take an action that is against an immediate desire in order to achieve an overarching goal, such as to play with another character whose preferred activity conflicts the character’s own. If children understand that the existence of the goal should overcome the immediate preference for the specific activity, they would predict the person should act according to the goal. Alternatively, if children do not appreciate the hierarchical relations between the different desires, they should choose randomly or predict the person would act to satisfy the immediate desire. The stories involved third-party judgments, which had the advantage of being objective across different participants, and less susceptible to the influences of children’s own desires or preferences.

Existing research suggests different possibilities for the development of this understanding. On one hand, children achieve a working understanding of simple desires and conflicting desires during early preschool years (e.g., Wellman & Wooley, 1990). Desire has also
been argued to be a mental state that does not involve complex representational relations with the world. Therefore, it is plausible that children may also achieve an understanding of internal conflicting desires early in life, during preschool years. On the other hand, understanding internal conflicting desires may require an ability to integrate multiple perspectives of a single situation, which may be difficult for preschoolers. Previous studies on children’s understanding of other subjective states also seem to suggest children do not attribute conflicting emotions or desires to people until age 7 or 8 (e.g., Choe, et al., 2005; Harris, 1983; Harter, 1983). The current study allows us to examine these different possibilities and will give us a more complete understanding of the development of our mental state reasoning.

**Study 1**

Study 1 examines children’s understanding of the relations between internal conflicting desires in the play situation. We presented 4- to 7-year-old American children with stories in which a character would like to play with another character. In one story the preferred activities of the two characters conflict with each other, leading to an internal conflict for the first character to either play the preferred activity or to play with the other person. In the other story there were no such conflicts in desires between the two characters, so there was no internal conflict involved in playing with the other person. Of interest was what the child predicted the character would choose to do in each story.

**Method**

**Participants.** Sixty-four children from two preschools and two afterschool programs in an Eastern United States city participated. Participants were 21 four-year-olds (12 girls, range = 48 to 57 months, M= 51.2 months), 23 five-year-olds (11 girls, range = 60 to 70 months, M = 64.0 months), and 20 six- and seven-year-olds (12 girls, range = 73 to 96 months, M = 83.8 months). The majority of the children were from middle class families in the area.

**Design and materials.** We presented children with two stories in which one character desires to play with another character (Ziv & Frye, 1999). Play situations were chosen because they are familiar to children and often involve conflicts. In the *Prosocial Conflict* story, the two
characters preferred to play different activities, so the main character’s desire to play her favored activity conflicted with her goal to play with the other person. Therefore, in order to play with the other character, the initiator has to propose to play the activity desired by the other person rather than the activity desired by her own. The Prosocial Conflict story was contrasted with a Prosocial No-Conflict story, in which no internal conflicting desires were involved. In this story, the initiator also wants to play with the partner but does not have a preference of her own; only the partner has a preference between two activities. The initiator, therefore, experiences no internal conflict in order to play with the partner. Children were asked to judge at the end of each story which activity the initiator would propose to play with her partner. Children’s answers in each story were compared across age groups.

Two Disney princess toy figures Snow White and Bell were used to act out the Prosocial Conflict story, and the toy figures of Ariel and Sleeping Beauty were used to act out the Prosocial No-Conflict story.

Procedur. The 4- and 5-year-olds were tested individually in a quiet room at the preschool during normal daytime hours, and the 6- and 7-year-olds were tested in the same room but during after school hours when they came to join the after-school program. Each child heard both stories in a session that lasted about ten minutes. The toy figures used as the initiator in each story and their desires were counterbalanced across the participants within each age group.

The child was first introduced to the characters before hearing each story. The child was asked to identify and name each of the figures before proceeding. Children did not have difficulty in distinguishing and remembering the characters. All children confirmed that they were familiar with the activities in the story (hide and seek, playing blocks, reading and watching cartoons). The child heard each story in a counterbalanced order after this warm-up phase. The narrative for the Prosocial Conflict story was: “These are Snow White and Bell. Snow White does not like to play blocks; she likes to play hide and seek. Bell likes to play blocks; she does not like to play hide and seek. Now Bell really wants to play with Snow White; she really wants Snow White to play with her.” For the Prosocial No-Conflict story, the child was told: “These are Ariel and the
Sleeping Beauty. Ariel does not like to read; she likes to watch cartoons. Now Sleeping Beauty really wants to play with Ariel; she really wants Ariel to play with her.” The activities liked by the characters were counterbalanced across participants.

Immediately after the child heard each story, he/she was asked two memory questions in a counterbalanced order to make sure the critical information in the story was understood: 1) Preference Desire question: What does Snow White (Ariel) like to do? What does Bell (Sleeping Beauty) like to do? 2) Goal Desire question: Does Bell (Sleeping Beauty) want to play with Snow White (Ariel) or not? Feedback was provided and the story was clarified or retold if children did not give correct answers to any of the memory questions.

After the memory questions, the child was asked the test question: What will Bell (Sleeping Beauty) say to Snow White (Ariel) so that Snow White (Ariel) will be willing to play with her, play blocks (read) or hide and seek (watch cartoons)?

Results and Discussion

![Figure 1](image)

Figure 1. Mean percentage of goal-oriented responses by age for the Prosocial stories in Study 1.

Scoring. Children’s responses to the memory and test questions were coded as 1 or 0. To get a score of 1 for each of the two memory questions, the child had to identify the desires of the two characters, and the overall desire of the initiator to play with the other character. For the
test question, children got a score of 1 if their answer reflected the desire of the partner, and they got a score of 0 if they answered with the initiator’s own desire.

**Group and task differences.** Children did very well with the memory questions. All children remembered the desires of the two characters correctly. All children except two 4-year-olds acknowledged that the initiator wanted to play with the other character. Excluding these two children did not affect the results, so they were included in subsequent analyses.

Log-linear analyses were conducted to analyze children’s responses to the *Prosocial No-Conflict* story and *Prosocial Conflict* story separately. The best-fit model revealed no significant effect of age on children’s responses to the *Prosocial No-Conflict* story, $X^2(2, N = 64) = 4.92, p = .30$. In contrast, there was an effect of age on children’s responses to the *Prosocial Conflict* story, $X^2(2, N = 64) = 11.43, p = .004$. Further analyses of the age differences for each question revealed no difference between 4- and 5-year-olds’ performances, $X^2(2, N = 64) = 1.92, p = .17$. However, the 6- and 7-year-olds performed better than both the 4-, $X^2(1, N = 41) = 11.27, p = .001$ and the 5-year-olds, $X^2(1, N = 43) = 4.48, p = .034$. Six- and 7-year-olds predicted the initiator would propose the activity that was desired by the partner, whereas younger children predicted the initiator would choose the activity desired by her own. These results are displayed in Figure 1.

**Comparisons to chance.** Children’s responses for each story were compared to a chance level of 0.5 out of 1. Binomial tests indicated that for the *Prosocial No-Conflict* story, 4-year-olds were at chance ($p = .38$), and 5-, 6- and 7-year-olds were above chance ($ps < .011$). In contrast, for the *Prosocial Conflict* story, 4-year-olds were below chance ($p = .027$), 5-year-olds were at chance ($p = .68$), and 6- and 7-year-olds were above chance ($p = .041$).

These results revealed an age-related change in understanding the relations between internal conflicting desires between 4 and 7 years. In situations where there was an internal conflict between choosing a favored activity versus the goal of playing with another person, 6- and 7-year-old children were more likely than younger children to judge that the character would act in accordance with the goal to play with the partner, instead of fulfilling her basic preference.
In contrast, when the main character did not have an internal conflict in desires, the age groups did not differ from each other in predicting the prosocial action of the character. Therefore, it is the understanding of relations among internal conflicting desires and their relations with people’s actions that seems to be challenging for preschool children.

The stories in Study 1 involved prosocial behaviors in play situations. These situations had the advantage of being familiar to the children. Nevertheless, two factors in the **Prosocial Conflict** story might also have caused difficulty for younger children’s performance. First, the **Prosocial Conflict** story involved two characters and their different desires. In order to answer correctly about what the initiator would do, the child had to represent the interpersonal conflicting desires (each character’s preferred activity) in addition to the conflicting desires within the individual (play the favored activity vs. play with the other person). Because 4-year-olds have been found to have difficulty in understanding conflicting desires between people under certain circumstances (e.g., Moore et al., 1995), it is possible this demand might have made the task difficult for the younger groups. Second, good performance in the prosocial situation also required perspective-taking ability: The child needed to know from the perspective of the partner what she would like to hear. Thus the young children’s poor performance on the **Prosocial Conflict** story might not be due to poor understanding of intrapersonal conflicting desires, but might be because of a failure of perspective-taking in this situation. Indeed, although the three age groups did not differ on the **Prosocial No-Conflict** story, 4-year-olds did not perform above chance on this story, suggesting they might not be proficient in taking the perspective of the partner. These potential confounding factors could be addressed by having stories involving only one main character rather than a social interaction, which was what was explored in Study 2.

**Study 2**

In Study 2, we designed two new **One-Character** stories, each involving only one main character. In both stories, the main character desired a goal (e.g., lose weight or get good grades) that conflicted with a basic preference of the same character (e.g., liking chocolate rather than broccoli or wanting to watch cartoons rather than do homework). Similar to Study 1, the child
was asked to predict what the character would do—something undesired but in accordance with the goal (e.g., eat broccoli or do homework), or something that the character desired but was unhelpful for the goal (e.g., eat chocolate or watch cartoons). These stories avoided the potential confounding factors of the prosocial stories in Study 1. They also tested whether children’s judgment was similar for non-social situations. Children’s false belief understanding was also assessed by a standard Change-of-Location False Belief task as a comparison (Wimmer & Perner, 1983).

**Method**

**Participants.** The same sixty-four children from Study 1 participated in the second study. Participants were 21 four-year-olds (12 girls, range = 48 to 57 months, M= 51.2 months), 23 five-year-olds (11 girls, range = 60 to 70 months, M = 64.0 months), and 20 six- and seven-year-olds (12 girls, range = 73 to 96 months, M = 83.8 months). The majority of the children were from middle class families in the area.

**Design and materials.** Children were presented with two One-Character stories, one Food story and one Academic story. In the Food story, the main character wants to lose weight. However, the character likes chocolate but not broccoli, so the character’s food preference conflicts with the goal. In the Academic story, the main character wants to get good grades on an upcoming exam, but again the character’s preference about activities conflicts with this goal (likes watching cartoons but not doing homework). Similar to Study 1, children were asked to predict what the main character would choose to do. Pilot testing indicated that children did not have difficulties in understanding that eating broccoli and doing homework were more helpful than the other options for the characters’ main goals. Children also did not have difficulty in understanding that some options could be more desirable than others for an individual. They understood that when a person had two desirable options, if one was more important than the other, then the person would choose the more desirable option. Children’s answers in each story were compared across age groups.
An elephant puppet was used to act out the Food story. A toy figure of a boy was used to act out the Academic story. Two toy cups, a piece of toy chocolate and a toy figure of a girl was used for the Change-of-Location False Belief story.

Procedure. As in Study 1, the preschool children were tested individually in a quiet room at the preschools during normal daytime hours, while the 6- and 7-year-olds were tested during after school hours. The whole testing session lasted less than ten minutes for each child.

Before the child heard each story, he/she was first introduced to the characters in the story. Then the experimenter read the stories to the child in a counterbalanced order. After that, two memory questions were asked regarding the main character’s desired goal and preference about activity or food. Feedback was provided if the child answered any of the memory questions incorrectly. Next, the child was asked the test question of predicting what the character would choose to do. The specific stories and questions are presented in the Appendix.

Results and Discussion

Figure 2. Mean percentage of goal-oriented responses by age for the combined One-Character story and percentage of correct responses for the Change-of-Location story in Study 2.

Scoring. Children’s responses were coded similarly to Study 1. For the memory questions, children got a score of 1 for each question if they answered correctly about the desired goal or the food/activity preferences of the main character. They got a score of 0 for each
incorrect answer. For the test questions, children received a score of 1 for the *Prediction* question if they predicted the main character would choose the activity or food that was helpful for the goal. They got a score of 0 if they predicted the character would choose the desirable but unhelpful activity or food. In the false belief task, children got a score of 1 for predicting the character would search in the original location and a score of 0 for the location that contains the chocolate.

**Group differences.** Children did very well on the *Memory* questions. All age groups answered correctly about the main character’s preference for the activity or food. All but one 4-year-old answered correctly for the main goal of the main character in the *Academic* story.

We created a combined score for each test question of the two *One-Character* stories by adding up children’s score for the *Food* story and the *Academic* story. The total score for each question ranged from 0 to 2. A preliminary non-parametric test revealed that children’s performance on the *Prediction* question of the *Academic* story was better than their performance on the *Prediction* question of the *Food* story (*p* = .011, McNemar’s Test).

A one-way ANOVA was conducted to analyze the combined score for the *One-Character* stories. There was a effect of age, *F*(2, 61) = 8.95, *p* < .001 (percent correct *Ms* = 19.1, 41.3, and 67.5 for 4-, 5-, and 6-and 7-year-olds respectively). Tukey’s HSD tests indicated that 6- and 7-year-olds performed better than the 4-year-olds, *p* < .001 and marginally better than the 5-year-olds, *p* = .058. The 6- and 7-year-olds predicted that the main character would act in accordance with the main goal (choose the undesired activity or food), whereas the 4- and 5-year-olds predicted the character would act in accordance with his preference for the activity or food instead of the main goal. These results can be seen in Figure 2.

Children’s responses on the *Change-of-Location False Belief* task were consistent with the existing results in the literature (Wellman, Cross, & Watson, 2001). Sixty-two percent of the 4-year-olds, 91% of the 5-year-olds, and all 6- and 7-year-olds correctly predicted the character would search in the original location (Figure 2). Chi-square tests indicated that both of the older groups performed better than the 4-year-olds, *X*2(1) > 5.66, *p* < .017.
Comparisons to chance. Children’s responses to the combined One-Character stories were compared to a chance level of 1 out of 2. Four-year-olds performed below chance, $t(20) = -4.24, p < .001$, 5-year-olds were at chance, $t(22) = -1.0, p = .33$, and the 6- and 7-year-olds were above chance, $t(19) = 2.33, p = .03$. In agreement with the group differences on the Chang-of-Location False Belief task, Binomial tests revealed that 4-year-olds’ performance was not different from chance, $p = .38$, while the two older groups performed above chance, $ps < .001$.

Relations among the tasks. Spearman’s rank correlations among the prosocial stories in Study 1, the combined One-Character story in Study 2 and the Change-of-Location False Belief task were calculated. As presented in Table 1, children’s responses on the combined One-Character story were related with their responses on the Prosocial No-Conflict story and the Prosocial Conflict story, $ps(62) = .30$ and $.25$, $ps = .015$ and $.048$, respectively.

In this study, consistent with the results from Study 1, we found that 6- and 7-year-olds performed better than 4-year-olds in understanding the relations between internal conflicting desires. Specifically, 6- and 7-year-olds predicted that the main character would act in accordance with the main goal (choose the undesired but helpful activity or food), whereas 4-
year-olds’ responses were influenced by the main characters’ preferred activity or food instead of their desired goal. Because the stories in Study 2 did not involve social interactions, younger children’s performance could not be due to a failure of registering different desires between people or perspective taking.

One more aspect of the tasks has to be controlled before we can reach a conclusion about the difference in older and younger children’s understanding. Eating chocolate and watching cartoons are appealing to most children. This characteristic may lead to at least two factors that could account for younger children’s performance. First, young children might project their own preferences to the main character and thus predict he would choose the things that they themselves thought were desirable. Second, because the answers were given verbally, it is possible that younger children were not able to inhibit their response and simply blurted out the attractive option. Study 3 aimed to address these issues by investigating children’s understanding of novel desires that they did not have prior belief about.

**Study 3**

To explore the possibility that younger children’s predictions for the characters’ behaviors were based on their own preferences or impulsivity, in Study 3, we designed a *Novel Desire* story that involves goals and preferences that were unfamiliar to the children. In this story, the main character’s goal was to feel “blarb,” which conflicted with her basic preference for the flavors of two novel fruits. The character liked the flavor of the fruit that was not helpful for feeling blarb and disliked the flavor of the fruit that could make the person feel blarb. The child was asked to predict which fruit the character would choose to eat. Because children did not have preexisting beliefs about the goal or the basic preference, their responses could not be accounted for by attribution of their own desires or impulse control.

**Method**

**Participants.** Participants were 45 children from four preschools and two afterschool programs in New England area. There were 15 four-year-olds (7 girls, range = 48 to 58 months, M= 54.1 months), 15 five-year-olds (9 girls, range = 60 to 67 months, M = 62.7 months), and 15
six- and seven-year-olds (10 girls, range = 74 to 96 months, M = 87.6 months). The majority of the children came from middle class families in the area.

**Design and procedure.** We told the story to the children while showing them illustrative pictures on a computer screen. The child was told that the character really wanted to feel blarb, and she liked one of two novel fruits and did not like the other one. However, the favored fruit was not helpful for feeling blarb, while the undesired fruit could help. Two solid circles, one being green and one being yellow, depicted the two novel fruits. The fruit preferred by the character was counterbalanced across participants. We followed similar procedure as in Study 1 and Study 2, except that to make sure the child understood the critical information about the novel fruits, in addition to the *Preference Desire* (which fruit the character liked) and the *Goal Desire* (whether the character wanted to feel blarb or not) questions, the child was also asked a *Effectiveness Desire* question, about which fruit would help the character feel blarb. After the memory questions, the child was asked to predict which fruit the character would choose to eat. Each child heard this *Novel Desire* story and answered the questions in one five-minute session. The specific story and questions are presented in the Appendix.

**Results and Discussion**

![Figure 3](image-url)

Figure 3. Mean percentage of goal-oriented responses by age for the *Novel Desire* story in Study 3.
**Scoring.** Coding for responses was similar to what was used in the previous studies. Children got a score of 1 for answering each memory question correctly and got a score of 0 for each incorrect answer. Children got a score of 1 on the test question by predicting that the character would choose the undesired but helpful fruit, and they got a score of 0 for choosing the desired but unhelpful option.

**Group differences.** All age groups answered correctly above chance for each of the memory questions, all ps < .026. All children answered correctly for the Preference Desire question, all but three 4-year-olds and one 5-year-old answered the Goal Desire question correctly, and all but two 5-year-olds answered correctly on the Effectiveness Desire question. Excluding the children who failed on any memory question did not affect the results, so they were included in subsequent analyses.

To test the effect of age on the test question, a log-linear analysis was performed. The best-fit model revealed an effect of age on children’s response, \(X^2(2, N = 45) = 15.40, p < .001\). Further analyses of the age differences for each question revealed no difference between 4- and 5-year-olds’ performances, \(X^2(1, N = 30) = 1.72, p = .19\) (Figure 3). However, the 6- and 7-year-olds performed better than both the 4-, \(X^2(1, N = 30) = 14.66, p = .001\) and the 5-year-olds, \(X^2(1, N = 30) = 6.95, p = .008\). Six- and 7-year-olds predicted that the character would choose the undesired fruit which was helpful for the goal of feeling “blarb,” whereas younger children predicted the person would choose the desired but unhelpful option. These results are displayed in Figure 3.

**Comparisons to chance.** Children’s responses were compared to a chance level of 0.5 out of 1. Consistent with the findings in Studies 1 and 2, Binomial tests revealed that 4-year-olds were below chance (\(p = .007\)), 5-year-olds were at chance (\(p = .30\)), and 6- and 7-year-olds were above chance (\(p = .035\)).

These results are in agreement with previous findings in Studies 1 and 2 that by age 6 or 7, children understand that the existence of an important, overall desire can set aside the fulfillment of an immediate, conflicting desire, and they predicted people would act according to
the main goal. In contrast, younger children predicted people would act based on basic preferences, suggesting they did not recognize the constraining impact of the existence of other desires. Their performance could not have been affected by their own preferences or impulse control, since the goal and preference were both novel to them.

