University of Alberta

The Development and Transmission of Culturally Unique Attentional Styles in Canada and Japan: A Demonstration of Children's Cultural Learning and Parents' Scaffolding Behaviors

by

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Dedication

I dedicate this dissertation to my mother, Akemi Senzaki, who taught me the compassion and devotion for learning.

Abstract

Accumulating evidence suggests systematic cross-cultural differences in patterns of attention, such that North American adults' attentional patterns tend to be more selective and object-oriented, while East Asian adults' attentional patterns tend to be more diffused and context-sensitive. Although such culturally divergent patterns of attention are expected to be the product of socialization practices unique to these cultural groups, little research to date has examined this theoretical assumption. The present research investigated the development and transmission of culturally specific attentional patterns by focusing on parent-child socialization practices as the source of cultural differences in visual attention in Canada and Japan. Two studies established that although children at ages 4 to 9 do not demonstrate cross-cultural differences in patterns of attention when they independently engage in a visual attention task that requires verbal description and recall (Study 1), when parents and children jointly engage in the same visual attention task, cultural differences emerge (Study 2). Particularly, Canadian and Japanese parents directed children's attention in a culturally unique manner, and this effect was especially strong among parents with older children. Age-related differences were also found in children's behavior, such that older children (7- to 9-year-olds) showed cross-cultural differences in their attentional patterns, mirroring those of their parents (i.e., object-oriented in Canada and context sensitive in Japan). Younger children (4- to 6-year-olds), however, did not show cultural differences even when their parents were demonstrating culturally unique attentional patterns during joint task engagement. These findings suggest parent-child interactions differ across cultural groups, which contribute to the

development of culturally unique cognitive processing styles. Implications of parental scaffolding and cultural learning during parent-child socialization practices are discussed.

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CHAPTER 1

Introduction

Children live and grow in a rich sociocultural context. Through interaction with more experienced members of the culture, such as their parents, children learn how to think, perceive, talk, remember, and learn (Bruner, 1990; Gauvain, 2001; Rogoff, 2003; Vygotsky, 1978). The importance of sociocultural context for cognitive development becomes clear when comparing a human child's development to that of other animals. Unlike most non-human animals, even compared to other primate species, human development is characterized with a prolonged maturation period, which leads to a great behavioral plasticity. This indicates that the learning environment plays a significant role in human development. Another striking difference between humans and other animals is the expectation for human children to participate in a complex cultural environment. As Bruner (1990) notes, human children are born to a world that is already filled with language, social practices, and other proper ways of living. Parents start making eye contact with their children from the first day of birth, expect their children to communicate using symbolic representations such as language, and teach them to engage in culturally appropriate behaviors (Deacon, 1997; Tomasello, 1999). For example, in many industrialized societies such as Canada and Japan, common milestones gauging child development include language development, toilet training, and readiness for schooling. Thus, in our daily life, cultural influence is inevitable in raising children; however, its importance for children's cognitive development is often taken for granted (Whiting & Edwards, 1988).

Although the influence of culture on cognitive development seems evident in our daily lives, it is easily overlooked because culture provides general principles of living (Bruner, 1990). Therefore, Bruner describes being cultural means being normative in a given society. For instance, people often do not realize how their experiences, values, and even fundamental ways of thinking are influenced by their cultural backgrounds until when they travel to a place with different cultural traditions. This experience is illustrated by Clyde Kluckhohn, who said, "it would hardly be fish who discovered the existence of water" (1949, p. 11), indicating that culture is often invisible for those who live in that culture, as water is invisible to the fish living in it. For this reason, it is difficult for most children and adults to recognize the way they engage in culturally unique thinking styles. Shweder suggests that the process of cultural development is the process of changing from being conscious to being unconscious (Shweder et al., 2007). For example, when a child learns how to tie shoelaces, she has to make a conscious effort to coordinate the fingers of both her hands, but once the child accomplishes this cultural learning after numerous trials, the full action becomes habituated and can be completed effortlessly. Similarly, when children are trying to learn culturally appropriate ways of processing information, effort may be necessary, but once they fully acquire the skill sets, culturally specific thinking styles may be habituated and exhibited without awareness.

Supporting this notion, growing evidence in cultural psychology has demonstrated systematic differences in cognitive styles, especially between members from North American cultures and East Asian cultures (for review, see Miyamoto & Wilken, 2011; Nisbett & Masuda, 2003; Nisbett & Miyamoto, 2005). While these studies demonstrate the robust effect of culture on adults' thinking styles, it is still unclear how people

develop such culturally appropriate cognitive manners. In particular, the current literature in cultural psychology is insufficient for explaining the origin of cultural differences in cognitive processing styles. It is speculated that culturally appropriate thinking styles are transmitted through experience and social interaction, yet only a few empirical studies have directly examined socialization processes across North American and East Asian cultures in relation to cognitive development (e.g., Fernald & Morikawa, 1993; Wang, Leichtman, & Davies, 2000).

The purpose of this dissertation is to explore the development and transmission of culturally unique cognitive styles by comparing the cognitive development of children and interactions with their parents in Canada and Japan at different developmental levels. In Study 1, I examine the development of visual attention among 4- to 9-year-old children in Canada and Japan. In Study 2, I examine parent-child socialization practices to explore the assumption that cultural learning would occur during such interactions. I then discuss the findings of the current research in terms of children's cultural learning, parents' scaffolding behaviors, and implications for cultural transmission across generations. I also discuss theoretical implications and future research of the integration of cultural and developmental psychology. In the subsections that follow, I first outline the theories and recent empirical findings that support the idea that culture influences cognitive development during early to middle childhood.

Cultural variation in cognitive processing styles

In the past few decades, accumulating evidence has shown systematic cross-cultural differences in a wide variety of perceptual-cognitive processes such as visual attention (Masuda & Nisbett, 2001, 2006), visual perception (Ji, Peng, & Nisbett, 2000;

Kitayama, Duffy, Kawamura, & Larsen, 2003), auditory perception (Ishii, Reyes, & Kitayama, 2003), categorization (Ji, Zhang, & Nisbett, 2004), and autobiographic memory (Wang, 2001) between members of North American and East Asian cultures. This robust set of evidence demonstrating cross-cultural differences in cognitive processes suggests that people are not merely "information processors" living in a context-free world, but rather, they attend to specific information and perceive it in order to understand the world they live in (Bruner, 1957). In order to discuss the ways in which people understand the world they live in, it is useful to look at the concept of worldview. A worldview is the mental and cognitive organization that constitutes the basic belief about the reality. James W. Sire defines a worldview as "a commitment, a fundamental orientation of the heart" (Sire, 2004, p. 122). He further suggests that people may not necessarily be aware of their worldviews, but they base their actions on them.

Understanding various cultures' worldview is indeed one of the most important objectives of contemporary cultural psychology, because each cultural group has historically developed and maintained its own unique worldviews that reflect a shared fundamental understanding of the world (Markus & Kitayama, 1991; Nisbett, 2003; Nisbett, Peng, Choi, & Norenzayan, 2001). According to American anthropologist Clifford Geertz (1973), culture is intricately woven into the shared meanings, symbols, ideologies, socialization processes, and other everyday aspects of a collective life. Geertz claimed that anthropology is an interpretative science, whose aim should be to provide "thick description" of cultural phenomena. Instead of categorizing all the cultural phenomena of the world into a single theory, Geertz urged anthropologists to stay closer

to the actual daily life surrounding the people. Richard Shweder, one of the founding figures of contemporary cultural psychology, introduced Geertz's view of culture to the study of psychology in the late 1980s. At this time, psychological studies predominantly focused on the search for a context-free universal law of psychology that functions equally for all people regardless of their cultural backgrounds. Shweder questioned this notion of the general law of psychology (Shweder & Levine, 1984), and argued that there should be multiple psychologies to explain psychological phenomena, such as the development of perception and cognition, for members of particular cultural communities around the world, because psychological tendencies are fostered, reinforced, and expressed in local cultures which have their own shared meanings and worldviews. Shweder described cultural psychology as the study that investigates "subject and object, self and other, psyche and culture, person and context, practitioner and practice, live together, require each other, and dynamically, dialectically, and jointly make each other up" (Shweder, 1991, p. 73). Largely based on Shweder's account, contemporary cultural psychologists in general understand culture as a composition of a rich network of practices, meanings, habits, and experiences that are transmitted over time (Kitayama & Cohen, 2007). Cultural psychology is thus concerned with how such a loosely organized culture influences psychological function, and in turn, how people engage in the maintenance of cultural worldviews.

Although cultural contexts seem to be closely related to the development of the human mind, it is difficult to examine cultural effects if we only focus on studying the mind and behaviors in a single culture. In order to understand how historically and culturally maintained worldviews shape psychological functions, Nisbett and his

colleagues (Nisbett, 2003; Nisbett et al., 2001) used cross-cultural methods and compared worldviews commonly shared in two divergent cultural groups: Western/North American cultures and East Asian cultures. According to Nisbett and his colleagues, the common philosophical views in Western societies have descended from Greek traditions, whose worldview is of a more *analytic* basis. For example, Aristotle, one of the most influential philosophers of Western thought, claimed that the world is composed of substances that can be detached from the context and separated into individual objects, each of which possesses unique characteristics and properties. As highlighted in Aristotle's system of formal logic, consistency, linearity, and non-contradiction have been highly valued as principles of thought in Western societies (Nisbett, 2003; Nisbett et al., 2001). Nisbett and colleagues refer to this tradition of Western thinking styles as an analytic thought.

In contrast, Nisbett and colleagues discuss that traditional religious and philosophical beliefs in East Asian societies, such as Taoism, Confucianism, and Buddhism, promote a more relation-oriented, context-oriented nature, which led them to historically develop a *holistic* thought. In Eastern societies, cultural lay theories of a good cognitive model include the theory of change and the theory of contradiction (Choi, & Choi, 2002; Ji, Nisbett, & Su, 2001; Hamamura, Heine, & Paulhus, 2008; Peng, & Nisbett, 1999; Spencer-Rodgers, Boucher, Mori, Wang, & Peng, 2009; Spencer-Rodgers, Peng, Wang, & Hou, 2004; Spencer-Rodgers & Peng, 2004; Spencer-Rodgers, Strivastava, & Peng, 2001). The theory of change refers to the idea that the world is an unpredictable, impermanent, and constantly changing place. The theory of contradiction is the belief that two contradicting propositions can be regarded as truth; therefore, nonlinear and dialectical thinking is highly valued. In this view, the nature of the world

is interpreted as impermanent and interconnected. Because objects and context are often perceived as a whole unit, Eastern societies emphasize the idea that contextual and background information, in addition to the focal objects, is necessary to understand the nature of the world.

A large number of empirical studies have demonstrated analytic patterns of thought in Western and North American societies (mainly the United States, Canada, and Western European societies), and holistic patterns of thought in East Asian societies (mainly China, Japan, and Korea) in relation to social inference. For instance, cross-cultural investigations have been conducted on the classic social psychological concept referred to as the correspondence bias, which is the tendency to overestimate other people's internal attitudes and dispositions while underestimating situational factors when inferring their behaviors (Jones & Harris, 1967). Studies have shown that the correspondence bias is relatively smaller among East Asians compared to North Americans (Choi & Nisbett, 1998; Masuda & Kitayama, 2004; Miyamoto & Kitayama, 2002). These findings suggest that when encountering situations that require explanation and prediction of others' behaviors (i.e., focal objects), East Asians are more inclined to refer to the situational and contextual information, compared to North Americans (Choi, Nisbett, & Norenzayan, 1999; Morris & Peng, 1994; Norenzayan, Choi, & Nisbett, 2002).

Evidence for such cultural differences in thinking styles can also be found in the fundamental psychological levels of cognitive-perceptual processing. For example, in order to examine cultural variations in patterns of attention, Masuda and Nisbett (2001) asked university students in the U.S. and Japan to observe short videos depicting

underwater images. Masuda and Nisbett found that when describing underwater scenes, American students tended to focus on the focal objects such as the large fish, while Japanese students were more likely to describe the contextual information, such as the types of aquatic environment. These findings were replicated in a study that used an eye tracker, which found that Canadian students spent more time looking at the area where the large fish was swimming, compared to the Japanese students, while Japanese students spent more time looking at the background area than their Canadian counterparts (Senzaki, Masuda, & Ishii, 2013). This cultural difference in attentional patterns has been found using a variety of tasks, such as the change blindness task (Masuda & Nisbett, 2006), the Stroop task (Ishii et al., 2003), emotion recognition (Masuda, Ellsworth, Mesquita, Leu, Tanida, & van de Veerdonk, 2008; Ishii, K., Miyamoto, Mayama, & Niedenthal, 2011), scene perception (Chua, Boland, & Nisbett, 2005), the rod-and-frame task (Ji et al., 2000), and the framed-line test (FLT: Kitayama et al., 2003).

These studies provide a theoretical and empirical demonstration of how culture provides foundations for the shared meanings and worldviews that have been historically transmitted through socialization practices over generations, and the close-knit relationship between culture and perceptual-cognitive functions. In particular, North Americans share the analytic worldview in which people and objects are expected to possess unique characteristics and attributes; therefore, North Americans tend to put effort in understanding these characteristics by selectively focusing on internal attributes and properties of individual objects. On the other hand, in order to achieve an effective understanding of their social and physical environments based on their holistic

worldviews, East Asians tend to divide their attention among multiple objects and cover the wide range of information in the background.

In recent years, there has been a growing interest in examining the developmental trajectories of culturally divergent cognition in early to middle childhood. One of the earlier studies was conducted by Duffy and his colleagues to determine when children start exhibiting cross-cultural differences in visual attention (Duffy, Toriyama, Itakura, & Kitayama, 2009). They found that cross-cultural variation in visual attention emerged at around 6 years of age. In their study, 4- to 6-year-olds did not show cross-cultural differences in their performance on the framed-line test, but children older than 6 years of age demonstrated a significant cross-cultural difference in patterns of attention, such that American children performed better than Japanese children in the task that required them to selectively attend to the target line and ignore the contextual information. Conversely, Japanese children performed better than American children in the task that required them to attend to both the target and the contextual information to make perceptual judgments. These findings suggest that by 6 years of age, American children develop analytic patterns of attention, and Japanese children develop holistic patterns of attention. This research is one of the first studies that demonstrated cross-cultural differences in children's cognitive processing styles. As such, one of the main implications of this study was to stimulate further investigations examining the developmental onset of culturally unique cognitive processes.