**General Discussion**

A core feature of desires is that they can potentially be in conflict with each other in a single mind. A person with multiple conflicting desires may nevertheless often choose to perform only one action. To understand and predict the person’s chosen act, it is important to understand that internal conflicting desires may be related in a hierarchical way, in which the pursuit of one desire as a goal would inhibit the fulfillment of other basic desires. Across three studies, we found an age-related change in understanding the hierarchical relations between internal conflicting desires. When told that a person had a goal that conflicted with a basic preference, preschoolers predicted that the person would act according to her preference. In contrast, 6- and 7-year-olds predicted the person would choose the undesired activities if they were helpful for achieving the goal, suggesting they realized that the existence of the goal overcame the preference.

One possible interpretation of these results is motivational. Older, but not younger children gave the goal-oriented response because older children value the goal, such as getting good grades, more than younger children, while younger children cared more about having fun. That is, they may simply predict the person’s actions based on their perceived “desirability” of the targets. However, the similar developmental patterns we found across the different story contexts make this account implausible. Playing with other children may certainly be important for both younger and older children. More to the point, feeling “blarb” was a novel goal for all participants. Nevertheless, younger children’s responses were not better in any of these situations, suggesting the goal familiarity or relevance to the child could not be the main factor that determined their prediction.

Another potential factor that could have contributed to younger children’s responses was a lack of inhibitory control. Because most young children like chocolate and watching cartoons, it
is possible that they were not able to inhibit the impulse to pursue these options. However, their performance on the prosocial and the novel desire stories is also less open to an explanation of impulsivity. In the Prosocial Conflict story, the activities desired by the two characters were counterbalanced across participants, so it was unlikely that the dominant response pattern was caused by the greater appeal of either option. In the Novel Desire story, the fruits were unfamiliar to the children, so children did not need to inhibit any impulse when responding either.

We believe the difference in younger and older children’s performance reflects an age-related change in their theory of mind ability, particularly about understanding the hierarchical relations between desires in a single mind. When a person only has single or compatible desires, it is reasonable to predict the person will act based on his preferences. However, as the reality often is, the characters in the stories held conflicting subjective states. To predict what a person will do in this situation, it is essential to understand that the pursuit of a more important desire often prevents the fulfillment of the other more basic and less important desires. Being unable to recognize this, younger children displayed a “hedonistic” type of reasoning when predicting what the person will do with internal conflicts. They predict the person will choose the favored activity and food over the disliked ones. As a “desire psychologist”, children as young as two predict people will act towards fulfilling their desires (Wellman & Wooley, 1990). Without developing the awareness of hierarchical relations between desires, the preschoolers still rely on this kind of thinking when making predictions about the behaviors of the person with conflicting desires. However, between 5 and 7 years, the realization of the hierarchical relations between internal conflicts enables children to expect people to act according to the goal, even at the expense of other immediate desires. That is, the child has changed from a “simple desire psychologist” to a “hierarchical desire psychologist.” They start to understand that when a person has internal conflicting desires, the overarching goal has the power to deter the fulfillment of the more immediate desires, and people’s behaviors are thus guided by those desires that are higher in the hierarchy.
The developmental change between 5 and 7 in understanding the relations between internal conflicting desires is consistent with the majority of previous findings on children’s ability to attribute simultaneous conflicting mental states to people. Around age 7 children start to understand that people may have mixed emotions (e.g., Harris, 1983, 1989; Harter & Buddin, 1987) and begin to appreciate how situational factors such as rules may contribute to mixed emotional states (Lagattuta, 2005). The results for internal conflicting desires also show change during these same years (Choe et al., 2005).

Researchers have occasionally found children younger than age 7 have some rudimentary understanding of conflicting mental states, but the discrepancy in results were mostly due to the specific abilities tested and methodological differences. For example, Kestenbaum and Gelman (1995) found that 4- and 5-year-olds could describe and identify facial expressions of mixed emotions. This ability might be related to and possibly is a precursor to understanding internal conflicting mental states, but identifying expressions of conflicting emotions is different from actually understanding the existence of these mental states. In addition, Bennett and Galpert (1993) found that 5-year-olds were correctly able to predict a person’s behavior based on his conflicting desires. For example, they told children that a person wanted to visit his friend, but then thought that a person they really disliked would be at his friend’s house. The disliked factor was stressed so that children and adults predicted the person would not visit his friend. In the story, the person’s desire to avoid the disliked person was stated last, so to succeed, children did not have to understand concurrent desires that directly conflict with each other. Collectively, the existing findings reveal an advancement for understanding internal conflicting mental states between ages 5 and 7. This understanding is achieved relatively late considering that children already have a working understanding of simple desires and conflicting desires between people by the age of 3 (e.g., Cassidy et al., 2005; Flavell et al., 1990; Wellman & Wooley, 1990; Rakoczy et al., 2007). This discrepancy leads to the question of why it takes a few more years for children to update their understanding of other types of desires to conflicting ones in a single mind?
Certain cognitive abilities may need to be achieved in order for children to appreciate the relations between internal conflicting desires. Developmental changes between ages 5 and 7 have been accounted for by researchers, especially by Piagetian and Neo-Piagetian theories (e.g., Fischer, 1980; Piaget, 1965). According to their perspectives, the most important cognitive development between ages 5 and 7 is the change from unidimensional thinking to multidimensional thinking. Children around age 5 are thought to be capable of only representing a single feature of a situation, and when they reach age 7 or 8, children start to be able to represent multiple dimensions of a single situation simultaneously. Other researchers have used these theories to explain children’s acquisition of the simultaneity of multiple emotions (e.g., Harter & Buddin, 1987). At first sight, it seems plausible that this view might also account for the results in the current study. That is, young children may only focus on single desires, and do not appreciate that multiple mental states could coexist or understand the relations between them.

However, this account might not be the whole story. First, there is evidence that children’s ability to integrate differentiated dimensions may vary depending on the domain, and surprisingly in some domains children aged 5 or even younger were shown to actually have this ability (e.g., Levin, 1982; Markman & Seibert, 1976; Siegler, 1981). Therefore, even if integrating multiple dimensions is relevant for why children fail to appreciate the relations between internal conflicting desires, we still may need an account for what about this domain makes it hard for children to integrate the two dimensions in internal conflicts. Second, this view also does not adequately account for why interpersonal conflicting desires can be understood earlier than intrapersonal ones, since both of them seem to involve two dimensions. Third, although our internal conflicting desire stories involve two dimensions (a goal and a preference), to succeed in these tasks, children may not need to combine the two dimensions as they do in the conservation tasks. In the conservation tasks, the two dimensions (e.g., changes in the height and width of the water) are objectively of equal status, and the child has to combine them to conclude that the amount does not change when water is poured from the beaker to the graduated cylinder. However, in the conflicting desires situation, the two dimensions (the goal and the preference) are
hierarchically related. It is thus less of a matter to combine the two dimensions than to weigh the two dimensions and to choose between them. Therefore, the ability of combing two dimensions in the traditional Piagetian accounts may not be necessary for understanding relations between internal conflicting desires.

Three other cognitive abilities might be underlying children’s understanding of internal conflicting desires and need to be considered. First, younger, but not older, children might have difficulties in switching from one dimension (immediate desire) to the other dimension (overall goal), particularly due to hierarchical relations between the two dimensions. Based on Siegler’s (1981) formulation, in problems involving two dimensions, one dimension might be dominant and the other might be subordinate. In our conflicting desires stories, the person’s preference could be conceptualized as the dominant dimension, while the person's goal could be the subordinate dimension. In Siegler's terms, the story can be viewed as a “conflict-subordinate problem”, in which one choice (e.g., chocolate) is greater on the dominant dimension (preference), the other choice (e.g., broccoli) is greater on the subordinate dimension (goal), and the choice greater on the subordinate dimension (e.g., broccoli) is the correct answer. Switching from the dominant dimension to the subordinate dimension in this case has been found to be difficult for children around age 5.

However, two questions still remain unclear in this account. First, it needs to be explained what makes the goal instead of the preference the subordinate dimension. As Siegler (1981) stated, the dominant dimension is the one that young children often rely on and those that adults usually report as being more salient. This position seems more like a restatement of the phenomenon than an explanation of it. Second, children's performance in the false belief task (Wimmer & Perner, 1983) may also be viewed as a switch from one dimension (reality) to the other dimension (false belief), but children seem to pass the false belief tasks earlier than they pass the conflicting desires tasks. Therefore, there must be factors in the conflicting desires situation that makes the switch more difficult than in the false belief situation.
The hierarchical relations between the two dimensions might be the critical factor in answering the two questions. In the conflicting desires situation, the two desires are hierarchically related, with the desire in the overall goal being higher in the hierarchy, and the existence of it may cancel the pursuit of the desire lower in the hierarchy. In contrast, in the traditional location false belief tasks, belief may be less perceptually salient than reality, but the two dimensions are not hierarchically related. Specifically, the existence of false beliefs does not alter the state of the world, and the reality does not always give rise to true beliefs. It is possible that younger children are not sensitive to the hierarchical relations, so when they are presented with both the goal and the preference, they simply pay attention to the basic dimension without considering the one higher on the hierarchy.

Alternatively, it is also possible that younger children may be aware of both dimensions and even know that the goal is of a high importance for the character (this was stressed in the story and most children acknowledged it). However, they may not understand the implication of the hierarchical relations between them. They may have difficulty seeing that the option higher on the hierarchy actually has the power to negate the one lower on the hierarchy, which leads to the possibility that a person may do something he does not like if it can lead to something good. Without this understanding, the child may simply choose something the person likes because they are uncertain about the other possibility. Under either situation, the hierarchical relations between the conflicting desires may make the goal choice a subordinate dimension and make the conflicting desires stories more difficult than the false belief stories. This account predicts that in other situations that involve hierarchical relations between two conflicting dimensions, regardless of the specific content domains, young children may also select the choice greater on the dominant and basic dimension, rather than choosing the option that is greater on the subordinate dimension and is higher on the hierarchy.

Second, the differences between younger and older children's responses on the conflicting desires stories may also be considered from the representational change perspective. In order to fully comprehend the relations between internal conflicts, children may need advanced
meta-representational abilities, to represent multiple simultaneous relations between the state of the world and the state of the mind. Perner (1991) laid out the developmental sequence of understanding the representational nature of the mind in three levels: primary, secondary and meta. During the first year of life (primary level), children can only have a single model to represent the current situation. Then during the second year (secondary level), children can entertain multiple models and thus are capable of having representations freed from reality, as manifested in their pretend play ability. Finally, at about age 4 (meta level), children start to be able to represent representational relations, enabling them to understand that beliefs can misrepresent reality. Perner’s representational change theory provides a good explanation of the theory of mind development during the first four years of life. However, it does not account for advanced development beyond preschool. According to this account, because desires do not seem to misrepresent the world in the same sense that beliefs do, one would expect children to understand relations between conflicting desires earlier than false belief, which is inconsistent with what we have found. Therefore, representing conflicting desires might involve further development in children’s representational abilities beyond the existing three levels in Perner’s theory.

One plausible development might be representing multiple simultaneous relations between the world and the mind. Understanding false representations is a milestone in cognitive development, but it still involves representing a single relation between the world and the mind. To understand conflicting mental states is to go beyond this one-to-one (both true and false) correspondence between the world and the mind, which might conceivably be challenging, even for children who are expert at representing single relations. In agreement with this view, young children seem to believe in the singular relation between a single mind and the world. They explain that a person cannot have mixed emotions because they “don’t have two brains” (Harris, 1983). Kestenbaum and Gelman (1995) also found that 4- and 5-year-olds were much more proficient at acknowledging mixed emotional states for two-headed creatures than for one-headed ones.
It is reasonable that the ability for representing multiple relations between the world and mind develops later than the understanding of false beliefs. Typically a person can only act in one way or another. When a person behaves in a way that is inconsistent with reality, on observing this mismatch children may be inspired to explain the discrepancy in terms of the person’s false mental representations. In contrast, when it comes to conflicting mental states, the observable behavior tends to match only one motivational state at a time. Therefore, there are often no observable cues for children to detect the existence of simultaneous subjective states. This characteristic may contribute to the difficulty young children have in acquiring the understanding of multiple possible relations between the world and the mind, and it is conceivable that contradictory relations would be the most difficult among them.

A third possibility is that children’s developing understanding of agency might also play a role in their understanding of internal conflicts. Specifically, to predict the person would act according to the goal, the child not only needs to understand that desires may guide a person’s actions, but also needs to understand that as an agent, a person also has the ability to act against his desires. Or as Frankfurt (1971) famously proposed, humans are capable of forming “second-order desires”. This proposal means that in addition to having simple “first-order desires”, to do or not to do one thing or another, people may also have second-order desires or want to have or not have certain desires and motives. For example, a person who is addicted in drugs may try his best to overcome his desires for the drug. According to Frankfurt (1971), the person has two conflicting simple desires, to take the drug and to refrain from it. However, he is not neutral towards these desires; it is his second desire, not the first, that he wants to support and to make more truly his own. In other words, he has a second-order desire that to act according to the latter desire. He will be happy if the second desire wins out and will be sad if the addiction wins. In comparison, another person who is addicted in drugs may also have two simple conflicting desires but not the second-order volition. For example, the person wants to take the drug but also wants to give it up since it is so expensive. However, the person does not struggle to stop himself from taking it. In this case, the person does not have a second-order volition over
his simple desires, and which desire wins do not make a huge difference to him. It is possible that younger children only understand the basic “first-order desires” and not the “second-order desires”.

Recent research on children’s understanding of choice and free will suggests that 4- and 5-year-olds have some notions of people's freedom of choice in carrying out actions. When they see a person perform an action without obvious external forces, they often report that he has the ability to not perform that action. They also think that people’s choices are often constrained by various physical, social and psychological constrains (Chernyak et al., 2010; Chernyak et al., 2011; Nichols, 2004; Kushnir et al., 2009). However, there is some evidence that children may not understand the inhibition of desires until age 6 (Wente et al., 2013). Research on children's concept of emotion has also found that children understand emotion could be regulated around age 6, and this understanding develops thereafter until age 11 (Harris, olthof, & Terwogt, 1981).

These results suggest the possibility that around age 6 or 7, children’s view of the mind becomes fundamentally different from that of younger children in certain aspects. Younger children at best understand that the mind can lead to actions that conflict with reality, while older children may understand that the mind can lead to actions that conflict with itself. Younger children may understand that the person may actively choose different actions under the constrains of mental states, whereas older children may understand that the person may even actively choose to alter mental states and act against them. This new insight regarding the agency of the mind might lead to changes in children’s judgment in both the existence of choice and the contents of choice, so that around 6 or 7 years of age, children start to realize the possibility of choosing to inhibit desires (Wente et al., 2013), as well as to expect a person to act against a desire to achieve a goal. Future studies on the relations between the two types of judgments will be especially informative about this intriguing possibility.

To conclude, across three studies we found an age-related change in understanding the relations between internal conflicting desires. Kindergarteners and first graders understood that the existence of a goal would preempt the satisfaction of a basic desire that contradicts it, and
they predicted the person would choose the less favored activity over the more desired one to achieve a main goal. In contrast, preschool children relied solely on the person’s immediate desire to predict the behavior of the person, without recognizing the possible influence of the goal. These results contribute to the existing research on children’s understanding of desires and suggest that understanding internal conflicting desires might involve different cognitive abilities than those in simple desires and interpersonal conflicting desires. Several cognitive abilities might be underlying children’s understanding of internal conflicting desires, such as the appreciation of hierarchical relations, the ability to represent multiple relations between the world and mind, as well as the conception of the mind as capable of regulating or conflicting with itself. These possibilities provide different perspectives to look at the development in understanding internal conflicts and are not necessarily mutually exclusive. Testing these possibilities, especially using diverse types of tasks (e.g., ask children to explain, not just to predict people’s actions) in future studies might move the research, including the research on children’s theory of mind and their reasoning about agency and freedom of choice, along from where it currently is. Despite that these possibilities remain to be tested, the current findings contribute to the existing research not only by demonstrating the relatively late development of understanding internal conflicts compared to the understanding of simple mental states, but also by suggesting the potential new cognitive milestone achieved in children’s representations of the mind along with this understanding.
CHAPTER 3
The Role of Culture in the Development of Understanding Internal Conflicting Desires

Chapter 2 focused on developmental changes in the understanding of internal conflicting desires. The findings suggest that although children acquire an understanding of simple desires as early as about age 2 years (Wellman & Wolley, 1990), it is only near 6 or 7 years that American children show an understanding of the relations between internal conflicting desires. This trajectory leads to the important question about the mechanism for the development: How do children develop this understanding during early childhood? In other words, what factors are necessary for children to attain an understanding of internal conflicts? Broadly speaking, the relevant factors underlying the development, and possibly the development of theory of mind in general, might fall into at least two categories: cognitive abilities and sociocultural influences. Chapter 2 discussed the possible cognitive abilities necessary for understanding internal conflicts. This chapter considers the possible role of sociocultural influences in its development.

The Role of Culture in Theory of Mind Development: Implications of Different Theories

The nativist theory. Different theories of children’s theory of mind understanding have different views or implications on the role of sociocultural factors in its development. They differ mainly in terms of two related aspects: 1) whether culture plays a role in theory of mind development, and 2) if culture does play a role, then what is the role of culture in the development. Nativist theory, for example, claims that just as we are born with heads and toes, children are also born with many ideas or tendencies to think about the world in certain ways (e.g., Fodor, 1983). When it comes to understanding of the mind, nativism claims that we are born with innate ideas of folk psychology or innate processors to compute mental state information.

For example, Wierzbicka (1992) claimed that a set of basic mental state concepts (e.g., think, know, want and feel) are found in all languages and therefore are probably innate. Fodor (1992) also argued that people have innate psychological concepts, which exist in modules that
are encapsulated and invulnerable to evidence (Fodor, 1983). According to this view, young children’s theory of mind does not differ in any fundamental ways from adult folk psychology, and the child only needs to acquire computational resources to exploit what he or she already knows about the mind to make behavioral predictions. Somewhat differently, Baron-Cohen (1995) and Leslie (1995) argued that instead of having innate concepts, we use innately specified processors to deal with information of psychological states. Despite these variations in nativism, the nativist view in general predicts that culture only plays a very limited role of triggering children’s innate theory of mind abilities, and more experiences may not necessarily lead to major modifications in one’s theory of mind. Therefore, theory of mind development should be identical across different cultures.

The simulation theory. Simulation theory claims that children and adults understand other people’s mental states and behaviors by simulating or imagining in their own mind what the individual believes, desires, or feels (e.g., Harris, 1990). During development, it is their better imagination or mental simulation abilities that enable them to acquire mental state understandings. These simulation abilities are typically enabled by specific processors in the brain. Generally speaking, simulation theory has focused more on the process of mental state understanding than on the role of experiences in influencing the developmental process. However, the central arguments in the theory imply that children in different cultures should come to understand concepts of basic mental states similarly, because of the prevalence of personal psychological experiences and availability of simulation ability in most children.

Harris (1990), for example, claimed "the child's conception of the mind is probably universal in the early years because children everywhere will have certain common experiences and arrive at a core set of conclusions" (p. 218). According to Harris, cultural influences may only lead to variations in children’s folk psychology during later development. Supporting this view, Hardman (1981) found that like Western children, young children in some preliterate cultures believed that dreams were mental phenomenon. However, as they grew older, under the influence of their culture, they would increasingly regard dreams as real events experienced by
their wandering soul. Taken together, simulation theory implies that as long as children in different cultures have simulation abilities, the influence of different cultural values will not be evident in children’s understanding of basic mental state concepts. That is, the development should be invariant across different cultures early in life. Cultural beliefs may only play a role in later refinement of certain aspects of theory of mind.

**The executive function theory.** Executive function theory views children’s theory of mind development as enabled by children’s developing executive skills. These executive functions include abilities such as Inhibitory control, working memory, and cognitive flexibility (Diamond, 2013). More specifically, executive function theory suggests that children become increasingly able to reason about mental states when they become better at coping with high executive demands in the tasks, such as inhibiting salient reality information. According to this view, sociocultural inputs related with psychological phenomenon may not directly influence children’s theory of mind development. If the cultural values affect development of executive functions, however, children’s theory of mind development might be affected indirectly. Therefore, executive function theory implies that as long as children’s general executive abilities are similar, then children’s theory of mind would also follow similar developmental patterns across different cultures.