Another study (Imada, Carlson, & Itakura, 2013) demonstrated that there is a tendency of cross-cultural variation in context sensitivity in visual perception starting around age 4 to 5, which reach the levels of adults at around ages 8 to 9. In this study,

Imada and her colleagues used a combination of several tasks examining context sensitivity. The first task was a visual attention task similar to the underwater movie task developed by Masuda and Nisbett (2001), but they used still images to make the task more accessible for children. In this task, children observed an image per trial and described their observation afterwards. They also used the Ebbinghaus illusion task (Doherty, Tsuji, & Phillips, 2008; Kaldy, & Kovacs, 2003), which is a commonly used optical illusion of the size of the target circle when it is surrounded by either larger or smaller circles. Analyzing children's performances of these two tasks combined, Imada and her colleagues found that Japanese children were more context sensitive than American children; that is, Japanese children described more background information in the free description task and were more influenced by the Ebbinghaus optical illusion than American children, and such a cultural difference in attention was amplified as the children's ages increased.

Supporting the possibility of an earlier onset of cross-cultural differences in attention when using non-verbal tasks, Kuwabara, Son, and Smith (2011) also demonstrated that 4- to 5-year-old Japanese children were more likely to be sensitive to contextual information than American children of the same age group when they judged appropriate facial expressions of a target emotion in various contexts. Similarly, Kuwabara and Smith (2012) also examined children's performance using a relational matching task and a visual search task, and found that 4-year-old American children's visual attention was more object-oriented, while 4-year-old Japanese children's visual attention was more relational-oriented. Specifically, when the relational matching task was conducted using highly contextual and information rich stimuli, Japanese children

outperformed American children, suggesting that the object-oriented perceptual style limited American children's performance. In contrast, when the visual search task was conducted using cluttered but organized scenes, American children performed better than Japanese children, indicating that the object-oriented perceptual style allowed American children to effectively orient their attention toward the target object. These findings show that cultural differences can be observed at a much earlier period than were once indicated by Duffy and his colleagues if the cognitive requirement of the task is minimal.

Findings from recent studies provide evidence that children in North American and East Asian cultures indeed develop culturally unique patterns of attention in early to middle childhood. However, an important question remains unanswered: that is, where and how do children learn culturally divergent patterns of cognitive styles? The main goal of the present research is to answer this question and to better understand the sociocultural nature of cognitive development. To achieve these objectives, I investigated parent-child socialization practices in Canada and Japan using a cultural task reliably used within the adult population. If children's cognitive development is embedded in social interactions with other members of the culture, parent-child socialization practices are assumed to be a rich source of shared understandings of a meaning system in a given culture, and further provide a valuable opportunity for parents to transmit their culturally unique worldviews to the next generation. Parent-child socialization practices also allow children to learn such culturally appropriate manners of processing information. In the following section, I review theoretical frameworks on parent-child socialization in relation to cognitive development, and some recent empirical supports.

Parent-child socialization and cognitive development

Cultural psychologists explicate cross-cultural variations in cognitive processes by indicating that people living in different cultures are brought up to perceive and think about the world differently. For example, Masuda and Nisbett (2001) suggested that socialization patterns and cultural practices are the source of aforementioned cross-cultural variations in visual attention. Kitayama and Markus (1999) also suggest that for individuals to become mature and competent adults in a given society, they are required to engage in cultural practices which have been developed, maintained, altered, and transmitted over generations. Although cultural psychologists view the process of socialization as the point where children begin to develop culturally unique patterns of perception and cognition, evidence directly examining the relationship between socialization and culturally divergent perceptual and cognitive styles is limited. As recent findings (e.g., Duffy et al., 2009; Imada et al., 2013; Kuwabara & Smith, 2012) have reported significant cross-cultural differences in patterns of attention during early to middle childhood, socialization practices children experience during these developmental periods may be particularly important for learning culturally unique patterns of attention.

In the literature of cognitive development, sociocultural contexts have traditionally received inadequate attention (for review, see Rogoff, 2003). The dominant theories of cognitive development have largely focused on individual development, by describing the way children think at different ages, based on the assumption that there is one universal course of cognitive development regardless of the sociocultural contexts in which learning occurs (e.g., Piaget & Inhelder, 1969). Although this type of research helps us understand changes in the way children think, our understanding of how children

acquire those ways of thinking is limited. Several researchers, however, have examined the learning process with a particular emphasis on sociocultural activities that surround children, because the learning contexts can make a significant contribution to the way children think. Notably, the sociocultural-historical theory based on the works of L. S. Vygotsky and Alexander Luria (Luria, 1979; Vygotsky, 1978, 1934/1987; Vygotsky & Luria, 1930/1993) claims that mental functions, such as the organization of logical thought, active remembering, and selective attention, are products of sociocultural activity. This is because children learn and acquire information by participating in their everyday social context while interacting with more mature members of the culture. In such a sociocultural context, the primary caregivers actively direct children's attention to meaningful events in their daily life; consequently, the attentional direction from child to object and object to child is mediated by another person. This mediational process, Vygotsky describes, is the foundation of a child's cognitive development (Cole, 1996; Vygotsky, 1978).

One of Vygotsky's most influential theoretical concepts is the concept of the zone of proximal development (ZPD), defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Although the implication of this theory has been widely discussed in the field of educational research (Wertsch, 1984), Vygotsky originally demonstrated its critical implication in regards to the development of higher cognitive processes such as voluntary attention and memory (Vygotsky, 1962, 1978). Vygotsky suggests that the process of cognitive development

occurs in two phases: first at the interpersonal level and then at the intrapersonal level. First, the more knowledgeable others direct child's attention, but the child is not able to take advantage of others' guidance if the child is not mentally ready for it, or if the level of guidance is inappropriately beyond the scope of the child's level of understanding. When the guidance is appropriate for the child's learning, and the appropriate amount of guidance is presented to her, the child would show the evidence that she has gradually entered the zone of proximal development, in which she demonstrates her capability of accomplishing a task only in collaborative activities with adults. As the child's participation in the activity improves, she starts directing the partner's attention, and finally, the child internalizes this process and becomes to regulate her own attention.

As suggested by Vygotsky, parent-child socialization practices are important experiences for children to understand their world. This unique environment provides a common ground for children to understand and infer meanings of both physical world and symbolic representations (Bruner, 1983; Nelson, 1981), which is central for learning the culturally shared meaning. The critical role of caregivers has been recognized by many researchers; for instance, Bruner suggests that infants are intrinsically motivated and sensitively attuned to social interaction with their primary caregivers. Through social interaction, children and their caregivers "extract meanings, assign interpretations, and infer intentions" (p. 29, Bruner, 1983). Shweder and colleagues also noted that "parents are culture bearers, and their models of childhood social relations are as variable as their culture's conceptions of the good life and how to live it" (Shweder et al., 2007, p. 738). Thus, researchers suggest that primary caregivers play especially important roles in children's cognitive development because they teach social conventions (Gauvain, 2001;

Tomasello, Conti-Ramsden, & Ewert, 1990) and organize social activities (Rogoff, 1990) for children.

In line with these theoretical proposals, several empirical studies have suggested that joint cognitive activities between children and adult partners foster children's cognitive development within European-American populations. Research on development of planning during early and middle childhood has shown that children, particularly those who are older than 7 years of age (Gauvain, 1992), learn sophisticated planning strategies, such as the strategies to navigate through grocery stores, by engaging in the task with adult partners (Gauvain & Rogoff, 1989; Radziszewska & Rogoff, 1988, 1991). Bruner identifies the specific behaviors through which parents and other mature members of the culture can enhance children's learning, which is known as scaffolding. Scaffolding refers to the adults' appropriate guidance to children in the learning context (Wood, Bruner, & Ross, 1976). One of the key concepts of scaffolding is the idea that skilled members (e.g., parents) temporarily support children's emerging skills, and this support is adjusted and tailored according to children's needs (Wood et al., 1976). Supporting Bruner's claim of scaffolding, in a study that empirically examined joint-attention behaviors among preschoolers and early elementary-school children during a problem-solving task, mothers who worked with 4- to 5-year-olds in constructing a toy demonstrated a greater number of attempts to direct their children's attention (i.e., joint attention bid) than mothers who interacted with 6- to 7-year-old children (de la Ossa & Gauvain, 2001). In addition, although the trend was statistically non-significant, older children made a larger number of verbal attempts to direct their mothers' attention than younger children. These results support the notion that scaffolding occurs in a learning

environment and parents indeed adjust the levels of assistance depending on their children's needs.

Other studies have demonstrated the effect of parental scaffolding in different domains, such as the development of spatial cognition. For example, Szechter and Liben (2004) have examined different types of parental guidance in the development of spatial-geographic representation during joint picture book reading among parents and their 3- and 5-year-old children. They found that the quality of parental guidance during joint picture book reading was associated with children's performance in understanding sizes and distance-size relationship. That is, the conceptual information mothers conveyed during joint picture book reading, such as, "the roaster is really tiny now," was significantly correlated with children's performance measuring their spatial understanding, which was administrated after the joint activity. These results show that natural discourses between mothers and children foster children's perceptual-cognitive development in early childhood.

Wang and her colleagues have also examined cross-cultural variations in conversations between preschool children and their mothers in relation to the development of autobiographic memory (Doan & Wang, 2010; Fivush & Wang, 2005; Wang, 2001, 2006; Wang & Leichtman, 2000; Wang et al., 2000). These studies are particularly important for the current research because they suggest that parent-child socialization practices function as the transmitter of culturally appropriate cognitive styles. For instance, Wang and her colleagues compared conversations of American and Chinese mothers and their 3-year-old children when they remembered emotional experiences (Wang, 2001) and read picture books by projecting their own experiences

(Wang et al., 2000). These studies demonstrated that the conversations of American mother-child dyads were more independently oriented, by focusing on the child's roles and emotions, while Chinese mother-child's conversations were more interdependently oriented, with less emphasis on the personal themes and more focus on social and moral rules associated with the particular situations. Notably, these studies have provided empirical support that mothers' conversations with their preschool children convey culturally appropriate ways of organizing information, such as various emotional states and self-view, which in turn influence children's cognitive development.

Cross-cultural differences in parents' behaviors interacting with their children can also be found even during infancy. In one of the earlier studies, Fernald and Morikawa (1993) examined cross-cultural differences in maternal speech to 6- to 19-month-old infants during play, and they demonstrated that American mothers' speech was more object-oriented, as seen in the higher frequency and more consistent use of nouns to label toys, when compared to Japanese mothers' speech. Japanese mothers, on the other hand, often used toys to engage their infants in social routines such as greeting, resulting in placing emphasis on the importance of interpersonal relationships. Although the findings of this study suggest that parental inputs to children's learning environments may be significantly different across cultures from early on, it is unclear when children's attentional patterns would develop in a similar manner as their adult partners.

The main conclusion that can be drawn from these studies is that parents provide guidance to support children's cognitive development in various domains during joint activities. In addition, these studies suggest that verbal communication is an important method for parents to transmit culturally unique ways to organize information.

The important role of verbal communication in cognitive development has been discussed by many researchers. In particular, Nelson (1981) suggests that adults provide much guidance in the context of children learning scripts. A script is defined as the general understanding of what happens when in specific situations. Scripts are developed based on concrete experiences, such as a bedtime routine, and it is often referred to as an "event schema." This concrete representation of knowledge functions as a foundation for a schema, which is a more abstract and general understanding of the world (Bartlett, 1932; Bruner 1983; Nelson, 1981). According to Nelson, scripts are based on social activities; hence, both children and adults take parts in conversations where the scripts are built on. In this interaction, adults provide the context and structure of the conversation by planning activities and sometimes even supplying lines and conversational pieces for children. Thus, children acquire their part in a script that is centered around a goal determined for them by adults. For example, in an European-Canadian families' bedtime routine, parents may routinely read books to children at night, say "good-night," and leave the child's room as an indication of the time for him to sleep in his own room by himself. On the other hand, in Japan, in which the majority of families adopt co-sleeping practices (Latz, Wolf, & Lozoff, 1999), parents may read books to their children, say "good-night," and sleep in the same bed as their children. Through these routine sequential events, children learn who does what and when. Although this parent-child script building has been discussed mostly in the context of first language acquisition in a single culture context (Bruner, 1983; Nelson 1996), this is highly relevant to the current research because it suggests that verbal communication practices between parents and children may play an important role in the transmission of culturally unique thinking

styles across different cultures. In particular, Vygotsky suggests that language plays an important mediating role in the development of voluntary attention (Vygotsky, 1962; Winsler, Diaz, & Montero, 1997).

Supported by a plethora of compelling evidence that children's experiences interacting with their parents provide a great resource for children to learn culturally appropriate ways of organizing information, the current research is aimed at studying how children may learn from social interaction with their parents in the domain of visual attention across North American and East Asian cultures. To explore the social origin of culturally unique attentional patterns, I examine joint activities that involve parent-child verbal communication, because previous research (e.g., Nelson, 1996; Vygotsky, 1962) indicates that verbal communication plays a significant role in sharing knowledge about how to organize information in a culturally appropriate way through social practices and interactions.

In the current research, I aim to examine parent-child interaction in relation to the transmission of culturally unique patterns of visual attention. I maintain that such an examination of communication between parent-child pairs during scene observation would give us insight into further understanding the development of culturally divergent cognitive processing. In addition, although past research that examined parent-child interaction has found parental scaffolding behaviors with various tasks, investigation of how parent-child interaction may influence children's behavior differently as a function of the child's age was limited. To test cultural differences and age-related differences in patterns of attention in Canada and Japan In the current study, current studies target parent-child interactions among 4- to 9-year-old children and their parents.

Overview of the current research

According to the sociocultural-historical theory, the different sociocultural environments of North American and East Asian families would directly shape children's perception by teaching them what to pay attention to and how to interpret their surroundings, which could contribute to the development of cultural differences in perception and cognition.