**The theory theory.** Compared to other theories, theory theory puts more emphasis on the role of sociocultural input in the development of theory of mind. According to this theory, children are like scientists, who receive data from experiences, form theories based on existing data, and adjust their theories to fit new data (Gopnik & Wellman, 1994). Therefore, theory theory predicts that children’s theory of mind will be dependent on the type of sociocultural input they receive. For the psychological phenomena that are prevalent in every culture, children are likely to construe similar constructs and theories. For example, when there are no obvious constraints, people everywhere act to fulfill their desires. Children in different cultures may observe this phenomenon, reason about it, and come up with a similar explanation: The person reaches towards it because he or she wants it.
On the other hand, theory theory also predicts that cultural emphasis on certain mental state phenomena may lead to variations in developmental processes. Supporting this view, for example, Wellman and colleagues (2006) found that Chinese and U.S. children developed an understanding of desires, beliefs and emotions in similar developmental trajectories. However, U.S. children understood diverse beliefs—people could have different views about something—earlier than knowledge—or the understanding of false beliefs. On the other hand, Chinese children showed the opposite pattern, possibly due to Chinese culture’s greater emphasis on knowing and acquiring practical knowledge. Therefore, theory theory claims that sociocultural influences play a critical role in affecting children’s construction of theory of mind concepts. It predicts that children’s theory of mind development would only be similar across cultures so far as the cultural beliefs and practices are similar.

In summary, the major theories on theory of mind imply at least two possibilities regarding the role of culture in its development. On one hand, according to nativist theory, simulation theory and executive function theory, culture’s role in theory of mind development is limited, peripheral, or indirect. They generally predict cross-cultural similarity in terms of theory of mind development. Specifically, nativist theory claims that culture plays very limited role in triggering children’s theory of mind abilities, so theory of mind development should be identical across different cultures. Simulation theory and executive function theory have not explicitly specified the role of culture in theory of mind development, but they imply that as long as children have similar simulation abilities or executive functions, theory of mind development would also be similar across different cultures in the early years. On the other hand, theory theory places more emphasis on the role of culture on theory of mind development. It predicts that theory of mind development would only be similar so far as the cultural emphasis on the psychological phenomena are similar, and when relevant cultural inputs are different enough, variations on the development of theory of mind are expected, even including the acquisition of basic mental state concepts.
Existing Cross-Cultural Research on Theory of Mind Development

Researchers have investigated whether theory of mind development is similar or different across cultures. Consistent with the predictions of all the theories mentioned above, the existing evidence indicates that developing a theory of mind during early childhood is largely universal. It seems that at least the understanding of fundamental mental states is observed in most cultures in infants and very young children (e.g., Wellman, 1998). For example, Wellman, Cross and Watson (2001) conducted a meta-analysis comparing false belief understanding across different countries. The results suggested that children in Europe, North America, South America, East Asia, Australia, and Africa all developed an understanding of false belief in childhood. Moreover, there is some evidence that the sequence for the acquisition of different mental state concepts may in general also be cross-culturally invariant: For example, Tardif and Wellman (2000) showed that both Chinese and American children acquire the basic understanding of desires prior to beliefs. Therefore, it seems that theory of mind development is impressively widespread and similar in childhood across different cultures in our world.

Despite these similar developmental patterns across cultures, some cross-cultural variations have been obtained, especially in terms of the developmental trajectories and the timing of development (Lillard, 1998b; Liu, Wellman, Tardif, & Sabbagh, 2008; Vinden & Astington, 2000; Wellman et al., 2006). For instance, consistent with Chinese culture’s greater emphasis on the acquisition of knowledge, Wellman and colleagues (2006) found that Chinese children understood knowledge earlier than diverse beliefs, which was the opposite of the pattern among U.S. children. Researchers have also found substantially different timetables across cultures in theory of mind development. In a meta-analysis, Liu and his colleagues (2008) compared more than 150 studies on Chinese and North American children’s false belief understanding. They found a difference of more than 2 years in the timing of false-belief understanding across four different cultural communities in the two regions. These results suggest that consistent with theory theory, despite the general universal development of theory of mind, specific timing and developmental trajectory of basic mental state understanding may vary
under the influence of very different sociocultural conditions.

Most cross-cultural investigations of theory of mind development have focused on false belief understanding, mainly because of its significance in theory of mind development and the availability of clear measures. A small number of studies have included a series of theory of mind tasks to examine their developmental sequence across cultures, but the tasks used were mostly simple mental states (e.g., Wellman et al., 2006). To our best knowledge, the existing cross-cultural studies on theory of mind development have barely examined cultural influences on the development of understanding conflicting mental states. The closest might be the hidden-emotion task in Wellman et al. (2006)’s study with Chinese children, in which the child was asked to judge whether a person could feel one emotion but display a different one. They found that, like U.S. children, Chinese children also understood hidden emotion later than false belief. Arguably, understanding hidden emotion and understanding conflicting mental states might be very different, because in the former situation only one subjective state is genuinely felt, whereas in the latter there are at least two. Therefore, it remains unknown whether children’s understanding of conflicting desires follows a similar developmental pattern in different cultures.

**Understanding Internal Conflicting Desires in Different Cultures**

There are two general possibilities for the role of culture in children’s understanding of conflicting desires. First, compared to understanding simple mental states, it is possible that sociocultural influences might be more evident. Based on the findings obtained in Chapter 1, as well as previous studies on children’s understanding of conflicting mental states (e.g., Choe et al., 2005), it seems children acquire the understanding of conflicting mental states later than the understanding of simple mental states. As Harris (1990) proposed, as children grow older, their participation in the culture may become more extensive and elaborate. As a result, it is conceivable that the concepts acquired relatively later in life may be increasingly influenced by their cultural values. If this is true, then it should follow that children growing up in very different cultures may develop an understanding of internal conflicting desires differently.

Alternatively, it is also possible that understanding of internal conflicts might be culturally
invariant. Children in different cultures may all experience internal conflicts of desire some time during their life and may also observe other people have difficulty in dealing with conflicting desires. It is possible that these experiences are sufficient for children to develop an understanding of internal conflicts, and thus cultural values may not evidently affect children’s acquisition of this concept. Since the existing work on children’s understanding of conflicting mental states has been conducted only with Western children, a comparison of children’s understanding of internal conflicts in Western and Non-Western cultures could contribute to our understanding of sociocultural influences in children’s understanding of conflicting mental states.

To compare children’s understanding of conflicting mental states across cultures, it may be helpful first to think about which cultural aspects may be relevant to its development. Culture is a general term that encompasses a broad range of human phenomena: people wear different clothes, eat different food and speak different languages, etc. It is thus important to specify the concrete aspects of culture that may play a role in theory of mind development. Intuitively, language, parental beliefs and practices, daily social experiences and interactions, as well as social and educational systems are some factors that could potentially influence children’s understanding of mental states. For example, previous studies have attributed cross-cultural differences in children’s understanding of false beliefs to languages (Liu et al., 2008). It was argued that some languages encode mental states more richly than others do, and some cultures (and subcultures) encourage mentalistic thought and talk more than others do. In addition to language, Wellman and colleagues (2006) have also argued that culturally shaped input, such as information and experiences pertaining to mental states (e.g., emphasis on knowing in the Chinese culture), may also influence the acquisition of mental state concepts. However, as Liu and colleagues (2008) argued, the observed differences in theory of mind development often are unlikely to be explained by any single factor; it is possible that linguistic and sociocultural factors may shape its development together.

If different cultural factors may all potentially influence theory of mind development, it is best to compare children’s performance in cultures that are significantly different from each other.
in multiple dimensions. The Chinese culture, for example, differs from Western cultures in multiple aspects, including folk psychologies, societal expectations, and parental beliefs and practices (Nisbett, Peng, Choi, & Norenzayan, 2001; Wang, 2004). Moreover, there are also differences between the Chinese culture and Western cultures in factors that are directly relevant to children’s theory of mind development and understanding of conflicting desires particularly. For example, the majority of Chinese children are the single child in the family, whereas American children are more likely to have siblings. There is evidence that having older siblings is associated with better understanding of false beliefs (Perner, Ruffman, & Leekam, 1994). In terms of the understanding of conflicting desires, daily interactions and conflicts with siblings might give children more opportunities to deal with conflicting desires, such as the desire to play or cooperate with the sibling and the desire to fulfill their own preferences. Parents may also intervene during these situations and demonstrate to children how to solve these issues properly. Moreover, older siblings, who are able to solve conflicting desires in terms of their relative importance, might serve as a good model for younger children who are not yet aware of the strategy. Therefore, it is conceivable that having siblings might benefit U.S. children’s understanding of internal conflicts.

Particularly relevant for children’s developing understanding of internal conflicts, Chinese culture places much greater emphasis on impulse control than Western cultures. In Western individualistic cultures, self-reliance and autonomy are valued. Children are socialized to be assertive and independent in pursuing personal goals, instead of inhibiting their own desires to fulfill group goals. In contrast, maintaining group harmony and social order are primary concerns of the Chinese society. This group orientation in the Chinese culture encourages individuals to fulfill group and social goals, even at the expense of restraining personal desires. For example, the traditional Confucian values emphasize that individuals should display appropriate actions consistent with a set of rules (Ho, 1986). Both Confucian and Taoist philosophies consider self-restraint as indicators for mastery and social maturity (Feng, 1962; King & Bond, 1985). These cultural values and norms have influenced the beliefs and practices of Chinese parents. Chen
and colleagues (1998), for example, found that impulse control is especially valued by Chinese parents and appears early in Chinese children. Other researchers also found that Chinese parents are more controlling compared to Western parents and they encourage their young children to be dependent on them and obedient to them (Ho, 1986; Kriger & Kroes, 1972; Lin & Fu, 1990).

Moreover, in addition to inhibiting personal desires to achieve social harmony and goals, Chinese cultural and society also emphasizes controlling impulses to achieve greater accomplishments. Many Chinese folktales, proverbs and idioms are intended to encourage people to overcome great difficulties to obtain academic or career achievement. "Wen Ji Qi Wu", for example, a famous story that parents and teachers often tell to young children, is about an aspiring person who rises up every morning upon hearing the rooster to practice sword. Stevenson et al., (1990) found that Chinese children are pressured by parents to perform optimally even as early as the preschool and kindergarten years. Chen and colleagues (1998) also found that, compared to Western mothers, Chinese mothers are more likely to encourage children to achieve. It is conceivable that the cultural emphasis on overcoming difficulties to achieve may facilitate Chinese children’s appreciation of the relations between conflicting desires as well as how to resolve them, so that Chinese children might develop the understanding earlier than U.S. children. Taken together, the Chinese culture provides an excellent Non-Western comparison to Western cultures, which may help shed light on the influences of cultural values and socialization process in children’s understanding of conflicting desires.

The Present Study

The aim of the present study is to investigate whether sociocultural influences may play a role in children’s understanding of internal conflicting desires. To answer this question, the development of the understanding was examined in a sample of Chinese children. Of interest in the current study was whether children who grew up in China would develop an understanding of internal conflicts similarly or differently compared to that of the U.S. children. More specifically, the cross-cultural comparison focused on three main aspects: 1) whether Chinese children would
also develop an understanding of relations between internal conflicting desires like U.S. children;
2) Whether the timing for acquiring the understanding was similar or different for Chinese and
U.S. children; 3) Whether the developmental sequence for understanding conflicting desires
relative to other mental states (e.g., false beliefs) was similar or different among Chinese and U.
S. children. Cross-cultural differences in the first aspect would suggest that culture might
substantially influence the nature of children’s understanding of conflicting mental states.
Alternatively, if cultural differences were only found in the second or third aspects, it would
suggest that the role of culture is to facilitate the acquisition of conflicting desires understanding.
Results from the cross-cultural comparison would help distinguish the predictions of
different theories on theory of mind development. If consistent developmental patterns were
found among Chinese and U.S. children, it would support theories that claim theory of mind
development is based on innate modular maturation or on domain-general cognitive gains (e.g.,
nativist theory, simulation theory and executive function theory). In contrast, cross-cultural
differences in any of the three aspects would lend more support to theory theory, which proposes
that theory of mind development is based on processes of conceptual learning shaped by
culturally relevant input. Since previous cross-cultural studies on theory of mind development
have only focused on the understanding of single mental states, findings from the present study
would contribute to our understanding about the mechanism of more advanced theory of mind
development.

Study 4
To investigate cultural influences in the understanding of internal conflicts, the same
stories in the first three studies in Chapter 1 were presented to a sample of Chinese children,
including two prosocial stories and two one-character stories. Based on previous discussions
about Chinese culture’s emphasis on impulse control, it was hypothesized that Chinese children
might have more advanced understanding of internal conflicting desires compared to their
American counterparts.
Method

Participants. Sixty-one children from two preschools in a middle-sized city in China participated. Participants were 18 three-year-olds (8 girls, range = 36 to 46 months, M = 51.2 months), 20 four-year-olds (9 girls, range = 48 to 57 months, M = 51.2 months), and 23 five-year-olds (11 girls, range = 60 to 70 months, M = 64.0 months). To achieve a better cross-cultural comparison, we age matched the 4- and 5-year-olds on an individual basis with the American sample in Study 1 and Study 2. Similar to the American participants, the majority of the Chinese participants were from middle class families in the area.

Design and procedure. We presented the four stories in Study 1 and Study 2 to the participants, including the Prosocial Conflict story, the Prosocial No-Conflict story, the Food story, and the Academic story. All children were tested individually in a quiet room at their preschool during normal daytime hours. Each child heard all stories in a counterbalanced order. The whole testing including a brief break lasted about fifteen minutes for each child.

Similar to Studies 1 and 2, the child was introduced to the characters before he or she heard each story. The experimenter checked whether the child was familiar with the activities or food in the stories before proceeding. Then the experimenter read the story to the child in Mandarin. The child was asked two memory questions in a counterbalanced order regarding the main character's desired goal and preference immediately after they heard each story. Feedback was provided if the child answered either question incorrectly. Next, the child was asked the test questions similar to those in Study 1, about which option the main character would choose to do. The activity or food that appeared first in the questions was counterbalanced across participants.

Results and Discussion

Scoring. Children's correct and incorrect responses to the memory and test questions were coded as 1 and 0 respectively, as in Studies 1 and 2. To get a score of 1 for each of the two memory questions, the child needed to answer correctly about the main goal and the preference of the main character. For the test questions, children received a score of 1 if their answer
reflected the main goal of the character, and a score of 0 if they answered with the main character’s preferred activity or food.

**Group and task differences.** Overall the children did very well on the memory questions. All age groups answered the two memory questions correctly higher than 95% of the time for each story.

**Prosocial stories.** Log-linear analyses were conducted to analyze children’s responses to the *Prosocial No-Conflict* story and *Prosocial Conflict* story separately. The best-fit model revealed no significant effect of age on children’s responses to the *Prosocial No-Conflict* story, \(X^2(2, N = 61) = .66, p = .72\) and the *Prosocial Conflict* story, \(X^2(2, N = 61) = 3.69, p = .16\). Three-to 5-year-old Chinese children predicted the initiator would propose the activity that was desired by the partner, both when there was no conflict in desired activities between the two characters and when there was a conflict. Children’s responses were also compared to a chance level of 0.5 out of 1. Binomial tests indicated that for the *Prosocial No-Conflict* story, all age groups performed above chance (\(ps < .008\)). For the *Prosocial Conflict* story, 3-year-olds were at chance (\(p = .48\)), whereas 4- and 5-year-olds were above chance (\(p = .041\) and \(p < .001\), respectively). These results are presented in Figure 4.

**Combined One-Character story.** A preliminary non-parametric test revealed that children’s performance on the test questions of the two *One-Character* stories did not differ from each other (\(p = .50\), McNemar’s test). Similar to Study 2, we created a combined score for each test question of the two *One-Character* stories by combining the children’s score for the *Food* story and the *Academic* Story. The total score for the test question thus ranged from 0 to 2.

A one-way ANOVA was conducted to analyze the combined score for the *One-Character* stories. There was a significant effect of age, \(F(2, 58) = 9.10, p < .001\) (percent correct \(Ms = 25.0, 40.0, \) and 73.9 for 3-, 4-, and 5-year-olds respectively). Tukey’s HSD tests indicated that 5-year-olds performed better than 4-year-olds (\(p = .014\)) and 3-year-olds (\(p < .001\)). Five-year-olds predicted that the main character would act in accordance with the main goal (choose the undesired activity or food), whereas younger children predicted the main character would act in
according to his preference for the activity or food instead of the main goal. These results can be seen in Figure 4. Children's responses to the combined One-Character stories were compared to a chance level of 1 out of 2. Three-year-olds performed below chance, $t(17) = -3.43, p = .003$, 4-year-olds were at chance, $t(20) = -1.17, p = .26$, and 5-year-olds were above chance, $t(22) = 2.71, p = .013$.

**Change-of-Location False Belief story.** Children's responses on the Change-of-Location False Belief task were also analyzed. There was a main effect of age on children's responses, $X^2(2, N = 61) = 23.68, p < .001$. Eleven percent of the 3-year-olds, 40% of the 4-year-olds, and 83% of the 5-year-olds correctly predicted the character would search in the original location (Figure 4). Chi-square tests indicated that both 4- and 5-year-olds performed better than the 3-year-olds, $X^2(1) > 4.32, ps < .038$, and 5-year-olds also performed better than 4-year-olds, $X^2(1) = 8.59, p = .003$. Binomial test indicated that 3-year-olds' performance was below chance, $p < .001$, 4-year-olds performed at chance, $p = .50$, and 5-year-olds performed above chance, $p = .003$.

![Figure 4. Mean percentage of goal-oriented responses by age for the conflicting desire stories and percentage of correct responses for the Change-or-Location false belief story in Study 4.](image-url)
Cross-cultural comparison. To have a quantitative comparison between Chinese and U.S. children’s performances on these stories, 4- and 5-year-old children’s responses in the two cultures were directly compared. Chinese 4-year-olds performed similarly as their U.S. counterparts on the false belief story \( (t = 1.40, p = .17) \), but they performed better than their U.S. counterparts on the Prosocial No-Conflict story \( (t = 2.16, p = .037) \), Prosocial Conflict story \( (t = 3.72, p = .001) \), as well as slightly better on the combined One-Character stories \( (t = 1.87, p = .07) \). Chinese 5-year-olds performed similarly as their U.S. counterparts on the false belief story \( (t = .86, p = .39) \) and the Prosocial No-Conflict story \( (t = 1.23, p = .23) \), but they performed better than their U.S. counterparts on the Prosocial Conflict story \( (t = 3.40, p = .001) \) and the combined One-Character stories \( (t = 2.63, p = .012) \).

Relations among the tasks. To examine whether children’s answers on the test questions for the prosocial stories, the combined One-Character story, and the Change-of-Location False Belief story were related, simple and age-partialled Spearman’s rank correlations were calculated. Multiple moderate to strong correlations were found among the questions, which are presented in Table 2.

Table 2.

<table>
<thead>
<tr>
<th>Stories</th>
<th>Prosocial No-Conflict</th>
<th>Prosocial Conflict</th>
<th>One-Character</th>
<th>False Belief</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple correlations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in months)</td>
<td>.10</td>
<td>.22</td>
<td>.50***</td>
<td>.56***</td>
</tr>
<tr>
<td>Prosocial No-Conflict</td>
<td></td>
<td>.51***</td>
<td>.35**</td>
<td>.14</td>
</tr>
<tr>
<td>Prosocial Conflict</td>
<td></td>
<td></td>
<td>.20</td>
<td>.32*</td>
</tr>
<tr>
<td>One-Character</td>
<td></td>
<td></td>
<td></td>
<td>.31*</td>
</tr>
<tr>
<td>Partial correlations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prosocial No-Conflict</td>
<td>.51***</td>
<td>.35**</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Prosocial Conflict</td>
<td></td>
<td>.11</td>
<td>.24</td>
<td></td>
</tr>
<tr>
<td>One-Character</td>
<td></td>
<td></td>
<td></td>
<td>.04</td>
</tr>
</tbody>
</table>
These results suggest that similar as U.S. children, Chinese children also develop an understanding of relations between internal conflicting desires. However, it seems the timing for acquiring the concept was different for children from the two cultures. For U.S. children, the transition happened between age 5 and 7, whereas for Chinese children the development occurred mainly between age 4 and 5. Chinese children’s acquisition of the understanding was at least one year earlier than that of their American counterparts.