While the primary goal of the current research was to directly examine parent-child socialization practices as an origin of culturally unique perceptual and cognitive styles, the first step was to find the appropriate task for investigating socialization processes across cultures. Previous research has been inconsistent in documenting the specific age at which cultural variation emerges, which may be contingent on the task type. In particular, limited research has been conducted using a task that requires verbal communication. For the current investigation, verbal communication during parent-child socialization was expected to play an important key in cultural transmission; thus, the aim of Study 1 was to search for an appropriate joint activity task. To this end, Study 1 employed the fish movie visual attention task, which has been found to demonstrate consistent results among adults across North American and East Asian cultures (Masuda & Nisbett, 2001; Senzaki et al., 2013). In this task, participants observed a variety of underwater movies, each lasting approximately 25 seconds, and described their observation at the end of each movie. As previous research has found cross-cultural differences in children's performance in early to middle childhood, Study 1 examined possible cross-cultural differences in children's performance in the fish movie task, by comparing performances of children in early years of development (4- to 6-years) and in

middle childhood (7- to 9-years) in Canada and Japan. There were three possible outcomes for Study 1. Firstly, if children learn culturally unique cognitive styles at an early age, all children regardless of their age-groups (4-6 and 7-9) may demonstrate cross-cultural differences in patterns of attention. Secondly, if these children are in the process of learning culturally appropriate cognitive styles, they may show the differences according to their age. In such a case, comparing younger (4- to 6-years) and older (7- to 9-years) children would be effective in examining the development of culturally specific cognition. Third, as suggested by sociocultural-historical perspective (e.g., Vygotsky, 1978), it is possible that children are in the process of acquiring culturally unique cognitive styles, and they may not demonstrate cross-cultural differences when they engage in the task by themselves at all age-groups. In this case, neither younger nor older groups of children would demonstrate cultural differences in their patterns of attention. These hypotheses were tested using the fish movie task that requires 4- to 9-year-old children to verbally describe and recall their observation.

Employing the same visual attention task as Study 1, I examined parent-child conversations in Canada and Japan whereby participants jointly engaged in the visual attention task in Study 2. Canadian and Japanese parents and their 4- to 9-year-old children observed underwater movies together, and discussed their observation at the end of each movie. This study aimed at investigating the role of parent-child conversations in teaching and transmitting culturally unique ways of organizing visual information to their children in Canada and Japan by focusing on two main goals. The first goal of Study 2 was to investigate parents' scaffolding behaviors in transmitting culturally unique patterns of attention. Although parents were expected to engage in cultural teaching

regardless of children's age, the degree to which parents exhibit scaffolding may differ depending on the age of children. Because older children (7-9 years) and their parents were expected to be more active and elaborative than younger children (4-6 years) and their parents during joint remembering, parental scaffolding behaviors were expected to be more strongly exhibited by parents with older children than those shown by parents who were working with younger children.

Secondly, I examined age-related changes in children's behaviors during parent-child joint recall across two age groups of children (4-6 and 7-9 years). These age groups were chosen because previous research in culture and cognitive development (Duffy et al., 2009; Imada et al., 2013; Kuwabara & Smith, 2012; Kuwabara et al., 2012; Wang, 2001, 2006; Wang & Leichtman, 2000; Wang et al., 2000) has shown that socialization occurs during early to middle childhood may be particularly important for children to learn culturally appropriate cognitive styles. In addition, research examining development of planning behaviors during adult-child joint activities (Gauvain, 1992; Gauvain & Rogoff, 1989; Radziszewska & Rogoff, 1988, 1991) has shown age-related differences in how children were learning from adult-child interactions. In particular, only children who were older than 7 years of age demonstrated the benefit of adult-child joint activities in their individual development of planning behaviors, but children at ages 4 to 5 did not. Taken together, three hypotheses were generated in regards to children's behavior during joint task engagement. First, children in all age groups may demonstrate cultural differences in the patterns of attention while they jointly engage in a visual attention task with their parents. Secondly, because these children are in the learning process, there may be age differences in the effect of cultural learning. In that case, it is plausible that

only older children (7-9 years), and not younger children (4-6 years), demonstrate cultural differences in patterns of attention. Thirdly, the development of culturally unique cognitive development may occur later on, in which case neither older nor younger children demonstrate cultural differences in patterns of attention even when they engage in the task with their parents. Based on prior research (Gauvain, 1992; Gauvain & Rogoff, 1989; Radziszewska & Rogoff, 1988, 1991), I expected that only older children (ages 7 to 9) and not younger children (e.g., 4- to 9-years) would show cultural differences in patterns of attention.

CHAPTER 2

Study 1: Examining analytic and holistic patterns of attention in Canadian and Japanese children

The aim of Study 1 was to use a visual attention task that requires verbal communication in order to assess the development of attentional patterns of 4- to 9-year-old children in Canada and Japan. Children were asked to watch short underwater videos, and they were asked to freely recall their observation in as much detail as possible. Their recall was coded into three target categories: focal objects, background, and active living beings. Focal objects included swimming fish that were the main characters in the scene, and background objects included contextual information. In previous research with adults (Masuda & Nisbett, 2001; Senzaki et al., 2013), North American participants were more likely to attend to the focal objects than East Asian participants, while East Asian participants were more attentive to the background than their North American counterparts. Lastly, active living beings included moving objects, but they were not the main characters in the scene. Thus, I did not anticipate any cross-cultural difference in patterns of attention to active living beings.

In relation to examining cultural differences, three hypotheses were tested by comparing attentional patterns of young (4-6 years) and old (7-9 years) children in Canada and Japan. Firstly, if culturally unique cognitive development occurs early, both age-groups would show cross-cultural differences in patterns of attention, such that Canadian children would be more attentive to the focal objects than Japanese children, and Japanese children would be more attentive to the background than Canadian children at all ages. Secondly, if children were in the process of cultural learning, only the older

group would show cross-cultural differences. Another possibility was that if children were in the process of learning culturally unique attentional styles, both younger and older groups of children may not demonstrate cultural differences in their patterns of attention. The current study tested these hypotheses to examine whether Canadian and Japanese children would demonstrate culturally different attentional styles when they engage in the task that requires them to verbally describe and recall their observation.

Method

Participants

The participants were 50 children in Canada and 50 children in Japan in two age groups (see Table 1); 3 additional children in Canada and 4 additional children in Japan participated in the study, but their data were not obtained due to video-camera malfunction. All the Canadian children were born in Canada, were of European-Canadian descent, and spoke English as a first language. All the Japanese children were born in Japan and spoke Japanese as a first language. Canadian children were recruited via research participant database at the University of Alberta and by posting flyers in local daycares and afterschool programs in Edmonton, Alberta. Japanese children were recruited by posting flyers in local daycares and afterschool programs at various locations in the greater Tokyo area (one afterschool program in Sakura-ku, Saitama and two preschool programs in Machida-shi, Tokyo).

Parents' levels of education were similar across cultures. In both cultures, 96% of mothers had college or higher degrees, while 97% of Canadian fathers and 89% of Japanese fathers had college or higher degrees. The levels of parental education were not

Table 1

Sample size, gender, and mean age (and SD in months) of the participants in Study 1

	All		Age Group			
			4-6		7-9	
	Canada	Japan	Canada	Japan	Canada	Japan
N	50	50	22	25	28	25
Gender	20M	23M	9M	11M	11M	12M
	30F	27F	13F	14F	17F	13F
Mean age (SD)	6; 11 (21.9)	6; 6 (22.3)	5; 4 (10.2)	4; 11 (10.4)	8; 2 (10.5)	8; 6 (9.6)

significantly correlated with any of the variables of present interest, and thus were omitted from further analysis.

Materials

I modified animated underwater vignettes developed by Masuda and Nisbett (2001), by adding the water background sound to the movies to make them more attractive for children to watch (Fig. 1). Each animation included different types of swimming fish, small sea animals, and background objects, and lasted approximately 25-27 seconds. In addition, all of the scenes took place in different types of water with various colors, such as a green colored lake and a blue colored deep sea. These movies were presented on a laptop PC.

Procedure

Children were tested individually in a laboratory or in a quiet testing room at the daycare or the afterschool facility. After a warm-up play time (lasting 5-10 minutes on average), children were asked to watch 4 movies and describe their observation. Movies were presented in random order, and each movie was played twice. In order to encourage children to remember the content of the movie in detail at the end of the movie, the experimenter asked children to describe their observation while they watched each movie. The instruction was as follows:

"I am going to show you 4 movies, and I will ask you some questions. They are very short movies, and I will ask you to remember what you see. We will watch each movie twice, so you can remember them well. You are going to tell me what you see in the movie when the movie ends."

Figure 1. Sample experimental stimulus.

When the movie ended, the experimenter asked, “Can you tell me what you saw?” and prompted children to describe their observation freely. The experimenter asked questions such as “Is there anything else?” or “Can you tell me anything else?” until the child indicated that there was nothing else to describe. The instruction was translated and back translated from English to Japanese (see Appendix A for Japanese translation), and the task was administrated in English in Canada, and it was administrated in Japanese in Japan. As previous research with adult participants has shown that recall description is highly correlated with patterns of eye movements during observation (Senzaki et al., 2013), I examined children’s recall behaviors across cultures as the measurement of visual attention.

Coding

Sessions were videotaped first and transcribed afterwards. Adopting coding schema from previous research (Masuda & Nisbett, 2001; Senzaki et al., 2013), transcribed data were divided into the smallest descriptive accounts, which were used as the coding unit. For example, when the participant described the movie as “I saw two large fish,” the meaningful accounts that describe the movie were “two*”* (the number of the referred target), “large” (the attribute of the referred target), and “fish” (referred to the target that is categorized as the focal object); thus, this statement would be coded as three accounts for focal objects (see Appendix B for more examples of coding). By focusing on the meanings, the current coding schema attempted to minimize issues related to multi-language data collection. As in the study by Masuda and Nisbett (2001), this coding schema was aimed at examining the content of the observation, which would reflect the primary focus of attention.

Each account was categorized into three groups: focal objects (including information regarding focal fish and background fish), background (including inert living beings such as plants and rocks, as well as other environmental information such as the water body), and active living beings (including information regarding small animals such as water bugs and turtles). Unlike previous research (Masuda & Nisbett, 2001), I included the background fish in the focal object group, as most participating children were unclear about which type of fish they were referring to. When accounts made by children were ambiguous (e.g., "I saw the big red spikes" referring to the red coral) two coders used the best judgements to identify the category of objects. When accounts were too ambiguous for coders to make a judgement (e.g., "I saw those weird things") or too vague (e.g., "I saw everything!"), these accounts were coded as "other," which was not included in further analyses. Segments of accounts were mutually exclusive.

All data coding was performed in the original languages. Two English-Japanese bilinguals independently coded both Canadian and Japanese data, and intercoder reliability estimates (Cronbach's alpha) based on the overlapping 25% data were .97 and .96 for Canadian data and for Japanese data, respectively. Disagreements were resolved by discussion among coders.

Results

The total number of accounts

First, I examined the total number of accounts regardless of the target of reference in order to examine possible cultural or age-group differences in the sheer volume of verbal descriptions. As expected, older children's total number of accounts (M = 119.34,

SD = 54.98) was larger than that of younger children (*M* = 63.49, *SD* = 44.69), $F(1, 96) = 33.19$, $p < .001$, $\eta_p^2 = .25$, and there was no effect of culture or interaction (see Table 2).

Description of observations

In order to examine developmental and cultural effects on children's patterns of attention, I conducted three separate 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) analyses of variance (ANOVAs) on the number of accounts that refer to the three targets: focal objects, background, and active living beings (Table 3)[1]. Firstly, there was a main effect of age-group on the total accounts of focal objects (Figure 2a). The number of accounts referring to the focal objects increased with age, and there was no main or interaction effect of culture. Secondly, the analysis on the number of accounts of background also yielded a significant main effect of age-group (Fig. 2b). Older children made a larger number of accounts referring the background information than younger children, and again, the cultural effects were not significant. There was also a significant main effect of age-group on the number of accounts referring to active living beings, but there was no significant effect of culture (Fig. 2c).

Table 2

The total number of accounts by Culture and Age-Group in Study 1

4-6 years		7-9 years										
Canada	Japan	Canada	Japan	Culture			Age-Group			Culture × Age-Group		
M (SD)	M(SD)	M (SD)	M(SD)	F(1, 96)	*p*	η_p^2	F(1, 96)	*p*	η_p^2	F(1, 96)	*p*	η_p^2
64.73 (53.30)	63.49 (59.86)	113.93 (56.46)	119.34 (35.99)	0.29	0.56	0.00	33.19	0.001	0.25	0.59	0.44	0.01

Table 3

Culture × Age-Group ANOVA on description of observations: Fs, ps, and effect sizes in Study 1

	Culture			Age-Group			Culture × Age-Group		
	$F(1, 96)$	p	η_p^2	$F(1, 96)$	p	η_p^2	$F(1, 96)$	p	η_p^2
Children's solitary recall									
Focal Object	.32	0.58	0.00	14.96	0.001	0.13	0.15	0.69	0.00
Background	2.56	0.11	0.03	12.25	0.001	0.11	0.12	0.73	0.00
Active Living	2.44	0.12	0.02	0.75	0.39	0.01	0.24	0.62	0.00