Based on these results, it is possible that consistent with the hypothesis, Chinese culture’s emphasis on impulse control might have facilitated children’s understanding of relations between internal conflicting desires. However, how culture might have influenced their performance in the tasks remains unclear. First, as theory theory claims, cultural values may affect children’s concept when children revise their existing theories of mind based on culturally shaped input. Another possibility is that as executive function theory implies, Chinese culture’s emphasis on impulse control may help Chinese children gain more advanced executive functioning skills, especially inhibitory control abilities. If this is the case, children’s understanding of conflicting desires per se was not directly affected by the sociocultural input they received, and they performed better at the tasks only because their inhibitory control abilities were better than their American peers. A third possibility is that instead of influencing cognitive abilities of children, cultural inputs might be received by children like scripts and scenarios. For example, Chinese children might have learned from their parents and teachers that a good girl or boy should be more concerned with other individuals’ goals more than their own desires, as well as should finish homework first before play. Therefore, they might simply report these “memorized” responses in the tasks without answering based on considering the relations between the internal conflicting desires of the characters in our stories.

To test these possibilities, it would be helpful to examine Chinese children’s understanding of conflicting desires that require fewer inhibitory control abilities and were not directly relevant to their daily familiar experiences, which was the focus of study 5.
Study 5

Study 5 aimed to examine whether Chinese children’s better performance on the internal conflict stories could be accounted for by their better inhibitory control abilities or better familiarity with the situations. The Novel Desire story (see study 3, Chapter 1) that involves goals and preferences unfamiliar to the children is helpful for this goal. Because children did not have preexisting beliefs about the goal or the basic preference, they did not have to inhibit their own preferred choices. In addition, it was also unlikely that they could have learned from adults about what a person should do in the situation. Therefore, Study 5 examined Chinese children’s performance on the Novel Desire story. If Chinese children still understood this story earlier than their American counterparts, it would suggest that cultural input might influence children’s conceptual understanding of conflicting desires, not only through gains in inhibitory control or script-like responses.

Method

Participants. Participants were 30 children from a preschool in a middle-sized city in Mainland China. There were 15 three-year-olds (9 girls, range = 36 to 45 months, M= 42.7 months) and 15 five-year-olds (9 girls, range = 60 to 71 months, M = 65.3 months). Similar to their U.S. counterparts, the majority of the Chinese children also came from middle class families in the area.

Design and procedure. As in Study 3, children were told that a character really wanted to feel “blarb”, and she liked one of two novel fruits but did not like the other one. However, the favored fruit was not helpful for feeling “blarb”, while the undesired fruit could help. It was also emphasized that feeling "blarb" was the most important thing for the character at that moment. The story was illustrated on a computer screen. Two solid circles, one being green and one being yellow, depicted the two novel fruits. The fruit preferred by the character was counterbalanced across participants.

Following similar procedures as in Study 3, three memory questions were asked immediately after the child heard the story: 1) Preference Desire question (which fruit the
character liked) 2); the Goal Desire question (whether the character wanted to feel blarb or not), and 3) the Effectiveness Desire question (which fruit would help the character feel blarb). After these memory questions, the child was asked to predict which fruit the character would choose to eat. Each child heard this Novel Desire story and answered the questions in one five-minute session.

Results and Discussion

Scoring. Coding for responses was similar to what was used in the previous studies. Children got a score of 1 for answering each memory question correctly and got a score of 0 for each incorrect answer. Children got a score of 1 on the test question by predicting that the character would choose the undesired but helpful fruit, and they got a score of 0 for choosing the desired but unhelpful option.

Group differences. Children in general did well on the memory questions. All children answered the Goal Desire question correctly. All but one 3-year-olds and two 5-year-olds answered the Preference Desire question correctly, and all but three 3-year-olds and one 5-year-olds answered the Effectiveness Desire question correctly. Excluding the children who failed on any memory question did not affect the pattern of the results, so they were included in subsequent analyses.

A log-linear analysis was performed to test the effect of age on the test question. The best-fit model revealed a significant effect of age on children’s responses, $X^2(2, N = 30) = 11.57, p = .001$. As it can be seen in Figure 5, 5-year-olds predicted the character would choose the undesired fruit which was helpful for the goal of feeling “blarb,” whereas 3-year-old children predicted the person would choose the desired but unhelpful option. A direct cross-cultural comparison indicated that Chinese 5-year-olds performed better than their U.S. counterparts, $X^2(2, N = 30) = 6.95, p = .008$.

Comparisons to chance. Children’s responses were compared to a chance level of 0.5 out of 1. Consistent with the findings in Studies 1 and 2, Binomial tests revealed that 3-year-olds performed below chance ($p = .035$), whereas 5-year-olds performed above chance ($p = .035$).
These results are in agreement with the findings in Study 4. By age 5, children understand that the existence of an important, overall desire can cancel the fulfillment of an immediate, conflicting desire, and they predicted the character would act in accordance to the main goal. In contrast, younger children predicted people would act based on basic preferences, suggesting they did not recognize the constraining impact of the existence of other desires. Since the goal and the preference were novel to the children, it was unlikely that children could have learned before about how to react in the situation, and their performance could not have been affected by their own preferences or inhibitory control skills.

**General Discussion**

Studies 4 and 5 examined Chinese children’s understanding of conflicting desires. The cross-cultural comparison focused on three main aspects: 1) Whether Chinese children would also develop an understanding of relations between internal conflicting desires like U.S. children; 2) Whether the timing for acquiring the understanding was similar or different for Chinese and U.S. children; 3) Whether the developmental sequence for understanding conflicting desires relative to other mental states (e.g., false beliefs) was similar or different among Chinese and U.S. children. It was found that 5-year-old Chinese children, like their 6- and 7-year-old American counterparts, understood that the existence of an important goal would cancel the pursuit of a
more immediate desire. Three- to 4-year-old Chinese children, like their 4- and 5-year-old American peers, predicted the person would act to satisfy the immediate desires. Moreover, the sequence for Chinese and U.S. children to understanding false beliefs and conflicting desires was more similar than different. Children in both cultures performed similarly in understanding of false beliefs, and they did not understand conflicting desires prior to understanding false beliefs. These results suggest that U.S. and Chinese children both develop an understanding of relations between conflicting desires in childhood, but the timing for the acquisition was earlier among Chinese children.

These findings shed light on the predictions and implications of different theories on theory of mind development. First, according to the nativist theory, culture only has minimum influence on triggering children’s innate concept of mental states and thus the development should look the same in different cultures. However, we found that Chinese and U.S. children acquired the understanding of internal conflicts at different times, which does not support the view that culture’s influence in the development of mental state understanding is very limited.

Second, these results are also inconsistent with the predictions of the simulation theory. The simulation theory proposed that as long as children in different cultures have similar simulation abilities, they should have similar developmental patterns in understanding fundamental mental state concepts. According to this theory, culture may only play a role in refining children’s understanding during later development, especially about understanding that is based on highly personal experiences (e.g., dreams, being ill etc.). Internal conflicts is a psychological phenomenon widespread among humans, rather than a culturally or personally specific subjective state. We found that contrary to simulation theory’s predictions, understanding of this fundamental mental state was influenced by culture. Moreover, it is unlikely that Chinese children simply have better simulation abilities than U.S. children, which could explain the cultural differences in their understanding conflicting desires. There are no obvious dimensions in the Chinese culture that lead children to better simulation abilities. Even if Chinese children do have better simulation abilities, they should also perform better than their U.S. counterparts in false
belief understanding, which was not what we found. Therefore, the cross-cultural difference was unlikely due to different simulation abilities among children in the two cultures, and the current findings have also undermined the simulation theory’s views.

Third, the current findings also do not lend enough support to the executive function theory. According to this theory, culture does not directly influence children’s mental state concepts, although it may indirectly influence their performances in the tasks by influencing their executive functioning abilities. Among these abilities, Chinese culture’s emphasis on impulse control might be most likely to influence children’s inhibitory control abilities. At the first sight, it is possible that Chinese culture’s emphasis on impulse control might have helped Chinese children to gain better inhibitory control abilities to deal with the task demands, which might explain the differences in performances between Chinese and U.S. children. This possibility is also consistent with existing findings in the literature that Chinese children had better executive functioning skills than their U.S. counterparts, as well as executive functioning abilities predicted theory of mind development in both countries (Sabbagh, Xu, Carlson, Moses, & Lee, 2006). If this account were true, it would predict that children should perform better in the tasks that required fewer inhibitory skills.

To shed light on this account, a Novel Desire story was included and tested, in which children did not have to inhibit their preferred responses. However, as found in Study 5, children’s performance on this story was not better than their performance on the other stories. Moreover, the inhibitory control account would also predict that Chinese children should also perform better in the false belief task, which presumably involves the ability to inhibit knowledge about the reality. However, we did not find that Chinese performed better than U.S. children in the false belief task. Previous studies have also found that despite of Chinese children’s better inhibitory skills, these abilities did not seem to translate into superior performance on false belief tasks compared to North American children (Liu et al., 2008). Therefore, it is unlikely that sociocultural inputs have only influenced children’s inhibitory control abilities rather than their understanding of conflicting desires per se. However, even though children’s cognitive control abilities might not
account for the cultural differences, we may not rule out the possibility that children’s actual impulse control experiences might play a role in facilitating children’s understanding of conflicting desires. It is still possible that due to Chinese culture’s greater emphasis on impulse control, Chinese children may be asked to exert self-control more often than their U.S. counterparts, which may highlight to them the existence of conflicting desires. Studies investigating relations between cognitive inhibitory control tasks, delay-of-gratification tasks and conflicting desires tasks may shed light to these possibilities.

Finally, these findings are most consistent with the views of theory theory, which claims that culturally shaped input may influence children’s understanding of mental states through conceptual learning processes. When children experience conflicting desires and learn about how to deal with them from their parents, they may revise their existing theories of mind based on these inputs. Chinese children might receive more relevant sociocultural inputs related with conflicting desires, which may lead to their better performance on the tasks. However, before we accept this view, it is helpful to consider an alternative interpretation for the cross-cultural differences: is it possible that instead of revising their theory of mind concepts based on the sociocultural inputs, children might actually treat them like “scripts” and scenarios, and simply retrieve the relevant information when they need them? For example, when parents and teachers encourage children to control themselves in order to gain bigger rewards, children may store these episodes in their memories. When Chinese 5-year-olds were asked to predict what the person would do in the social and academic stories, their memories about these relevant situations and inputs were triggered and reported.

A careful examination suggests that this alternative account to be unlikely. For one thing, this way of receiving cultural information is extremely uneconomic. Children would have to store thousands of pieces of episodes in their mind, and would have to search through them when they need to figure out what to do in a given situation. It would thus be very energy and time consuming to deal with the information and retrieve the information. However, it did not take the children a laboriously long time to respond to the test questions in our study. For another thing, it
is unlikely that all the children may have encountered very similar situations before and learned from their parents about the best strategies in dealing with them. Especially for the *Novel Desire* story, children may never have heard that a person should act to feel “blarb”. Therefore, it suggests that culture influences children’s performance not simply because they memorize what they have been told before as scripts. It is more plausible that children have revised and updated their theories of mind based on the relevant sociocultural information.

Recent evidence has also lent further support to this conceptual learning process. From the beginning of life, infants are far from passively taking in information from the environment; instead, they are constantly interpreting it and using it, such as making inferences about larger populations based on the limited samples that they have observed (e.g., Xu & Denison, 2009; Xu & Garcia, 2008). Infants are also able to infer people’s psychological states based on only limited behaviors of the person (e.g., Kushnir, Xu, & Wellman, 2010; Xu & Kushnir, 2013). Their sensitivity to statistical information and inductive learning ability may drive their acquisition of new concepts. For example, infants younger than 18 months old assume that other people share their preferences for crackers over broccoli (Repacholi & Gopnik, 1997). However, with very few observations of an experimenter reaching for the boring object, 16-month-old infants are able to infer that she has a preference for it. The anomalous data might have served as a strong cue to the infants that a new explanation is needed. It seems that infants are able to notice the inconsistency between the behaviors of the person and their prior beliefs about people’s preferences. To resolve this discrepancy, they start to form a new concept—subjective preference.

This rational learning process might also be at work for the development of advanced theory of mind. It is possible that at first children may have a concept of single desires. However, they would increasingly notice their own or other people’s struggles with multiple conflicting desires. When their parents or teachers try to persuade them to give up their immediate desires, it may also highlight the existence of other goals for them. Therefore, children may try to integrate these experiences into their existing beliefs and knowledge, which may eventually lead to the construction of the new concept of conflicting desires. This view predicts that children who
receive more relevant sociocultural input should be more likely to construct the new concept. Consistent with this prediction, our current studies reveal that children in different cultures have different timetables in developing this understanding. Future training studies may also provide insight regarding this possibility, such as presenting them with real or hypothetical situations that may stimulate conflicting desires and pointing out for them the more beneficial options, to assess whether these inputs may facilitate children’s understanding.

If culture influences the development of children’s understanding of conflicting desires, it leads to the question of what type of cultural values or experiences may be critical to this development. In the introduction of this chapter, the experience of having siblings has been proposed as a potential factor. The majority of the Chinese participants were the single child in the family, whereas more than half of the American participants had at least one sibling. Although it is reasonable to expect that having siblings might provide children with more opportunities to deal with conflicting desires (e.g., to cooperate with the other person), American children in the current study did not perform better at the conflicting desire tasks than Chinese children. Previous studies have found that having older siblings was associated with better understanding of theory of mind, such as false beliefs (Perner, Ruffman, & Leekam, 1994). It is possible that the effect of having siblings might be more evident in children’s understanding of some mental states (e.g., epistemic states) but not others (e.g., subjective states). However, we cannot rule out the possibility that there might be a trend of superior performance among children with siblings, but the current study did not detect it due to certain limitations (e.g., small sample size, other confounding sociocultural factors). Future studies that focus on comparing performances among children with and without siblings in the same culture or community would help disentangle these different possibilities.

A more likely cultural factor that might have influenced children’s understanding of conflicting desires is the emphasis on impulse control. Western individualistic cultures greatly value independence and autonomy. Children are socialized to be assertive and independent in pursuing personal goals rather than inhibiting their own desires to fulfill group goals. Compared to
Western cultures, Chinese culture places much greater emphasis on impulse control. The Chinese society values group harmony and social order, which often encourages and requires individuals to restrain their personal desires to fulfill social and collective goals. Consistent with these values, Chinese parents have been found to value inhibitory control when educating their children, and they also encourage their children to overcome difficulties to achieve academic excellence as early as preschool (e.g., Chen et al., 1998; Stevenson et al., 1990). It is possible that this feedback and encouragement from parents may help children realize the existence of conflicts between multiple desires as well as their relation to actions. For the U.S. children, in comparison, 6 and 7 are the typical age for them to attend kindergarten and elementary schools, where they have more peer interactions and formal education. These settings impose more discipline and self-control on children than preschools (Sameroff & Haith, 1996). Consequently, children are likely to have more experiences contending with conflicting desires or emotions during this period than in preschool, which may contribute to the conceptual realization of these mental states. It is possible that, compared to the U.S. children, the sociocultural emphasis on impulse control received earlier by Chinese children might contribute to their earlier understanding of conflicting desires in development.

The current results, together with the findings from Chapter 2, may suggest the mechanism for the development of understanding conflicting desires. On one hand, as discussed above, the cross-cultural differences in the acquisition of the understanding suggests that consistent with the theory theory, the development is based on processes of conceptual learning shaped by culturally relevant input. That is, sociocultural input does play an important role in the development. More specifically, our results suggest that, instead of stipulating the nature of the concept, the role of relevant sociocultural input is to facilitate its development.

It is worth noting that these findings do not necessarily mean that in dramatically different cultures, children would definitely all develop the same concept. It is possible that even if Chinese culture is substantially different from Western cultures, the modern cities in both China and the U.S. may still share some similar values and societal expectations (e.g., the importance to
achieve). Therefore, studies in more remote hunter-gather and preindustrial societies might provide more conclusive answers to the question that whether sociocultural input might alter the nature of our mental state concepts. Moreover, to control for confounding factors, the stories and questions in the present study were highly structured rather than open-ended. It is possible that differences in children’s concepts might be revealed in more open-ended interviews in future studies. However, what we are able to conclude from the available evidence is that sociocultural input does play a role in children’s understanding of conflicting desires, at least in terms of facilitating its acquisition during development.

On the other hand, the important role of sociocultural input does not preclude the role of cognitive factors in its development. Indeed, our results in Chapter 2 and Chapter 3 suggest that sociocultural input alone is not sufficient for the development of an understanding of conflicting desires. Specifically, for Chinese children, even if they seemed to understand the relation between conflicting desires earlier than the U.S. children, they still did not understand it before they understood false beliefs. This comparison suggests that children may need to be cognitively prepared before they understand the relation between conflicting desires. As discussed in Chapter 2, some general cognitive representations of the mind might need to be developed, such as the appreciation of hierarchical relations, the ability to represent multiple relations between the world and the mind, as well as the conception of the mind as capable of regulating or conflicting with itself. Although the current results cannot distinguish these different accounts, we may at least conclude that the understanding of conflicting desires may develop as a result of children’s development of cognitively representative abilities and relevant sociocultural inputs. It will be intriguing to test in future studies whether cognitive and sociocultural factors may actually interact to lead to this important understanding.

Compared to the development of single mental state reasoning early in life, our results suggest that the role of culture and cognitive abilities in advanced theory of mind development is equally important as it is in the early years. On one hand, although simulation theory suggests that culture may play increasingly bigger roles in refining the nature of children’s theory of mind, it
seems at least culture does not really alter the nature of the understanding of conflicting desires. The oldest group of children in both U.S. and China reasoned similarly about the internal conflicts in relation to people’s actions. On the other hand, the role of culture does not seem to become less important in advanced theory of mind reasoning either. Similar to previous findings of cross-cultural variations of timetables in understanding single mental state (Liu et al., 2008), we found that the timing for children to acquire the understanding was different across very different cultures. Moreover, in terms of cognitive abilities, researchers have argued that children have to be cognitively prepared to understand beliefs, since beliefs might be more complex to represent compared to desires (e.g., Perner, 1991). The finding that U.S. and Chinese children did not understand conflicting desires prior to when they understood false beliefs supports the view that certain cognitive abilities might also need to be developed before children acquire the understanding.

In conclusion, our findings on Chinese children’s understanding of internal conflicting desires in comparison to their U.S. counterparts’ performance help to shed light on the developmental mechanism. Consistent with claims of the theory theory, sociocultural influences play a role in the development of children’s understanding of conflicting desires, as indicated by the different developmental patterns found among Chinese and U.S. children. In terms of the specific role of culture in the development, it is likely that sociocultural input exposes children to experiences that are inconsistent with their prior knowledge and belief, based on which children are able to construct new concepts that help integrate the existing and new information. Different sociocultural circumstances did not fundamentally impact the nature of their concept, since both Chinese and U.S. children eventually construct a similar understanding, possibly based on experiences of conflicting desires or relevant socialization processes. However, relevant sociocultural input might facilitate the acquisition of the concept, as indicated by the earlier understanding among Chinese compared to U.S. children, possibly due to Chinese culture’s greater emphasis on impulse control in early years. Equally important, Chinese and U.S. children did not understand conflicting desires prior to false beliefs, suggesting certain cognitive abilities
related with mental state representations have to be available for children to develop an understanding of relations between conflicting desires. Extending previous work on the development of single mental state understanding, the current findings contribute to our understanding of the mechanisms for advanced theory of mind development.
CHAPTER 4
Relations between Understanding of Internal Conflicting Desires and Social-Emotional Development

In Chapter 2 and Chapter 3, we have found that children in both U.S. and in China develop an understanding of relations between conflicting desires during childhood. For U.S. children, the development mostly occurred between age 5 and 7, and for Chinese children it happened between age 4 and 5. On top of these age-related differences and cultural differences, there were also individual variations within each culture and each age group. Does the individual differences in the development of this understanding have implications for children’s social-emotional development in life? The experiences of having conflicting desires are prevalent in life and to deal with them in beneficial ways can be important for our adjustment and wellbeing. It is thus an intriguing possibility that a better understanding of conflicting desires might be linked with children’s social-emotional behaviors and adjustment. The focus of this chapter is to explore the links between children’s understanding of conflicting desires and their social-emotional development.