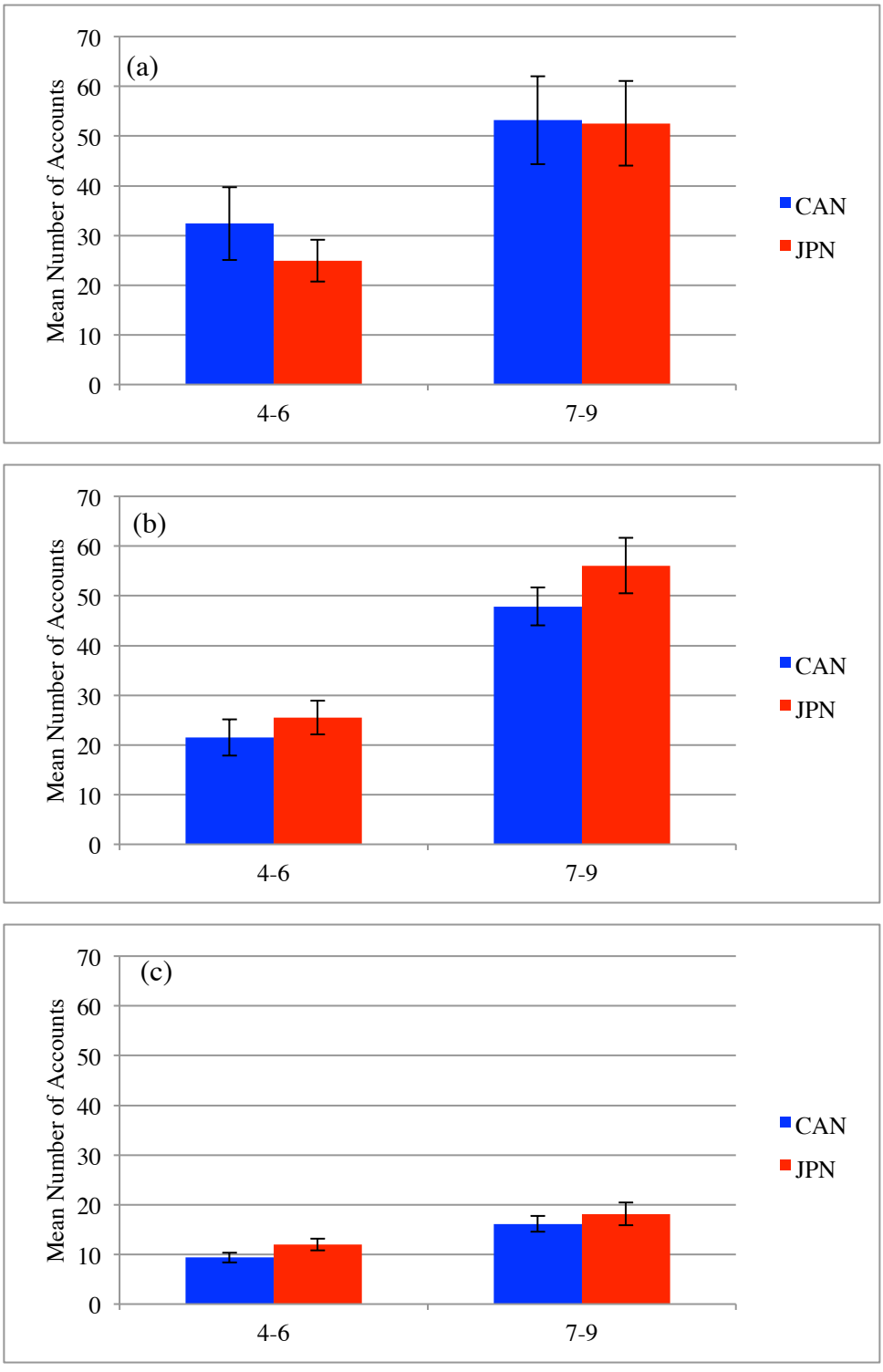


Figure 2. Children's description of observations by Culture and Age-Group in Study 1: Mean number of accounts of (a) focal objects, (b) background and (c) active living beings.

Discussion

Study 1 examined the development of visual attention using a fish movie visual attention task across two cultural groups (Canada and Japan) and across two age groups (4-6 and 7-9 years). The results demonstrated a significant main effect of age-group, such that in general, older children (7-9 years) in both cultural groups provided more elaborative accounts than younger children (4-6 years) when recalling the movie. As such, the number of accounts increased with age regardless of the target of attention, and there was no effect of culture. The current stimuli included highly salient objects such as moving fish, and children in both cultures were similarly attentive to these objects. Although this stimuli set has been reliably used with adults showing cross-cultural differences, the results of Study 1 showed that 4- to 9- year-old children's patterns of attention were not different across cultures. This result suggests that children are still in the process of learning culturally unique cognitive styles. Although culturally specific patterns of attention were not observed when children engaged in this fish movie visual attention task by themselves, it is still unclear whether children would show tendencies to attune their existing patterns of attention to culturally unique ones if they were guided by their parents. When a visual attention task required children to verbally describe and recall their observation, it could be the case that children were not able to show the culturally unique patterns of attention when engaging in the task alone, but they may have the potential to show culturally appropriate attentional patterns when their behaviors are guided by more skilled members of a culture. This prediction was tested in Study 2.

CHAPTER 3

Study 2: The role of parent-child conversations in transmitting culturally unique perspectives in Canada and Japan

Study 2 was designed to examine transmission processes of culturally unique cognitive styles – analytic and holistic thinking styles – from parents to children in Canada and Japan. The results of Study 1 demonstrated that 4- to 9-year-old children did not show culturally unique patterns of attention that were observed among adults using a fish movie visual attention task when they complete the task alone. Does this indicate that children were too young to demonstrate cultural variations in patterns of attention under all possible circumstances? Or, would children demonstrate cultural differences in patterns of attention if they were guided by more experienced members of their cultures, such as their parents? In Study 2, I asked 4- to 9-year-old children and their parents to engage in the same visual attention task together, to investigate whether children would demonstrate culturally unique patterns of attention during parent-child joint recall, and also to examine whether parents would provide scaffolding to promote children's cultural learning.

Canadian and Japanese parents and their 4- to 9-year-old children participated in the study. Their behaviors were compared across cultural groups and also across age groups (4-6 and 7-9 years). The study included a pre-test phase, in which the child participated in the task alone, and the test phase, in which parents and children jointly engaged in the task. Based on earlier research on cross-cultural variations in patterns of attention among adult participants, I predicted the following: First, I expected that parents in Canada and Japan would impart culturally unique patterns of attention to their

children. Specifically, Canadian parents were expected to discuss focal objects more than Japanese parents, while Japanese parents were expected to discuss contextual information more than Canadian parents. Second, I expected that parents' scaffolding behaviors would differ between parents with older children and those with younger children. Third, I predicted that older children would engage in qualitatively different joint remembering behaviors as compared to those of younger children. Specifically, older children would be more likely to contribute to the parent-child conversation than younger children. Because older children were expected to engage more in parent-child conversation, I predicted that older children would be more likely to demonstrate the internalization of culturally unique patterns of attention in their behaviors. Finally, I expected that children would demonstrate a greater effect of culture when they engage in the task with their parents (test phase) as compared to the time when they engage in the task alone (pre-test phase).

In addition to these general hypotheses on the effect of culture and age-related development on patterns of attention, there is also another possible cultural difference in the overall volume of verbal description given by children when they engage in the task with their parents. In particular, children in Canada may talk more than children in Japan due to differences in parental encouragements across cultures. Some research suggests that in North America, raising independent, autonomous, and self-reliant children is considered as one of the most important parental goals (Azuma, Kashiwagi, Hess, 1981; Chao, 2000; Keller et al., 2006). Such parental goals are set in practice, and studies have shown that parents in North American cultures, but not those in East Asian cultures, expect their children to be able to describe their own thoughts and opinions clearly

(Azuma et al., 1981; Wiley, Rose, Burger, & Miller, 1998). Such cultural differences in parents' socialization goals may lead Canadian parents to encourage their children to verbally describe their observations to a greater degree than Japanese parents when they engage in the task together.

Method

Participants

The participants were 46 parent-child dyads in Canada and 47 parent-child dyads in Japan in two age groups (see Table 4). One of the Canadian children was born in an Asian country and adopted to a Canadian family when she was 2.5 years old. All other parents in Canada identified themselves and their children as Caucasian and of European descent. All parents in Japan and their children were born and raised in Japan. Canadian parent-child dyads were recruited via research participant database at the University of Alberta and flyers posted in local daycares and afterschool programs in Edmonton, Alberta. Japanese parent-child dyads were recruited via existing research participant database at Kyoto University and at Tamagawa University. Parent-child dyads were tested either in a laboratory space at the local university or in a quiet room at the local daycare or afterschool programs.