Despite the abundant literature of theory of mind development, the majority of them have focused on normative age-related changes, and much less attention has been paid to the relations between individual differences in theory of mind development and social-emotional development. This is largely because traditionally, cognitive development and social development have largely been studied separately with different goals and methods. Recently, researchers have proposed the social cognitive development approach as a framework to bridge both research traditions (Olson & Dweck, 2008). Social cognitive development studies children’s social understanding, but also at the same time concerns deeply about its social antecedents and their consequences for adjustment outcomes. Investigations based on this approach may contribute to our understanding of both children’s cognitive development and social development. For example, by studying links between children’s theory of mind development and social-emotional
development, we are likely to have a better understanding of the mechanisms underlying theory of mind development, by gaining insight about its social and personal-level antecedents. On the other hand, the findings may also shed light on the cognitive mechanisms underlying children’s social-emotional functioning.

Social-emotional development is a broad category that includes multiple and complex components. For the purposes of the present study, our discussions and investigation focus on three major dimensions that have received extensive attention among researchers in the field: peer relations, behavioral tendencies (prosocial, aggressive and shy behaviors), as well as psychological adjustment.

**Theory of Mind Understanding and Social-Emotional Development: Conceptual Links**

**Influences of theory of mind understanding on social-emotional development.**

Our ability to understand mental states allows us to explain, predict and manipulate the behaviors of others in life. Without the understanding of mental states, we would have to be forced in reading physical movements and their outcomes (Astington, 2003). The important implications of theory of mind on our social-emotional development are most striking in their absence, as suggested by studies of children with autism (e.g., Baron-Cohen, Leslie, & Frith, 1985). Moreover, researchers who study typical development of theory of mind have also long recognized that theory of mind is a powerful social tool and may serve important social functions (e.g., Moore & Frye, 1991). For example, Moore and Frye (1991) argued that theory of mind ability could facilitate both cooperative and competitive behaviors. Specifically, children may act to help others better if they are able to recognize what the other person wants, thinks and feels. Consistent with this view, it has been found that as young as 18-month-old, children are able to provide instrumental help to others. However, by 30-month-old, children help others more frequently, require less communicative support from the person, as well as provide more empathetic helping for emotion-related needs (Svetlova, Nichols, & Brownell, 2010). Children’s increased understanding of psychological states during the second year of life contributes to the transition from infrequent instrumental help to more advanced helping behaviors. In addition, in
competitive situations, children’s developing understanding of desires and beliefs may also facilitate their manipulation of other people’s behaviors, as indicated by children’s growing ability to deceptively conceal their transgressions (e.g., Talwar & Lee, 2002).

More recently, researchers have turned their attention to the implications of individual differences in mental state understanding for the lives of typically developing children. Within normal populations, children do not differ in terms of whether they acquire theory of mind abilities, or whether some children acquire them to a greater or lesser degree. Instead, children only differ regarding when they understand specific mental states. Therefore, the question is whether early understanding has implications for children’s socioemotional development.

Although researchers are aware of the importance of theory of mind ability in our social life, few formal theories have been proposed on how earlier acquisition of theory of mind abilities may contribute to individual differences in social-emotional development. Intuitively, first, a better understanding of mental states may facilitate children’s social interactions and communications with others, by making them more sensitive to other people’s needs and thoughts. As a result, it is possible that children who have better and earlier theory of mind abilities will have better relationships with their peers and be more liked by others.

Second, in terms of social behaviors, a better theory of mind understanding may contribute more to prosocial behaviors than to aggressive or shy behaviors. As mentioned above, theory of mind understanding has been proposed as important for cooperative behaviors (Moore & Frye, 1991), which may depend on children’s ability to think from other people’s perspectives. Therefore, it is conceivable that children who have more advanced theory of mind understanding may have more frequent prosocial behaviors (e.g., helping, sharing, comforting), and they may act in ways that are more beneficial to other people. In comparison, aggression and shyness are dispositions that have biological roots and can be established before the acquisition of formal theory of mind abilities (e.g., Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Kagan, 1997). Therefore, it is possible that although theory of mind may facilitate aggressive or shy children’s social interactions, it may not directly influence these behavioral tendencies. Finally, influences of
theory of mind ability on children’s psychological adjustment may not be direct and straightforward. It has been found that compared to typically developing children, children with autism spectrum syndrome have higher rates of depression and anxiety (Kim et al., 2000). However, the co-occurrence of autism and psychological difficulties are likely to be due to complex genetic and adverse experiential factors (E.g., Ghaziuddin, Ghaziuddin, & Greden, 2002), rather than the lack of mind reading abilities alone. Conceivably, among children with intact social understanding, a later acquired theory of mind may not directly affect their psychological wellbeing either. One exception might be that children who have a better understanding of the mind might be more likely to feel more affiliated and integrated with others, since they may find it easier to explain and predict other people’s behaviors. However, the effect may be more likely to exist in older children and adolescents, who are able to monitor their performances in social situations. Performance and competence do not seem to be critical to young children and they do not seem to attribute stable competences or abilities to themselves (Harter, 1990, 1993; Nicholls, 1978).

The above discussions have focused on theory of mind abilities in general, however, theory of mind abilities involve the understanding of diverse mental states. It is possible that different mental state understanding may have different influences on social-emotional development, depending on their relevance to the specific behavior or adjustment. For example, understanding of beliefs might be more relevant than understanding of desires in terms of behaviors in deceptive situations.

**Influences of social-emotional development on theory of mind understanding.**

Children’s social-emotional development may influence children’s social understanding through two potential mechanisms: 1) through influencing the amount of children’s social interactions. It has been proposed that social interactions contribute to children’s theory of mind understanding (e.g., Astington & Baird, 2005). As discussed in Chapter 3, children receive sociocultural input from social interactions, based on which they form and revise their theory of mind during development. Therefore, increased participation in social interactions may facilitate
children’s understanding of mental states. According to this account, it is conceivable that children who are liked by peers and have better peer relationships will have more opportunities of social interactions, which may aid their theory of mind acquisition. Moreover, children’s behavioral tendencies may also play a role in the amount of their social interactions. Children who are prosocial and cooperative, for example, are likely to actively approach others and also be approached by others, which will increase their social interactions and may benefit their theory of mind development. In addition, like the sociable children, children who are aggressive may also actively approach others and may have ample interactions with others, although their interactions and relationships are likely to be heated and negative in nature. However, even negative social experiences such as conflicts and fights may also inform children about other people’s thoughts and feelings. Therefore, the social interactions of aggressive children may also be adequate for them to acquire mental state understanding at similar times as sociable children. In contrast, children who are shy may miss social interaction opportunities due to their withdrawal and inhibited tendency, which may be unfavorable for them to develop knowledge of people and mind. Lastly, it is conceivable that children who are psychologically well adjusted, such as having positive self-perceptions and positive school attitudes, may be more likely to actively engage in social interactions compared to children who are suffering from psychological difficulties like depression. Their social experiences are likely to help children with psychological wellbeing develop social understanding early in life.

Second, Children’s social-emotional characteristics may also influence their theory of mind development through affecting their tendency to observe and reflect upon social interactions. As Wellman and colleagues (2011) proposed, an observant, reflective approach to social interactions might help children learn from their experiences about mental states. Two socioemotional characteristics might be particularly relevant to this tendency: shyness and aggression. Contrary to the first view, this account predicts shy children may actually develop advanced social understanding earlier than other children, since they often intently observe other people’s interactions and seem to reflect upon other people’s thoughts and emotions. Aggressive
children, in contrast, may not have similar reflections on their social experiences with others. Most of the time, they tend to provoke interactions with others or react to other people’s responses, rather than observe others and reflect about the social information they have received. Therefore, this view implies that aggression is not helpful for the understanding of mental states, whereas shyness is a favorable socioemotional characteristic for its development.

In summary, theory of mind understanding and social-emotional development can be related in multiple ways. On one hand, children’s theory of mind abilities may facilitate their social interactions, which may contribute to their better relationships with peers. On the other hand, children’s social-emotional characteristics may also influence theory of mind understanding. If social interaction opportunities are essential for children to learn about people’s mental states, then children who are sociable, have better social relations or even aggressive may develop an understanding of mental states earlier than children who are shy and withdraw from others. Alternatively, however, if being observant and reflective about social experiences are essential for theory of mind development, then shy-sensitive children might have more opportunities to observe others in social situations and would thus have a better understanding of mental states compared to their aggressive peers. It is worth noting that these theoretical links do not imply that theory of mind development is necessary or sufficient for social-emotional functioning and vice versa, neither does it preclude any cognitive and sociocultural influences in theory of mind development, which are at other levels of explanation.

Theory of Mind Understanding and Social-Emotional Development: Existing Literature

Researchers have conducted empirical research to examine the links between children’s theory of mind development and social-emotional development, particularly in the past decades. The following review focuses the existing evidence regarding the relations between theory of mind and the development of three key social-emotional aspects: peer relations, social behaviors (prosocial, aggressive, and shy-sensitive behaviors) and psychological adjustment.

Theory of mind understanding and peer relations. Researchers have consistently found moderate associations between better mental state understanding and positive relations
between peers in early and middle childhood, despite the variations in theory of mind tasks and measures of peer relations across different studies (e.g., Badenes, Estevan & Bacete, 2000; Caputi, Lecce, Pagnin, & Banerjee, 2012; Cassidy, Werner, Rourke, & Zubernis, 2003; Denham, McKinley, Couchoud, & Holt, 1990; Peterson & Siegal, 2002; Slaughter, Dennis & Pritchard, 2002; Watson, Nixon, Wilson & Capage, 1999). For example, Watson et al. (1999) found that 3- to 6-year-olds’ better understanding of false beliefs were associated with teacher-rated positive relations with peers. Consistent with this finding, Peterson and Siegal (2002) showed that children who were rejected by their peers scored lower on false belief understanding than popular children, and children who had a reciprocal stable friendship performed better in false belief tasks.

Other researchers found that the links between theory of mind and peer relations might be clearer in some populations than in others. For example, Slaughter and colleagues (2002) found that children’s theory of mind understanding in various belief, desire and emotion tasks predicted their levels of peer preference, especially among children age 5 and above. Badenes et al. (2000) found among a sample of 4- to 6-year-olds that better ability to deceive others was associated with peer rated popularity among girls, whereas impaired understanding of lies in communications seemed to be associated with peer rejection among boys.

These results have revealed associations between children’s understanding of different mental states and peer relations, but the direction of the effects remain unclear due to the correlational nature of these studies. Caputi and colleagues (2012) recently conducted one of the few longitudinal studies to investigate children’s theory of mind abilities and peer relations by following 70 children from age 5 to age 7. Results showed that children’s aggregate theory of mind understanding in the early years contributed to higher peer acceptance one year later. In a three-wave longitudinal study involving 6- and 9-year-olds, Banerjee, Watling, and Caputi (2011) found that children in both groups who were not rejected by peers had better understanding of unintended insult in faux pas stories in the next year. Moreover, 9-year-olds who had better understanding of the faux pas were less likely to be rejected by peers one year later. These
results support bidirectional relations between advanced theory of mind understanding and peer relations. However, since the participants in the study were older preschoolers and school-age children, it remains unknown whether peer relations might contribute to theory of mind ability during earlier years. Taken together, existing studies on relations between theory of mind and peer relations indicate significant relations between the two. The relations are likely to be bidirectional in middle childhood, although more research will be helpful in revealing the underlying mechanisms and direction of effects in early childhood.

**Theory of mind understanding and social behaviors.**

**Prosocial behaviors.** Researchers have also been interested in the relations between children’s theory of mind understanding and prosocial behaviors, such as helping, sharing and cooperating. The existing findings have yielded mixed results. Some researchers have found significant relations between better theory of mind abilities and positive social behaviors (Caputi et al., 2012; Dunn et al., 1991; Dunn & Cutting, 1999; Lalonde & Chandler, 1995; Peterson, Slaughter, & Paynter, 2007; Walker, 2005; Watson et al., 1999). During play activities, preschool children with higher theory of mind ability, especially false belief understanding, are more likely to join peers’ play and play sociably with peers (Peterson et al., 2007), produce more joint play proposals involving both themselves and their peers (Astington & Jenkins, 1995), are more cooperative and responsive during play, as well as have fewer conflicts with their partners (Dunn & Cutting, 1999; Lalonde & Chandler, 1995). Moreover, theory of mind understanding has also been found to be associated with general social skills and competence. For example, Watson and colleagues (1999) found that better understanding of false beliefs were associated with teacher-rated social skills. Liddle and Nettle (2006) have found similar results among school-age children. Children who reasoned better of higher-order recursive beliefs were more socially competent as rated by their teachers.

Importantly, in a longitudinal study, Caputi and colleagues (2012) found that during the transitional to school, children’s early theory of mind understanding predicted higher levels of teacher-rated prosocial behaviors one year later, although the initial prosocial behaviors did not
seem to predict better theory of mind understanding during this period. Similarly, other longitudinal studies (Astington & Jenkins, 1999; Jenkins & Astington, 2000) found that children's false belief understanding in preschool years predicted their social behaviors in play situations, such as joint plans and role assignments, but not the other way around. These results provide initial evidence that the associations between positive social behaviors and theory of mind understanding might have been driven by the effect of theory of mind on social behaviors.

Other researchers, however, have failed to find a relation between theory of mind ability and positive social behaviors (e.g., Astington, 2003; Garner, Current, & Taylor, 2005; Ruffman, Slade, Devitt & Crowe, 2006). For example, Ruffman et al. (2006) did not find correlations between false belief, emotion, and desire understanding and conflict/cooperation behaviors rated by their mothers among preschoolers. Garner et al. (2005) found no correlations between false belief understanding and teacher-rated general social competence (Garner et al., 2005). The inconsistent results are likely to be due to the different methodologies and samples used in different studies. It seems the relations between theory of mind understanding and teacher/parent-rated general social competence tend to be especially inconsistent across different studies. Sensitive and precise measures of children’s prosocial behaviors are more likely to be found correlated with theory of mind understanding. In addition, larger samples and samples involving children of different ages tend to reveal more reliable results too.

Despite the mixed results, the existing evidence supports the view that theory of mind understanding is related with prosocial behaviors of young children. Moreover, existing evidence suggests that the contribution of theory of mind understanding to the development of prosocial behaviors is more evident than the influence of positive social behaviors on theory of mind development.

*Externalizing behaviors.* The link between theory of mind understanding and externalizing behaviors (e.g., aggression, conduct disorders, bullying, antisocial behaviors etc.) has also received much attention among researchers. At the first sight, children displaying externalizing behaviors often seem to show little concern about other people’s emotions,
suggesting a potential lack of social skills in mind reading abilities. However, researchers found no evidence that children with externalizing problems are actually impaired in fundamental theory of mind understanding (e.g., Deneault & Ricard, 2013; Happé & Frith, 1996; Hughes, Dunn, & White, 1998; Gini, 2006; Monks, Smith, & Swettenham, 2005). For example, Happé and Frith (1996) found that 6- to 12-year-olds with conduct disorders all passed false belief tasks like their peers without the disorder. In a sample of 8- to 11-year-olds, Gini (2006) found that bullies did not show any deficit in understanding beliefs and emotions compared to non-aggressive peers. Similarly, among preschool children, intact false belief understanding has been found among children who are aggressive (Monks et al., 2005), disruptive or “hard-to-manage” (Hughes et al., 1998).

If children with externalizing problems do not lack theory of mind understanding, are they delayed or more advanced in mental state reasoning? The existing results show different developmental patterns during early childhood and middle or late childhood. During early childhood, aggression has been found to be negatively associated with earlier and better false belief understanding (e.g., Capage & Watson, 2001). In one longitudinal study, Wellman, Lane, LaBounty, and Olson (2011) found that aggressive-externalizing temperament at age 3 predicted poor false belief understanding at age 5. Lane et al. (2013) have also found similar associations between aggression and lower theory of mind understanding among U.S. and Chinese preschool children. These findings suggest that children’s externalizing tendencies may negatively contribute to theory of development during early childhood.

Among school-age children especially boys, counter intuitively, researchers have found that better theory of mind abilities are actually associated with more severe externalizing behaviors (Gasser & Keller, 2009; Sutton, Smith, & Swettenham, 1999; Walker, 2005). In Happé and Frith’s (1995) study, for example, compared to other children, children with conduct disorder showed their mind reading ability best in the domain of antisocial behaviors (e.g., teasing and bullying). In a sample of 7- to 11-year-olds, Sutton and colleagues (1999) found that bullying behavior rated by self and peers was positively related with better understanding of beliefs and
emotions in deceptive situations. These findings raise the possibility that children with externalizing behaviors may have an intact but skewed theory of mind, or a ‘theory of nasty minds’ (Happé & Frith, 1995). Since superior theory of mind abilities are also related to prosocial behaviors, it is unlikely that better theory of mind abilities can lead to externalizing behaviors.

Whether aggressive and disruptive behaviors may actually facilitate theory of mind reasoning in certain situations among older children is an open question.

Taken together, research evidence indicates that children with externalizing behaviors have intact theory of mind and they may even be more advanced at mental state reasoning in certain competitive and manipulative situations. However, during early childhood, aggressive tendencies seem to be unfavorable for the acquisition of fundamental mental state understanding. In addition to methodological differences, the inconsistent results may also signal that externalizing behaviors and theory of mind might be linked in relatively complex ways than at the first sight.

**Internalizing behaviors.** Similar to relations between theory of mind development and externalizing behaviors, studies on relations between theory of mind and internalizing behaviors (social anxiety, shyness, social withdrawal etc.) also suggest different patterns in early and middle childhood. For example, in two longitudinal studies, researchers have observed that shy temperament at age 18 months predicted better understanding of beliefs, desires and knowledge at age 3 (Mink, Henning, Aschersleben, 2014), and children who displayed shyness-withdrawal temperament at age 3 performed better at false belief tasks at age 5 (Wellman et al., 2011). Positive associations between shyness and better false belief understanding have been found in Chinese preschoolers as well (Lane et al., 2013). These findings suggest that children’s internalizing tendencies and some forms of social disengagement may foster theory of development during early childhood.

In middle childhood, internalizing tendencies do not seem to be related with belief understanding, and are found to be related with poor emotion understanding. For example, Mewhort-Buist and Nilsen (2013) found that among 8- to 12-year-olds, shyness and social anxiety
symptoms were not related with their comprehension of ironic statements -- a form of advanced belief understanding. Banerjee and Henderson (2001) found that among 6- to 9-year-olds, socially anxious children were not associated with understanding of recursive beliefs regarding facts about the physical world. However, these children had difficulties in understanding links between emotions, intentions and beliefs in social situations. Based on one meta-analysis involving 113 studies on relations between social anxiety and emotion understanding among children and adults, O’Toole, Hougaard, and Mennin (2012) concluded that social anxiety was more strongly associated with decreased ability to understand complex emotions than to recognize basic emotions. Therefore, existing findings suggest that theory of mind understanding and internalizing behaviors might be differently related during early and middle childhood. Internalizing tendencies may facilitate theory of mind development, whereas during middle childhood the relation is not significant and may even be negative in terms of emotion understanding.

When these results are taken together with the results on externalizing behaviors, they support the view that nonreactive, observant and inhibited behaviors may foster theory of mind development during early childhood. The developmental patterns during middle childhood seem to be the reverse; children with externalizing behaviors display more sophisticated theory of mind reasoning in certain respects, whereas children with internalizing behaviors tend to have lower emotion understanding abilities. The different patterns might reflect the different ways that theory of mind understanding interacts with children’s behavioral tendencies during different developmental periods, but equally likely is that the key theory of mind understanding assessed during different developmental periods might be fundamentally different. More research is clearly needed in order to draw more definite conclusions regarding the different possibilities.

Theory of mind understanding and psychological adjustment. Compared to research on links between theory of mind development and children’s social relationships and behaviors, fewer studies have been conducted on the links between theory of mind understanding and children’s psychological adjustment. Indications for links between the two mostly come from adult
literature and research on children with autism. For example, adults who suffer from depression have been found to also have difficulties in advanced theory of mind reasoning (e.g., Inoue, Yamada, & Kanba, 2006; Lee, Harkness, Sabbagh, & Jacobson, 2005; Wolkenstein, Schönenberg, Schirm, Hautzinger, 2011). Research on children with autism has found that compared with typically developing children, children with autism or Asperger syndrome tend to report higher levels of loneliness (e.g., Bauminger & Kasari, 2000; Bauminger, Shulman, & Agam, 2003) and depression (Kim et al., 2000). Although these results provide some indication that theory of mind might be related to psychological difficulties, it does not necessarily imply that the two are directly related, since complex genetic and adverse experiential factors might mediate the links or actually give rise to both a deficit in theory of mind and psychological maladjustment. Moreover, these results also give little insight on the links among typically developing children.

Bosacki (2000) did one of the few studies on relations between theory of mind understanding and self-concept in typically developing preadolescents. She found that children’s understanding of beliefs and emotions in complicated social situations was related with their self-perceptions of behavioral-conduct (e.g., like the way they behave). The author explained the relation by arguing that person’s sense of self is created from their social experience and is influenced by their understanding of others as psychological beings. The links between theory of mind understanding and other aspects of psychological adjustment such as depression, loneliness or school attitudes have remained largely unstudied among typically developing children.

In summary, the existing studies on links between theory of mind and social-emotional development suggest that children’s theory of mind understanding is related with multiple social-emotional aspects, especially peer relations, prosocial behaviors, externalizing and internalizing tendencies. Better theory of mind understanding is related to better peer relations and more positive social behaviors among children of different ages. During early childhood, internalizing behaviors seem to foster theory of mind development, whereas externalizing tendencies are associated with delay in the acquisition of mental state understanding. The developmental
patterns seem to be more complex during middle childhood, with externalizing behaviors associated with more sophisticated theory of mind reasoning in certain respects and internalizing behaviors associated with lower emotion understanding abilities. Because the majority of these studies have been correlational, the specific mechanisms and directions of effects underlying the links are not entirely clear. Recent longitudinal studies suggest that in some domains (e.g., peer relations), theory of mind and social-emotional development may contribute to each other, and in other domains (e.g., aggression and shyness), theory of mind understanding is influenced by children’s social-emotional functioning.

**Children's Understanding of Internal Conflicts and Social-Emotional Adjustment**

The existing literature on relations between theory of mind understanding and social-emotional development have involved simple desire and emotion understanding, belief understanding (e.g., diverse belief tasks, false belief tasks, recursive belief tasks), and advanced perspective taking tasks. The relations between the understanding of conflicting mental states and social-emotional adjustment have hardly been investigated by researchers. Conflicting desires is a psychological phenomenon prevalent in real life, and to deal with them successfully may be important for our functioning and wellbeing. Therefore, compared to false belief understanding, conflicting desires might be even more relevant to children’s everyday situations. Intuitively, children’s understanding of conflicting desires may be related to children’s social-emotional development in life too.

More specifically, first, understanding of conflicting desires may be important to the maintenance of positive relations with peers. When children interact with each other, arguments and conflicts often arise over issues such as the ownership of toys, adoption of play roles, or different opinions regarding certain objects (Shantz, 1987). In these situations, children may experience internal conflicts between the desire to play with the other partner and the desire to satisfy their own desires. Children who only understand simple desires might be likely to only pay attention to their own immediate desires, whereas children with an understanding of multiple conflicting desires might be more likely to consider the importance of different desires when
choosing their actions. Conceivably, those who are able to act in a way that benefits their peers will be more likely to be liked by their peers and have more friends. Conversely, children who have positive relations with peers may have more opportunities to interact with them. During the interactions children may have more opportunities to realize the difference in desires between themselves and the other person, and their friendship may help highlight the conflicts between being nice to their peers and fulfilling their own desires.

Second, understanding conflicting desires may also be relevant to prosocial behaviors. Being prosocial and altruistic to others may often be at some expense of self-interest. For example, to share snacks or color pencils with a peer means that the child will have to eat fewer snacks and use the pencils less conveniently. It is likely that children may have to deal with their conflicting desires in these situations. They have to choose between keeping their self-interest intact versus being prosocial to other people. It is possible that understanding the relations between different conflicting desires may foster their other-oriented behaviors. Therefore, understanding internal conflicting desires may facilitate children’s positive social behaviors in life.

Third, children’s externalizing and internalizing behaviors may be related to the understanding of internal conflicts too. As mentioned above, if social interactions and experiences are important for the development of the understanding of conflicting desires, it would predict that children who are shy and withdrawal during peer interactions may be delayed in the development of the understanding, whereas children who are aggressive and disruptive may not necessarily acquire the understanding later than non-aggressive peers. Alternatively, if being observant and reflective are important for the development of the understanding, it should follow that children who are shy-sensitive may be superior in its understanding, whereas aggressive children may show a delay in this development.

Previous studies have supported the second possibility, that shy and observant temperament may foster the development of false belief understanding, whereas aggressive and reactive temperament can be unfavorable for its development in early childhood (Wellman et al., 2011; Lane et al., 2013). However, there might be some differences between understanding of
conflicting desires and understanding false beliefs that may lead to different links with children’s behavioral tendencies. False belief is a mental state that is easier to recognize in other people than in children themselves. Therefore, observations and reflections on other people’s behaviors and experiences may be critical for its development. In comparison, observations of other people may not be helpful in detecting the existence of other conflicting desires, since people usually are only able to act in accordance with one of their desires. The understanding of conflicting desires might be easier to recognize in children themselves than in other people, since having conflicting desires is a common subjective experience even among young children. They may occur in interpersonal situations as well as purely within the child, such as choose to eat one chocolate bar immediately or eat two tomorrow.

Therefore, unlike the understanding of false beliefs, observing other people’s interactions and experiences may not be as helpful in facilitating the development of conflicting desires. Direct participation in social interactions, in contrast, might be more favorable to this development, since it gives rise to more opportunities for children to realize the existence between their desires and other people’s desires, as well as the struggle with being positive and prosocial to other people and satisfying immediate desires. In brief, compared to aggressive children, shy children may be more likely to be delayed in understanding conflicting desires because of their lack of social interactions and experiences.

Fourth, we know little from previous research about the relations between theory of mind development and children’s psychological adjustment. Conceptually, the links between children’s understanding of conflicting desires and psychological adjustment is less clear than those with their social relationships and behaviors. In the literature, psychological difficulties have been found influenced by children’s behavioral dispositions (e.g., Chen, Rubin, & Li, 1995), relationships (e.g., Ladd & Gordon, 2003), home environment (e.g., Fantuzzo, et al., 1991), as well as social-information processing mechanisms (e.g., Dodge, 1993). It seems that children’s experiences and the meaning they apply to them primarily influence psychological adjustment. Therefore, understanding of conflicting desires and psychological adjustment may not be linked
with each other, except being indirectly associated through other behavioral-experiential variables.

The majority of existing studies on the links between theory of mind understanding and social-emotional functioning have been conducted in Western cultures. However, it is possible that social-cultural circumstances and contexts may play a role in the manifestation of the links. According to the contextual-developmental perspective (e.g., Chen & French, 2008), cultural context might influence the “functional meaning” of children’s behaviors through social interaction processes. Children who display the same behavior in different cultures may have different adjustment outcomes, depending on how other people react to the behavior based on cultural values and norms. Is it possible that the same cognitive understanding may have different implications in different cultures too? For example, In the Chinese society, collective goals and group harmony are highly valued. Even young children are encouraged and expected to control their impulses and behaviors to benefit other people and the group. Behaviors that only satisfying one’s own desires are disliked and often criticized. Children who have a better understanding of the relations between internal conflicts might be more able to behave in prosocial ways in interpersonal situations and may have better positive peer relations. In contrast, compared to the Chinese culture, U.S. culture is both more individualistic and also places less emphasis on impulse control during early childhood. Children may thus do not have the same pressure of pleasing others as their Chinese counterparts, and self-oriented behaviors may not be perceived as negative. Therefore, the social benefits of having a better understanding of internal conflicts may not be as evident in the U.S.

The Present Study

The aim of the present study is to investigate relations between children’s understanding of internal conflicting desires and their social-emotional development. Specifically, we focus on three key aspects of children’s social-emotional adjustment: 1) peer relations, 2) social behavioral tendencies, including social-cooperation, aggression and shy-anxiety, and 3) psychological adjustment, focusing on their self-perceptions of social integration, self-worth and positive
attitudes towards school. In addition to understanding of conflicting desires, a false belief measure was also included to examine whether the understanding of different mental states might be differentially related to children’s social-emotional development. The relations between theory of mind understanding and social-emotional adjustment were examined in both China and the U.S., which allowed us to explore whether the relations might be moderated by cultural contexts.

It is hypothesized that better understanding of conflicting desires would be positively related with peer relations and social-cooperative behaviors, and negatively related with shy-anxious behaviors. The relations might be stronger among Chinese children than among U.S. children, since Chinese culture values impulse and behavioral control more than the U.S. culture, especially during early childhood. Moreover, consistent with existing literature, it is hypothesized that better performance on the false belief task might be positively related with peer relations, social-cooperative behaviors and shy-anxious behaviors, and negatively related with aggressive behaviors in both U.S. and China. Children’s understanding of conflicting desires and false beliefs may not be evidently linked to their psychological adjustment.

Study 6

Study 6 examines relations between understanding conflicting desires and social-emotional development among Chinese and U.S. children. Relations between false belief understanding and social-emotional development were also examined as a comparison. Multiple methods have been used to measure their social-emotional development, including peer nominations, peer and teacher ratings, as well as self-reports. Of interest was how children’s peer relations, behavioral tendencies (social-cooperation, aggression and shy-anxiety), and psychological adjustment (self-perceptions of social integration, self-worth and positive attitudes towards school) were linked with their understanding of conflicting desires and false beliefs, as well as whether the links might be different in different cultures.
Method

Participants. Participants were the same Chinese and U.S children in studies presented in Chapters 2 and 3. Forty-four U.S. children came from two preschools in an Eastern United States city participated, including 21 four-year-olds (12 girls, range = 48 to 57 months, M= 51.2 months) and 23 five-year-olds (11 girls, range = 60 to 70 months, M = 64.0 months). Forty-three children from two preschools in a middle-sized city in China participated, including 20 four-year-olds (9 girls, range = 48 to 57 months, M = 51.2 months) and 23 five-year-olds (11 girls, range = 60 to 70 months, M = 64.0 months). To achieve a better cross-cultural comparison, we individually age matched the participants from each culture. The majority of participants in both countries came from middle class families in the area.

Design and procedure. Procedures and designs of the cognitive stories were presented in Chapters 2 and 3. Children’s responses to the Prosocial Conflict story, the Food story and the Academic story were summed to form a total score of conflicting desires understanding. The score thus ranged from 0 to 3. Children’s response to the false belief story was also included, with a range of 0-1.

We individually administered to the children a peer assessment measure of social functioning, a sociometric nomination measure and a self-report measure. Identical procedures were used for both American and Chinese children. The interview session lasted about 15 to 20 minutes for each child, with a brief break in the middle. Teachers were asked to complete a rating scale for each participant concerning his or her school-related competence. The members of our research team carefully examined the items in the measures that were initially developed in the United States, using a variety of strategies (e.g., repeated discussion in the research group, interviews with children and teachers, psychometric analysis). The Chinese versions of the instruments were translated and back-translated to ensure comparability with the English versions. Extensive explanations of the procedure were provided during administration. American and Chinese children did not have difficulties in understanding the procedure or the items in the
measures. All the measures have been used extensively and proved to be valid in both cultures (e.g., Chan, 1997; Chen, Cen, Li, & He, 2005; Chen & Rubin, 1994).

The internal conflicting desire tasks and the nominations and self-report measures were completed on different days. Half children completed the internal conflicting desires tasks first, and the other half of the children completed the nominations and self-report measures first.

Measures.

Peer assessments of social functioning. Peer assessments of social functioning were conducted using an adapted version of the Revised Class Play (RCP; Masten, Morison, & Pelligrini, 1985). The RCP has been widely used in the United States and in China (e.g., Chen, et al., 2005). This technique has been found particularly useful in assessing children’s social functioning in different social-cultural contexts because it taps insiders’ perspectives rather than adult values or expectations. Based on the procedures by Masten et al. (1985) and McCandless and Marshall (1957), each child was provided a booklet in which the names and photos of all children in the class were printed on each page. The experimenter read each behavioral descriptor to the child, and then the child was asked to nominate up to three classmates who could best fit the description. The child was allowed to indicate their nominations both verbally and by choosing a picture. The same procedure was followed for each descriptor, until the child provided nominations for all 6 descriptors. Subsequently, nominations received from all classmates were used to compute each item score for each participating child. Therefore, each item score was the sum of the number of nominations the child received from all his/her classmates who participated in the interview. The item scores were standardized within the class to adjust for differences in the number of nominators in each classroom. The RCP measure consists of items in broad areas of sociability, aggression, and shyness. The questions focused on observable behaviors of peers, so they were less susceptible to different interpretations among children in different cultures.

Three measures were formed in the present study: 1) Sociability-cooperation, formed by two items tapping aspects of social competence (i.e., “makes new friends easily,” “helps others
when they need it”). Internal reliability for this variable was acceptable (Cronbach’s alpha, .72 and .61 for Chinese and American samples respectively). 2) Aggression-disruption, formed by two items concerned with physical and verbal aggressive behaviors (i.e., “gets into a lot of fights,” “picks on other kids”). Internal reliability was high (Conbach’s alpha, .91 and .82 in the Chinese and American samples). 3) Shy-anxiety, originally assessed by two items (i.e., “very shy and anxious,” “usually look sad”) used in previous studies with school-aged children. These items were indicators for social wariness and sensitivity from the peers’ perspective (Chen, Rubin, & Sun, 1992; Masten et al., 1985). However, children in the present study seemed to have difficulty understanding the first item “very shy and anxious”. Even when there were children in the classroom who could fit the description (as indicated by the head teachers’ ratings), many children denied they knew such children and did not provide nominations for this item. This effect is consistent with the findings that preschool children often describe people in terms of observable physical or behavioral features and they do not have a good understanding of internal and personality traits of people (e.g., Barenboim, 1981; Livesley & Bromley, 1973). Therefore, only the item “usually look sad” was retained in further analyses, which had moderate correlations with teacher-rated internalizing problems in Chinese and American samples, Spearman’s rho = .45 and .42, ps = .003 and .022 respectively.

**Sociometric nominations.** Children were asked to nominate up to three classmates whom they most liked to be with and three classmates whom they least liked to be with (positive and negative playmate nominations). The nominations received from all classmates were totaled and then standardized within each class to control for the number of children in each classroom and permit appropriate comparisons. As suggested by other researchers (e.g., Coie, Terry, Lenox, Lochman, & Hyman, 1995), cross-gender nominations were allowed. The positive nominations received from peers provided indexes of acceptance as a playmate and as a friend, and negative playmate nominations provided an index of rejection as a playmate.

**Teacher-ratings.** In the American and Chinese preschools in the present study, one teacher is usually in charge of a class. This head instructor often teaches the children and takes
care of various social and daily activities of the class. The head teacher usually instructs the same group of children over several years and is thus very familiar with the children. Following procedures by Hightower et al. (1986), the head teacher was asked to rate each child in his or her class on the 30 items of behavioral problems and school related social competence in the Teacher-Child Rating Scale (T-CRS; Hightower et al., 1986). The T-CRS has proved reliable and valid in Chinese children (e.g., Chen & Rubin, 1994). Teachers rated on a 5-point scale how well each of these items described each child, ranging from 1 (not at all) to 5 (very well). Consistent with the results of previous studies (Chen, Dong, & Zhou, 1997; Hightower et al., 1986), four factors were identified: (1) Acting-out/aggression (e.g. “Disruptive in class”, “Fight with other children”). Internal reliabilities for this variable were .87 and .85 for Chinese and American samples; (2) Shyness-Anxiety (e.g. “Shy, timid”), with internal reliabilities being .85 and .76 in Chinese and American samples; (3) School-related social competencies (e.g., “Is friendly toward peers”, “Take turns when playing with others”). The items in this part of the original measure involve four areas: (1) assertive social skills; (2) frustration tolerance; (3) task orientation; and (4) peer social skills (Hightower et al., 1986). Ten items that were relevant for preschoolers were included in the present study, the majority of which were about social skills.

Factor analyses revealed that the items represented a single factor in both Chinese and American samples, with internal reliabilities being .82 and .73. Thus, consistent with the procedure used in previous studies (e.g., Chen et al., 1995), a global score of social competence was calculated in this study by averaging the scores of the items. All teacher rating scores were standardized within each class to control for the teacher’s response style and to allow for appropriate comparisons. Following the procedure by Chen et al. (1997), peer and teacher assessment scores were standardized and then aggregated to form a single index of the corresponding construct\(^1\). This approach was followed because the items on peer and teacher assessed aggression and shyness reflected the same constructs and to reduce overlap and

\(^1\) Pearson correlations between teacher ratings and peer assessments in the Chinese sample were .60 on aggression ($p < .001$) and .34 on shyness ($p = .032$), and in the American sample were .35 on aggression ($p = .026$) and .39 on shyness ($p = .011$).
redundancy in analyses.

**Self-reports.** We also administered several self-report measures as indications for children’s psychological adjustment, including self-perceptions of social integration, self-worth, and school attitudes. Before the measure was administered, children were provided detailed explanations about the task and about how to respond to the questions. When it was clear that children understood the task, the researcher read aloud each item and recorded the responses. For each item question of these measures, children were asked to choose answer “Yes, No, or Sometimes”. Each answer reflecting positive self-perceptions or attitudes received a score of 1, each negative answer received a score of 0, and a “sometimes” response received a score of 0.5. The scores of all items for the same construct were averaged and formed a single measure, with higher scores indicating more positive self-perceptions and attitudes.

**Self-perceptions of social integration.** A measure of perceived social integration, based on Harter (1985) and Cassidy and Asher (1992), was administered to the children during the individual interviews. The 15 items (e.g., “Do you have a lot of kids to play with at school?” “Do you get along with other kids in school?”) tapped children’s social experience with peers in the school. Factor analysis showed that the items indicated a single factor representing children’s perceived social affiliation and integration. Previous research has indicated that self-perceptions of social integration are associated with peer social competence as assessed by others such as peers and teachers (e.g., Chen, He, & Li, 2004). Internal reliability for this measure was .78 and .89 among Chinese and U.S. children in the current study.

**Self-worth.** Children’s self-perceptions of general self-worth were assessed by items adapted from *The Selfperception Profile for Children* (Harter, 1985). The measure included 14 items (e.g. ‘Some people are happy with themselves as a person, but other people’) and have been proved reliable, valid and appropriate in Chinese children (Chan, 1997; Chen, Liu & Li, 2000; Kwok, 1995; Stigler, Smith, & Mao, 1985). Internal reliability of the measure was .58 in the Chinese sample and .50 in the U.S. sample.

**School attitudes.** A measure of school attitudes, adapted from Ladd, Kochenderfer, and...
Coleman (1997), was administered to the children during individual interviews. The 8 items in the measure (e.g., “Do you like school?” “Are you happy at school?” and “Do you wish you could stay home and did not have to go to school?”) tapped individual differences in their school attitudes. Factor analysis revealed that the items loaded on a single factor reflecting children’s general attitudes toward school. Internal reliability was .85 and .87 in the Chinese and U.S. sample.

Results

Descriptive statistics. Descriptive statistics of Chinese and U.S. children’s scores of the conflicting desire stories, the false belief task, as well as their social-emotional adjustment measures are presented in Table 3 and Table 4 respectively. Consistent with previous literature on social-emotional development, boys had higher scores of aggression and lower scores of teacher-rated social competence in the Chinese sample (e.g., Yang, Chen, & Wang, 2013). These gender differences approached significance among U.S. children too. No differences were found in understanding of conflicting desires and false beliefs between boys and girls in both samples.

Table 3.

Means and Standard Deviations of Understanding of Conflicting Desires and Social Variables for Chinese Boys and Girls in Study 6

<table>
<thead>
<tr>
<th>Variables</th>
<th>Boys (N=20)</th>
<th></th>
<th></th>
<th>Girls (N=23)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>T value</td>
<td></td>
</tr>
<tr>
<td>Conflicting Desires</td>
<td>2.10</td>
<td>.91</td>
<td>1.90</td>
<td>1.14</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td>False Belief</td>
<td>.55</td>
<td>.51</td>
<td>.70</td>
<td>.47</td>
<td>-.97</td>
<td></td>
</tr>
<tr>
<td>Positive Nominations</td>
<td>.03</td>
<td>.86</td>
<td>.38</td>
<td>.13</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>Negative Nominations</td>
<td>.19</td>
<td>1.14</td>
<td>-.24</td>
<td>.69</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>TR-Comp.</td>
<td>-.59</td>
<td>.94</td>
<td>.52</td>
<td>.64</td>
<td>4.56***</td>
<td></td>
</tr>
<tr>
<td>Social-Cooperation</td>
<td>-.05</td>
<td>.72</td>
<td>.48</td>
<td>1.06</td>
<td>1.84+</td>
<td></td>
</tr>
<tr>
<td>Shy-Anxiety</td>
<td>1.22</td>
<td>.53</td>
<td>1.04</td>
<td>.70</td>
<td>.95</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.

Means and Standard Deviations of Understanding of Conflicting Desires and Social Variables for U.S. Boys and Girls in Study 6

<table>
<thead>
<tr>
<th>Variables</th>
<th>Boys (N=20)</th>
<th>Girls (N=23)</th>
<th>T value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflicting Desires</td>
<td>1.20</td>
<td>.75</td>
<td>1.57</td>
</tr>
<tr>
<td>False Belief</td>
<td>.75</td>
<td>.79</td>
<td>.32</td>
</tr>
<tr>
<td>Positive Nominations</td>
<td>.55</td>
<td>.03</td>
<td>1.63</td>
</tr>
<tr>
<td>Negative Nominations</td>
<td>.08</td>
<td>-.16</td>
<td>.78</td>
</tr>
<tr>
<td>TR-Comp.</td>
<td>-.28</td>
<td>.19</td>
<td>1.79+</td>
</tr>
<tr>
<td>Social-Cooperation</td>
<td>.62</td>
<td>.25</td>
<td>1.30</td>
</tr>
<tr>
<td>Shy-Anxiety</td>
<td>-.03</td>
<td>.11</td>
<td>.59</td>
</tr>
<tr>
<td>Aggression</td>
<td>.32</td>
<td>-.08</td>
<td>1.84+</td>
</tr>
<tr>
<td>SP of Social Comp.</td>
<td>.90</td>
<td>.86</td>
<td>.65</td>
</tr>
<tr>
<td>Self-Worth</td>
<td>.96</td>
<td>.94</td>
<td>.59</td>
</tr>
<tr>
<td>School Attitudes</td>
<td>.94</td>
<td>.88</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Note. *** p < .001 + p < .1

Relations among social-emotional variables. Pearson correlations were calculated to examine the relations among different social-emotional variables among Chinese and U.S. children. These results are presented respectively in Table 5 and Table 6. In both samples, social-cooperation was strongly and positively related with positive peer nominations. Moreover,
among Chinese children, aggression was positively related with negative peer nominations, lower teacher-rated competence and lower self-worth. Among U.S. children, there was a nonsignificant trend that shy-anxiety was related with negative peer nominations and lower teacher-rated competence, whereas aggression was only related with lower teacher-rated competence. Finally, in both samples, children’s perceived social integration was positively related with their perceived self-worth, and it was also related to children’s school attitudes in the U.S. sample.

**Relations between theory of mind understanding and social-emotional variables.**

To examine relations between theory of mind understanding and children’s social-emotional development, Pearson correlations were also calculated for Chinese and U.S. children separately. These results are presented in Tables 5 and 6.

**Understanding false beliefs and social-emotional development.** Among the Chinese children, false belief understanding was not related with any of the social-emotional measures (Table 5). However, in the U.S. sample, better false belief understanding was positively related with lower negative positive peer nominations and higher self-perceptions of social integration (Table 6).

**Understanding conflicting desires and social-emotional development.** As can be seen from Table 5, among Chinese children, better understanding of conflicting desires stories were positively correlated with positive peer nominations, social-cooperative behaviors, and negatively correlated with shy-anxious tendency. In contrast, among U.S. children, unexpectedly, better understanding of conflicting desires stories were positively correlated with negative peer nominations and aggressive tendency (Table 6). Age-partialled correlations indicated similar patterns, except that understanding of conflicting desires was also negatively related with positive nominations among U.S. children ($r = -.45$, $p = .008$), and was not related with positive nominations among Chinese children ($r = .22$, $p = .20$). Other correlations were similar with age controlled.
Table 5.

*Intercorrelations among all Variables in the Chinese Sample in Study 6*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>False Belief</td>
<td>.27+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Nomi.</td>
<td>.32*</td>
<td>.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Nomi.</td>
<td>.07</td>
<td>-.14</td>
<td>-.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR-Comp.</td>
<td>.15</td>
<td>.16</td>
<td>.27+</td>
<td>-.31*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social-Coop.</td>
<td>.38*</td>
<td>.21</td>
<td>.65***</td>
<td>-0.03</td>
<td>.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shy-Anxiety</td>
<td>-.36*</td>
<td>.21</td>
<td>-.26</td>
<td>-.19</td>
<td>-.25</td>
<td>-.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agg.</td>
<td>.05</td>
<td>-.09</td>
<td>-.03</td>
<td>.52***</td>
<td>-.61***</td>
<td>-.08</td>
<td>.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP of Social Integration</td>
<td>-.16</td>
<td>.05</td>
<td>.19</td>
<td>-.16</td>
<td>.08</td>
<td>.11</td>
<td>-.11</td>
<td>-.27+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Worth</td>
<td>-.09</td>
<td>.00</td>
<td>-.02</td>
<td>-.19</td>
<td>-.01</td>
<td>.06</td>
<td>.03</td>
<td>-.38*</td>
<td>.45**</td>
<td></td>
</tr>
<tr>
<td>School Attitudes</td>
<td>.03</td>
<td>.24</td>
<td>.06</td>
<td>-.22</td>
<td>.19</td>
<td>-.08</td>
<td>.14</td>
<td>-.17</td>
<td>-.08</td>
<td>.11</td>
</tr>
</tbody>
</table>


### Table 6.

**Intercorrelations among all Variables in the Chinese Sample in Study 6**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>False Belief</td>
<td>.09</td>
<td>- .15</td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Nomi.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Nomi.</td>
<td>.34*</td>
<td>- .33*</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR-Comp.</td>
<td>-.14</td>
<td>.17</td>
<td>-.04</td>
<td>-.19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social-Coop.</td>
<td>.08</td>
<td>-.04</td>
<td>.64***</td>
<td>.14</td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shy-Anxiety</td>
<td>.08</td>
<td>-.10</td>
<td>.04</td>
<td>.29*</td>
<td>-.28+</td>
<td>-.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agg.</td>
<td>.36*</td>
<td>-.15</td>
<td>.03</td>
<td>.21</td>
<td>-.27+</td>
<td>.21</td>
<td>-.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP of Social</td>
<td>-.06</td>
<td>.33*</td>
<td>.15</td>
<td>-.04</td>
<td>.30+</td>
<td>.09</td>
<td>-.24</td>
<td>-.15</td>
<td>SP of Social Comp.</td>
<td>Self-Worth</td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Worth</td>
<td>.12</td>
<td>.10</td>
<td>.23</td>
<td>.03</td>
<td>.38*</td>
<td>.40*</td>
<td>.03</td>
<td>.03</td>
<td>.52***</td>
<td></td>
</tr>
<tr>
<td>School Attitudes</td>
<td>.03</td>
<td>.23</td>
<td>.26</td>
<td>.06</td>
<td>-.36*</td>
<td>.07</td>
<td>-.10</td>
<td>-.07</td>
<td>.56***</td>
<td>.02</td>
</tr>
</tbody>
</table>


Discussion

Relations between children’s understanding of conflicting desires and their social-emotional development were examined among Chinese and U.S. children. Multiple significant relations were found in both samples, but the specific relations were different in different cultural contexts. Among Chinese children, the understanding of conflicting desires were related with indexes of positive social-emotional adjustment such as positive peer nominations and social-cooperative behaviors, and was negatively related with shy-anxious behaviors. However, among U.S. children, understanding of conflicting desires was related with indexes of negative social-emotional adjustment such as negative peer nominations and aggressive behaviors. Moreover, better understanding of false beliefs was related to less negative peer nominations and higher self-perceived social integration among U.S. children, whereas false belief understanding was not related to any adjustment variables among Chinese children. Extending the existing literature, these results suggest the possibility that different aspects of theory of mind may be linked with distinct social and behavioral adjustments, as well as that cultural context may play a role in how children’s understanding of theory of mind and social-emotional development are linked.

Relations among social-emotional variables in Chinese and U.S. children. Relations found among different social-emotional variables in the current study were largely consistent with existing literature. First, among both Chinese and U.S. children, social-cooperative behavior was strongly and positively related with positive peer nominations. Similar relations have been found in many studies on children’s social-emotional development (e.g., see review by Eisenberg, Fabes, & Spinrad, 2006).

However, the relational and psychological correlates of shy and aggressive behaviors seem to vary depending on the cultural context. Consistent with the adjustment problems of aggressive children found in previous studies (e.g., Chen et al., 2005; Rubin, Bukowski, & Parker, 2006), we found that aggressive behavior was related lower teacher-rated positive competence in both samples as well as associated with negative peer nomination among Chinese children. However, we also found that aggression was positively related with lower self-worth among
Chinese children but not among U.S. children. These findings are consistent with existing findings that aggressive children in Western cultures tend to have positive and biased self-perceptions (e.g., Hoza, Molina, Bukowski, & Sippola, 1995), whereas aggressive children in China tend to develop psychological disturbances such as depression and have low self-perceptions of social competence (e.g., Chen et al., 2004). Psychological adjustment of aggressive children is likely to be influenced by the social attitudes and responses they receive during interactions. In Western cultures, despite the general discouragement of aggressive behaviors, sometimes aggressive children may receive support and admirations from their peers (e.g., Cairns & Cairns, 1994). However, the Chinese culture is primarily concerned about social harmony and strictly prohibits aggressive behavior. Aggressive children in China are likely to receive unanimous negative responses from peers and teachers, which makes it difficult to develop inflated self-perceptions (Chen, Chung, & Hsiao, 2009).

In terms of shy-anxious behaviors, consistent with existing literature (e.g., Rubin, Coplan, & Bowker, 2009), we found a trend that shy-anxiety was related with negative peer nominations and lower teacher-rated competence among U.S. children. The relations were not significant among Chinese children. Although the small sample of our study might have limited our ability to detect significant relations, the results seem to suggest a more negative implication of shy-anxious behaviors among U.S. children than among the Chinese participants in our study. This might be due to greater emphasis on competiveness and assertiveness in Western societies than in the Chinese region where the study was carried out. It is worth noting that shy children in other regions of China may develop more adverse adjustment like their American counterparts, especially those who grow up in urban areas of big cities (e.g., Chen, Wang, & Wang, 2009).

**Relations between understanding of conflicting desires in social-emotional variables.** The primary aim of the present study was to examine relations between understanding of conflicting desires and children’s social-emotional development. Consistent with our hypotheses, among Chinese children, better understanding of conflicting desires stories were positively correlated with positive peer nominations, social-cooperative behaviors, and negatively
correlated with shy-anxious tendency. This pattern suggests that social interactions and experiences might be important for young children to develop an understanding of conflicting desires. During social interactions, children are likely to encounter frequent conflicts with their peers, which may lead them to realize the conflicts in desires between themselves and other people, as well as the inner conflicts between maintaining interactions and relations with the other person and satisfying their own desires. Children who have positive peer relations, display more positive social behaviors and are less shy may have more opportunities to interact with others.

Conversely, it is possible that a better understanding of conflicting desires may benefit children’s social relationships and behaviors too. When children’s own desires and interests conflict with those of their peers, those who are able to consider multiple desires may be more likely to recognize other people’s needs as well as their desire of maintaining relations with the other person. Consequently, they may be more likely to act in ways that benefit others and their relationships. Therefore, it is possible that relations between understanding conflicting desires and positive social relations and behaviors might be bidirectional. Future longitudinal studies will be helpful in exploring these intriguing possibilities.

The results among U.S. children were somewhat unexpected and counterintuitive: children who were aggressive and received more negative peer nominations actually had a better understanding of conflicting desires. These results should not be interpreted too much before they are replicated with larger samples. What we can do here is only to offer some speculations. These results do not contradict the possibility that social interactions and experiences might be important for the development of understanding conflicting desires. In fact, children who are aggressive may often actively approach other children and thus do not lack social interactions. Children who received negative nominations might be disliked by their peers out of a variety of reasons including being aggressive or shy, so as a group they may not all lack social interactions either. Why these children seemed to have a better understanding of internal conflicting desires seems to require a further explanation. One possibility might be that these children may have more conflicts with peers due to their aggressive, disruptive and disliked behaviors, and thus
might be more likely to perceive the existence of conflicting desires. Replications of the results and longitudinal studies are clearly needed before any definite conclusions can be made.

Although the understanding of conflicting desires has unexpected relations with maladaptive adjustment among U.S. children, we found that American children who had better false belief understanding scored lower on negative peer nominations and had higher self-perceptions of social integration, which were consistent with the existing literature (Bosacki, 2001; Lane et al., 2013; Mink et al., 2014; Wellman et al., 2011). The different social-emotional correlates of the understanding of conflicting desires and false beliefs support the view that different mental state understanding might have different implications for children’s socioemotional development (Astington, 2003).

Our results show that understanding of internal conflicts was related with different social-emotional adjustment among Chinese and U.S. children. It is clear that the cultural context may play a role in the manifestation of these links. In the Chinese society, where impulse and behavioral control are greatly emphasized even during early childhood, behaviors that benefit others and the group are particularly appreciated and liked. Children who have a better understanding of the relations between internal conflicts might be more able to behave in prosocial ways even at the expense of their own desires. Therefore, in the context where impulse control is valued, children’s better understanding of conflicting desires might be related to more prosocial behaviors and more positive peer relationships.

In contrast, compared to the Chinese culture, U.S. culture is both more individualistic and also places less emphasis on impulse control during early childhood. Although an understanding of conflicting desires may help children consider the importance between different options, they may not have the same pressure of pleasing others as their Chinese counterparts. Therefore, a better understanding of internal conflicts may not lead to behaviors that go beyond satisfying own immediate desires. Moreover, since individual choices are valued and impulse control is not viewed as important, actions of satisfying own desires might be perceived as justified and obeying others or the group may not be particularly appreciated. As a result, better understanding
of internal conflicts may not necessarily lead to better peer relations in the U.S. as in the Chinese society. The specific mechanisms of how cultural context might influence the links between internal conflicts understanding and social-emotional development have to be investigated in future research, but these results highlight the importance of cultural context in the relations between theory of mind understanding and social-emotional adjustment.

The current study has some limitations that need to be addressed in future research. First, the small sample sizes have limited our ability to detect potential significant relations and might also affect the reliability of the study. Second, the study was correlational, preventing us to draw any conclusions about the direction of effects. Third, we tried to individually age-match the Chinese and U.S. children, but even if the age groups were similar, the level of understanding between participants in the two cultures was different. In Chapter 3, we reported that many Chinese children have developed an understanding of relations between conflicting desires by age 5, whereas fewer U.S. children have demonstrated the understanding at this age. A separate analysis on Chinese 4- and 5-year-olds revealed similar trends among the two age groups, suggesting the better understanding of 5-year-olds did not change its relation with social-emotional adjustment. However, for better comparisons and interpretations, it might be ideal in future studies to study children with similar level of understanding in both cultures, such as only among 4-year-olds. Finally, we must stress that in this preliminary study, no measurement of general intelligence, language or executive function was made. Therefore, we cannot rule out the possibilities that children’s understanding of conflicting desires may co-vary considerably with these general cognitive abilities. Thus, we cannot claim that the understanding of conflicting desires is uniquely or differentially predictive of social-emotional development, until studies controlling these variables are carried out. Despite these limitations, the current study has provided initial findings regarding the underexplored links between understanding of conflicting subjective states and social-emotional development, as well as highlighting the importance of cultural context in the manifestation of the links.
CHAPTER 5
Conclusions and Discussion

Having multiple conflicting desires simultaneously is a common life experience. This dissertation investigates children’s understanding of this mental state. The six studies reported offer insights into its developmental changes, possible cultural influences in its development, as well as its links with children’s social-emotional development. In light of the three research questions raised in Chapter 1, several findings emerged. First, studies in Chapter 2 reveal an age-related change in understanding internal conflicting desires among 4- to 7-year-old American children. When presented stories involving a character with an immediate preference that conflicted with a more important goal, 6- and 7-year-olds predicted the character would act in accordance with the goal, whereas younger children predicted the character would fulfill the immediate desire. These findings suggest that unlike the older group, younger children do not realize that the existence of an overall conflicting goal could deter the pursuit of a less important immediate desire. Importantly, children’s responses were consistent across different situations, even when the desires and goals were unfamiliar to them. Therefore, the differences between younger and older groups are likely to reflect differences in mental state understanding, rather than familiarity with the situation or their own preferences.

Study 4 and 5 in Chapter 3 examined the role of social-cultural influences in the development of this understanding, by studying the development among a sample of Chinese children. The results indicate that like their U.S. peers, Chinese children also developed an understanding of internal conflicting desires. However, U.S. children acquired the understanding around ages 6 and 7, whereas Chinese children gave goal-oriented responses by the end of preschool, at least one year earlier than their U.S. counterparts. These results suggest that consistent with the theory theory, social-cultural inputs play a role in children’s acquisition of this mental state understanding. In particular, Chinese culture’s greater emphasis on impulse control in early childhood and its collective orientation may facilitate children’s understanding of internal
conflicts, possibly by highlighting the conflicts between impulses and other goals, as well as the importance of inhibiting personal desires to act in ways that benefit others and the group.

Study 6 in Chapter 4 explored the links between children’s understanding of conflicting desires and their social-emotional adjustment in life among Chinese and U.S. 4- and 5-year-olds. Multiple associations were found in both samples, but the patterns seemed to be very different in the two cultures. Among Chinese children, better understanding of conflicting desires was related with better peer relations, more prosocial behaviors, and less shy-anxious behaviors. This pattern is consistent with the view that frequent and positive social interactions and experiences may be important for young children to develop an understanding of conflicting desires. Moreover, it is likely that a better understanding of conflicting desires may benefit children’s social relationships and behaviors too, possibly by facilitating their consideration of different options when there are multiple desires present. In contrast, among U.S. children, a better understanding of conflicting desires was associated with peer rejection and aggression. The mechanisms underlying the links still remain unclear, but what we can conclude from these findings is that cultural context plays a role in the manifestation of the links between mental state understanding and social-emotional adjustment. In the context where the understanding and related behaviors are emphasized, better understanding of conflicting desires is related with positive relational and behavioral adjustment of young children.

The Understanding of Internal Conflicting Desires and Theory of Mind Development

When we bring these studies together and especially place them in the context of children’s understanding of other mental states, the findings contribute to a more extensive understanding of theory of mind development. As we will discuss below, the developmental picture of understanding internal conflicts is both consistent and also different from the development of other mental state understanding, particularly in terms of the developmental changes, social-cultural mechanism underlying its development, as well the relations with social-emotional development.
**Developmental changes.** The results reveal that understanding internal conflicting desires is challenging for young children. It is known that even 2-year-old children are proficient in understanding simple desires (e.g., Bartsch & Wellman, 1995). On the first sight, the understanding of conflicting desires might also develop early in life since conflicting desires are composed of simple desires. However, what we found is that children in U.S. and in China did not understand relations between internal conflicts until age 5 and above, an age that most children already understand false belief (Wellman et al., 2001). This finding is surprising to some extent, especially since having internal conflicting desires may not be unfamiliar to young children, as indicated by their visible struggles in the marshmallow test situation (Mischel et al., 1972). However, it seems their awareness of the relations between conflicting desires is very limited and takes a long time to develop after achieving a good understanding of simple desires. These findings imply that in terms of theory of mind development, internal conflicting desires is an advanced mental state qualitatively different from simple desires. Therefore, although it has been argued that desires are conceptually simpler than belief to represent (e.g., Perner, 1991), it is necessary to distinguish simple desires from internal conflicting desires, since they have very different developmental trajectories.

Importantly, these findings also suggest certain cognitive abilities might have to be present for children to understand conflicting desires. As discussed in Chapter 2, at least three types of cognitive abilities might be relevant for the understanding: the understanding of hierarchical relations, the understanding of multiple representative relations between the world and the mind, as well as the understanding of agency and second-order volitions. These abilities might be related rather than mutually exclusive. It has been argued that the understanding of false belief is a milestone for children’s cognitive development (e.g., Perner, 1991). Similarly, it is possible that the understanding of internal conflicting desires may also signal the maturity of important cognitive abilities, which may be even more advanced and beyond those underlying false belief understanding.
Among the understanding of different mental states, the developmental progression of understanding internal conflicts is most parallel to the development of understanding mixed emotions. Western children show clear understanding about mixed emotions also around age 7 (e.g., Harris, 1983, 1989; Harter & Buddin, 1987; Lagattuta, 2005). Like desire, emotion is also a subjective mental state, and mixed positive and negative emotions often exist in us even towards the same target or situation. Therefore, it is conceivable that these developments of them share common underlying cognitive abilities and mechanisms. Future studies that involve both conflicting desires tasks and mixed emotions tasks might shed light on this possibility by investigating the relations between two. On the other hand, desires might also be different from emotions in terms of their relations to actions. Desires seem to motivate behaviors more directly than emotions. Children have been proposed to be “desire-psychologist” and then “belief-desire psychologist” (Wellman & Wooley, 1990), but not as “emotion psychologist”. We more often explain and predict behaviors based on desires than on emotions. In fact, individuals may often feel happy or sad without doing anything about these states. Therefore, it may not be easy to predict a person’s actions based on information about conflicting emotions, and it will be interesting to see whether children are sensitive to this difference between desires and emotions.

It is also interesting to consider whether similar developmental progression might be shared in the understanding of “conflicting beliefs” too. The case of beliefs might be less clear than conflicting emotions and desires. It is certainly possible for a person to feel strong urges of both playing a video game and finishing the work at hand. Theoretically, It seems possible that a person might hold simultaneous conflicting beliefs too, such as both believing the chocolate is in the box and believing it is in the basket. However, in reality, it is hard to imagine a person may really contradict his own epistemic judgment in this way. If a person claims he believes in both possibilities regarding the location of the chocolate, it suggests that he is only guessing and does not really believe either of the possibilities. As we often see in life, a person’s false belief is more often pointed out by others than discovered by the person himself, for one does not often believe different realities at the same time. However, if we broaden beliefs from epistemic beliefs to
subjective beliefs (e.g., attitudes and value judgments), conflicting beliefs might happen, such as a person may think a piece of modern art as both ugly and beautiful. Subjectively, the presence of these conflicting judgments might be more implicit than conflicting desires or emotions, which might make it even harder for children to be aware of it.

**Developmental mechanism.** We found a cross-cultural difference in the development of children’s understanding of internal conflicting desires, that Chinese children seemed to acquire the understanding at least one year earlier than their American counterparts. In comparison, false belief understanding was similarly developed around age 4 and 5 among children from both cultures. In Chapter 3, we have discussed about the possible role of social-cultural inputs in the development of conflicting desires. It seems the cultural influence was specific in the understanding of conflicting desires, rather than in the development of mental state understanding in general. Therefore, even though researchers often study theory of mind development as if it is a single family of cognitive abilities, the development of different mental states may be susceptible to different social-cultural circumstances. Researchers have found that family conversations on mental states predict children’s theory of mind understanding (for a review see Symons, 2004). Most of these studies did not differentiate different types of mental state language and how they are related to different types of mental state understanding. Our findings suggest it might be a possible direction worth exploring in the future.

**Links with social-emotional development.** We have investigated how children’s social-emotional development is linked with the understanding of conflicting desires and the understanding of false belief. In both the Chinese and U.S. samples, we have found different patterns of social-emotional correlates of the understanding of conflicting desires and false beliefs. Among Chinese children, understanding of conflicting desires was related with positive social relations and behaviors, whereas the understanding of false belief was not related to social-emotional variables. Among U.S. children, understanding of conflicting desires was related with negative peer relations and aggressive behaviors, whereas better false belief understanding was related with lower peer rejection and higher self-perceptions of social integration. Chapter 4
discussed the possible mechanisms and the role of cultural context in the manifestation of the links. The different social-emotional correlates of conflicting desire understanding and false belief understanding is another important finding.

In terms of the influences on social-emotional adjustment, both understanding may have equally important functions for social behaviors during interactions. However, social-emotional functioning may contribute to the two types of understanding differently. The existing literature suggests that an observant, shy-internalizing temperament may facilitate the acquisition of false belief understanding (Lane et al., 2013; Wellman, 2011). However, we found that shy-anxious behavior was related to poorer understanding of internal conflicting desires. As a speculation, it is possible that rather than being observant during social interactions, actual participation in social interactions might be more favorable for the development of understanding conflicting desires. A key difference between false belief and internal conflicts is that false belief might be easier to discover in other people, whereas internal conflicts is most often felt within the individual. Therefore, observing other people’s interactions and social experiences may help the child realize the existence of false beliefs. However, these observations may not lead to an understanding of conflicting desires, since people mostly act only according to one desire at a time. In comparison, for young children, social situations are likely to give rise to conflicts between peers, which may in turn cause internal struggles between the desire to please the other person or to fulfill one’s own immediate desire. Thus, children who have ample opportunities to participate in social situations may have more experiences with these internal conflicts than those who are shy and withdrawn. Although the current findings do not distinguish these possibilities, they do suggest that different mental state understanding, especially those with versus without observable corresponding behaviors, might be linked differently with children’s socioemotional development.

The Understanding of Internal Conflicting Desires and Other Cognitive and Social Abilities

**Metacognition.** Children’s understanding of the specific relations between internal conflicting desires may have important connections with cognition and behavior in other domains, such as metacognition and self-control. Research on children’s metacognition has documented
the “utilization deficiency” for children aged 4 to 7 (Bjorklund, et al., 1997; Miller, 1994; Woody-Ramsey & Miller, 1988), which means children often fail to use the most beneficial strategies in memory and learning tasks, although sometimes they can even spontaneously produce these strategies. One factor that contributes to this failure might be insufficient realization of the relations between mutually exclusive desires. Once children acquire this understanding, they may be more proficient at selecting a strategy based on its utility for the goal instead its convenience or familiarity. Longitudinal studies of children’s understanding of the relations between internal conflicting desires and metacognition could shed light on the causal relations between the two.

**Self-control.** The investigation of this research was first motivated by the observations that children and adults often experience conflicting desires and control their desires. What are the likely relations between children’s understanding of internal conflicts and their self-control ability? On one hand, children’s understanding of internal conflicting desires and self-control behaviors may have mutual influence on each other. It is possible that the experiences of using self-control to deal with actual internal conflicts may help children to realize that the pursuit of an important desire may cancel the less important conflicting ones. Conversely, children’s conceptual understanding may also facilitate their decision making in life. In situations involving conflicts between immediate desires and long-term goals, as children gain deeper understanding about the relations between internal conflicting desires, they may be more likely to consciously make decisions that are helpful for achieving the overarching goal rather than simply accepting their immediate desire.

On the other hand, it should be noted that children’s understanding of internal conflicting desires may not be necessary nor sufficient to dealing with their own desires in beneficial ways. As Harter and Buddin (1987) pointed out, conceptual understanding and experience will not always be synchronous. Indeed, research on children’s choice to delay gratification has shown that preschool children as young as 4 are able to opt for delayed larger rewards instead of only trying to satisfy their immediate desire (e.g., Lemmon & Moore, 2007; Thompson, Barresi, & Moore, 1997), although children at this age do not seem to have an understanding of internal
conflicting desires yet. It is possible that in reality, when children have to choose between a basic desire and a goal, the goal may have real motivating power for the child, which helps him/her to relinquish the immediate desire voluntarily without having to reflect on the relations between the different desires.

Conversely, although we found that children at ages 6 or 7 start to understand that people will behave in favor of their main goal and not their immediate preference, it does not imply that they will always do so when they have conflicting desires. Children’s actual behavior in these situations might be influenced by a variety of personal and environmental factors, such as the appeal of the rewards or the cost of pursuing the goal (e.g., Mischel & Metzner, 1962). Despite the potential discrepancy between conceptual understanding and the child’s behavior, it does not exclude the intriguing possibility that they can influence each other to some extent. It will be important to investigate the relations between children’s understanding of internal conflicts and their actual self-control behavior, as well as the circumstances when the relation may be particularly pronounced.

Culture and the Understanding of Internal Conflicting Desires

A theme in our investigation of children’s understanding of internal conflicting desires is the role of culture in it. Based on our findings and discussions in Chapters 3 and 4, it seems the role of culture can be conceptualized in two broad ways: as inputs and as context. These also correspond to the different views of cultural influences among researchers in cognitive development and in social development. Researchers in cognitive development tend to view culture as the inputs that inform children’s mind, through culturally shaped conversations, direct instructional processes, or as experiences to be represented (e.g., Wellman et al., 2006). In contrast, researchers in social development tend to view culture as the context where development happens, through attitudes and responses from other people during social interactions (e.g., Chen & French, 2008). These views are also applicable for our studies. As we have discussed, sociocultural inputs from parents and teachers on impulse control may facilitate the understanding of conflicting desires, whereas how the understanding is associated with
adjustment outcomes might depend on how much it is valued and emphasized by the cultural members.

There are other ways that culture may influence children's theory of mind understanding or their social behaviors. One powerful mechanism is through cultural tools, such as the languages we speak (Vygotsky, 1962). As Vygotsky (1962) first famously proposed, our thoughts can be mediated by our languages. In line with this view, it has been found that the differences in mental state terms have implications for children's false belief understanding (Liu et al., 2008; Tardif, Wellman, & Cheung, 2004). For example, in English, think and belief may signal both true and false beliefs, whereas in Chinese there are specific verbs for “think falsely”. The use of the “think falsely” verb has been found to improve Chinese children's performance in false belief tasks (Tardif et al., 2004). In terms of the current investigation on the understanding of conflicting desires, no such marked differences in languages have surfaced between Chinese and English. However, if specific terms for conflicting desires do exist in some languages, it is still an intriguing possibility that children’s understanding might be influenced by the relevant linguistic factors.

Recently, the emerging field of cultural neuroscience provides us with exciting findings of how cultural norms interact with brain activities to give rise to social understanding and behaviors (see Kitayama & Uskul, 2011, for a review). For example, Murata, Moser and Kitayama (2013) found that cultural values on emotion expressiveness influence people's brain activities related with emotion regulation processes. Consistent with Asian culture's value on emotional control and North American culture's value on emotional expression, when asked to suppress emotional expressions induced by emotional stimuli, European-American participants showed no decrease in relevant brain's electrical activity and increased activity in frontal regions of the brain, suggesting they continued to experience the induced emotion and feel conflict in trying to suppress the expressions. However, Asian participants showed dissipated emotion-related brain activity and no indications for internal conflict during suppression. The authors argued that Asian cultures' emphasis on emotional control might have "trained" their cultural members to downregulate emotional processing during suppression, which the North American participants rarely
do. These findings lead to the interesting question of whether there would be similar cross-cultural differences in brain activities when people reason about conflicting desires and inhibiting them.

**Limitations and Future Directions**

There are some limitations in the studies reported in the current dissertation, some of which have been discussed in Chapter 4. In addition to those specific to the study in Chapter 4, the following limitations could also be addressed in future studies. First, consistent with the theory of mind research tradition, the current studies used short stories and forced-choice questions to assess children’s understanding of internal conflicting desires. This method has the advantage of being objective and giving easier control of the influences of irrelevant factors. However, this method also prevents us from getting richer insights about children’s understanding. Open-ended interviews, for example, may help reveal other aspects of children’s understanding.

Second, we studied relations between children’s understanding of conflicting desires and their social-emotional development in life. The findings provide the initial step in demonstrating the potential links between children’s social understanding and their adjustment. However, to get a better sense of the mechanism underlying the links, it might be better to observe how the understanding makes a difference to children’s everyday behaviors in more refined ways. For example, it might be more productive to observe children in actual social interactions and see whether the understanding is related with more prosocial behaviors. It is likely that children’s behaviors in relevant social situations actually mediate the links between the understanding and their adjustment.

Third, the tasks used in the study were about third-party situations. The child was judging stories about other characters. It remains to be investigated whether children’s understanding of their own conflicting desires might be similar to their understanding of other people’s conflicting desires. Admittedly, this additional step might limit our conclusions about the implications of the results, since understanding of one’s own conflicting desires may be more relevant than understanding other people’s conflicting desires in many life situations (e.g., delay-of-
However, interestingly, existing theory of mind research shows evidence of good agreement between children’s understanding of their own false beliefs and others’ false beliefs (e.g., Gopnik & Astington, 1988). It is an intriguing possibility that children who do not understand relations between conflicting desires in other people’s minds also do not understand their own conflicting desires. An investigation on this question would allow us to understand better children’s understanding as well as the behavioral implications of their understanding in first person vs. third person perspectives.

Fourth, like most theory of mind tasks, the conflicting desires tasks used in the current studies assessed children’s understanding in hypothetical and simplified situations. However, our everyday use of theory of mind is ongoing, highly dynamic and facilitated by many social cues. It is likely that children who are good at the cool, decontextualized tasks might perform poor in hot, ongoing social interactions. Alternatively, it is also possible that some children who do not perform well in these controlled cognitive tasks might demonstrate better mind reading skills when they are actually involved in the situation. With so many conceptual tasks available, it is perhaps the time for the field to move from investigating children’s conceptual understanding to how we actually perform mind reading tasks in real life situations. In fact, the difficulty in this direction may not lie in the tasks we use per se, but might be more about what theoretical distinctions need to be made about the cognitive components involved.

Finally, although the studies in this dissertation involved children from two different cultures, the majority of them came from middle-class and well-educated families. These children have received the most attention in theory of mind development, so it was good to study them for the purpose of comparison to existing literature. However, one needs to be cautious about generalizing the findings to other communities or cultures. Indeed, our own findings suggest that the timing for developing an understanding of conflicting desires and the implications of the understanding are influenced by social-cultural context. In cultures where pressures for controlling impulses are much lower than the Chinese and the U.S. culture, for example, relations between conflicting desire might be understood differently or later by the children there. Studies in
remote hunter-gather cultures with relaxed life-styles and less sociocultural pressures may help inform this possibility.

**Implications for Development and Education**

The present findings have broader implications for development and education. First, from an educational point of view, these results suggest that children's understanding of conflicting desires may have important implications for their learning strategies and school transition. As we have discussed, the development of children's understanding of conflicting desires seems to parallel development in their usage of strategies in memory tasks and learning (Bjorklund et al., 1997; Miller, 1994; Woody-Ramsey & Miller, 1988). Easy materials or fun learning methods, compared to difficult tasks and hard thinking, might be especially attractive to young children. When the easy learning tasks and methods are not as effective as the hard ones, however, there is a conflict in choosing between simple enjoyment and better learning outcomes. To select the most beneficial strategies, the child needs to understand a more useful strategy may deter the use of a more pleasant but less useful option. This understanding may open the possibility for children to see the point of difficult strategies and doing hard tasks and make it likely to adopt them. These changes in learning behaviors may thus help children to be more prepared for the transition to school, when learning becomes more formal and goal-oriented than purely fun-oriented.

Second, our findings suggest that children need to be cognitively prepared to understand internal conflicting desires. This requirement may have implications for parents and teachers who would like to help their children behave in beneficial ways when the child is conflicted. Explanations of the different options and their relations to each other might be helpful for older children or children who are in the transition of developing the understanding. For a three-year-old child, for example, this kind of reasoning might be confusing and counterproductive. Indeed, most children do not show delay-of-gratification until age 4 (Thompson et al., 1997), suggesting younger children have difficulty in even realizing the obvious benefits of other options. It might be more helpful if parents and teachers structure younger children’s situations in simple and
straightforward ways in the first place. When the pursuit of disliked options are unavoidable, parents and teachers may facilitate this process by making the process more directly appealing or providing enjoyable distractions in the delay period. For older children who have the cognitive competence to understand reasoning about different desires, it will be useful to point out to them the pros and cons of different options as well as the importance of behavioral control.

Third, our results regarding the links between understanding of conflicting desires and social-emotional development suggest that it might be helpful to integrate conflicting desire understanding in programs that aim to improve children’s social and learning skills. Many intervention programs for children with autism have already included the training of different theory of mind tasks, which has proved to be useful for this group of children (for a review, see White, Keonig, & Scahill, 2007). The training of conflicting desires might also be beneficial to children with autism as well as typically developing children, since conflicting desires is a frequent mental state that may be relevant in our decision-making processes about different actions. Improving children’s understanding of internal conflicting desires may have important connections with their control-related behaviors in social and learning situations. Conceivably, as children gain deeper insights into the relations between internal conflicts and how to balance them, they will be more conscious and prepared to give their own answers for hard choices in life, such as to save the world or to savor it.
APPENDIX

Stories in Study 2

The Food story

This is the Elephant. The Elephant really wants to lose weight so he can join the football team at school. Eating broccoli can help him to lose weight, and eating chocolate will only make him put on weight. The elephant likes the taste of chocolate; he does not like the taste of broccoli. The Elephant really wants to lose weight right now.

Memory Questions:

1) Preference Desire question: What does the Elephant like? What he does not like?
2) Goal Desire question: Does the Elephant want to lose weight and join the team or not?

Test Question:

This is lunch time. What do you think the Elephant will choose to eat? Broccoli or chocolate?

The Academic story

This is Tom. Tom is going to have a test tomorrow. Tom really wants to get a good grade on the test. To get a good grade, he has to do his homework and he cannot watch cartoons on TV. Tom likes watching cartoons; he does not like doing homework. Tom really wants to get a good grade for the test.

Memory Questions:

1) Preference Desire question: What does Tom like? What he does not like?
2) Goal Desire question: Does Tom want to get a good grade for the test or not?

Test Question:

What do you think Tom will choose to do today? Do homework or watch cartoons?

Story in Study 3

The Novel Desire story

This is Mary. There is a very good feeling called “blarb”, and Mary really wants to feel “blarb” today. Here are two fruits. The green fruit will make her “blarb”, the yellow fruit will
not. Mary likes the flavor of the yellow fruit; she does not like the flavor of the green fruit.

Mary really wants to feel “blarb”. It's the most important thing for her right now.

**Memory Questions:**

1) *Preference Desire* question: Which fruit does Mary like? Which she does not like?

2) *Goal Desire* question: Does Mary want to feel “blarb” or not?

3) *Effectiveness Desire* question: Which fruit can make Mary feel “blarb”? Which fruit cannot?

**Test Question:**

What do you think Mary will choose to eat today? The yellow fruit or the green fruit?


Kushnir, T., Xu, F., & Wellman, H. M. (2010). Young Children Use Statistical Sampling to Infer the Preferences of Other People. Psychological Science, 21, 1134-1140.


Rakoczy, H., Warneken, F., & Tomasello, M. (2007). "This way!" "No! That way!"---3-year olds know that two people can have mutually incompatible desires. *Cognitive Development, 22*, 47-68.


Wente, Bridgers, Xin, Gopnik, Zhu, & Seiver (2013). Poster presented at the meeting of the Cognitive Development Society, Memphis, TN.