All parent-child pairs came from middle- or upper-middle class families, and the level of education among participating parents were similar across both cultural groups (e.g., 95.6% of Canadian parents and 93.3% Japanese parents had college or higher educational degrees). The education levels among parents were not significantly correlated with any of the variables of present interest and thus were omitted from further analysis The gender distribution among participating parents was as follows: five fathers

Table 4

Sample size, gender, and mean age (and SD in months) of the child participants in Study 2

	All		Age Group			
			4-6		7-9	
	Canada	Japan	Canada	Japan	Canada	Japan
N	46	47	24	23	22	23
Gender	19M	21M	11M	8M	8M	13M
	27F	26F	13F	15F	14F	11F
Mean age (SD)	6; 10 (20.5)	7; 0 (20.3)	5; 6 (9.0)	5; 7 (7.6)	8; 5 (9.2)	8; 7 (9.5)

and 41 mothers in Canada, and three fathers and 44 mothers in Japan. The gender of parents did not influence the results and therefore, I conducted further analyses collapsing the gender of parents.

Procedure

I used the same underwater, animated movies used in Study 1. After a warm-up playtime, which lasted 5-10 minutes on average, children first engaged in the task alone (pre-test) and completed two movies. The experimenter followed the same procedure as Study 1 and asked the child to watch movies and describe their observation after the end of each movie. Parents stayed in the same room and were asked to complete a questionnaire during the pre-test phase.

After the pre-test, children and parents were asked to engage in the joint observation and joint recall activity. Children and parents sat in front of a computer monitor (Figure 3), and parents were encouraged to help their children to remember and describe the content of the movie in as much detail as possible at the end of each movie. Although it was stressed that the main focus was on the recall, to facilitate recalling, parents and children were encouraged to discuss their observation during the movie. They watched four movies together, and each movie was played twice. Although there were no time restrictions to their conversations, parents were encouraged to talk with their children for a minimum of one minute after each movie was played.

Coding

All parent-child conversations were videotaped first and transcribed afterwards. The general coding schema followed those used in Study 1, and accounts made by parents and children were counted and analyzed separately (see Appendix C for the

Figure 3. Experimental setup and procedure in Study 2.

sample conversations). In coding both parents' and children's behaviors, both verbal and nonverbal gestures were included, because nonverbal behaviors, such as pointing and miming, have been shown to provide communicational intentions in instructional settings (e.g., Goldin-Meadow, 2003). For example, a situation when a parent pointed at the screen, asked the child "Do you remember what was over here that was very tall?" and gestured the shape of a seaweed was counted as one account of the background object category, because in this action the parent was trying to direct the child's attention to a seaweed, which is a background object. Each account was counted and categorized into focal objects, background, and active living beings groups. Vague accounts (e.g., "What was your favorite part of the movie?") and irrelevant conversations that were not related to the movies (e.g., "Do you remember that we went to an aquarium last summer?") were coded as "other," and were not included with further analysis. As in Study 1, all data coding was performed in the original languages. Two English-Japanese bilingual coders independently segmented and coded both Canadian and Japanese data, and intercoder reliability estimates (Cronbach's alpha) based on the overlapping 25% data were .93 and .95, for Canadian and for Japanese data, respectively. Disagreements were resolved by discussion among coders.

Results

The total number of accounts

I first examined the total number of accounts in parents' and children's speech. I conducted three separate 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANOVAs on the total number of accounts in parents' and children's observational accounts and recall accounts. Based on the findings of prior research, (e.g., Azuma et al., 1981), I

expected that Canadian children would make a larger number of total accounts than Japanese children when they engaged in the task with their parents. The results confirmed this prediction, and showed that the sheer volume of descriptive accounts were different across cultures among older children (Table 5) during joint recall. In order to examine cultural effects on attention beyond this baseline difference in the total number of accounts, an adjustment was necessary. As in Fernald and Morikawa (1993), I used Analysis of Covariance (ANCOVA) in order to control the baseline differences found in the total number of accounts. Although cross-cultural differences in the total volume of accounts were found only among older children during joint recall, in order to make direct comparisons within the findings of Study 2, I used the total volume as a covariate in all of the subsequent analyses.

In the following analyses, I first present children's behaviors during pre-test. Second, I discuss findings of parents' and children's reports separately during joint recall. On each of these analyses, I conducted 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANCOVAs controlling for the total account volume as a covariate (Table 6). Finally, in order to examine the role of parents' scaffolding on children's cultural learning, I compare children's behaviors between solitary recall and joint recall and also examine parents' mediating role on children's behaviors.

Children's account during solitary recall

There was a significant main effect of age-group on the total accounts of focal objects and background. Specifically, younger children were relatively more likely than older children to refer to focal objects (Fig. 4a), while older children were relatively more likely to refer to the background information than younger children (Fig. 4b) after

Table 5

The total number of accounts by Culture and Age-Group in Study 2

	4-6 years		7-9 years		Culture			Age-Group			Culture × Age-Group		
	Canada	Japan	Canada	Japan									
	M (SD)	M(SD)	M (SD)	M(SD)	$F(1, 89)$	p	η_p^2	$F(1, 89)$	p	η_p^2	$F(1, 89)$	p	η_p^2
Children's solitary	18.42 (14.33)	18.26 (11.72)	58.86 (30.19)	45.17 (27.58)	1.81	0.18	0.02	52.61	.001	0.38	1.80	0.18	0.02
Parents' joint	114.79 (55.83)	91.52 (36.25)	160.00 (86.09)	166.25 (94.88)	0.35	0.56	0.00	17.28	.001	0.17	1.38	0.24	0.02
Children's joint	54.75 (23.25)	67.91 (45.19)	177.55 (60.29)	126.71 (63.37)	2.53	0.12	0.03	79.09	.001	0.48	8.19	0.01	0.09

Table 6

Culture × Age-Group ANCOVA on description of observations: Fs ps, and effect sizes in Study 2

	Culture			Age-Group			Culture × Age-Group		
	$F(1, 89)$	p	η_p^2	$F(1, 89)$	p	η_p^2	$F(1, 89)$	p	η_p^2
Children's solitary recall									
Focal object	1.27	0.26	0.01	13.82	.001	0.14	0.05	0.83	0.00
Background	0.39	0.54	0.00	11.62	.001	0.12	0.05	0.83	0.00
Active living beings	0.91	0.34	0.01	0.07	0.79	0.00	0.03	0.87	0.00
Parents' joint recall									
Focal object	30.56	.001	0.26	0.06	0.80	0.00	8.59	.001	0.09
Background	24.08	.001	0.22	1.77	0.19	0.02	4.74	0.03	0.05
Active living beings	2.91	0.09	0.03	3.84	0.05	0.04	2.84	0.10	0.03
Children's joint recall									
Focal object	5.95	0.02	0.06	1.10	0.30	0.01	5.94	0.02	0.06
Background	3.11	0.08	0.03	2.65	0.11	0.03	6.58	0.01	0.07
Active living beings	1.37	0.24	0.02	1.25	0.27	0.01	0.10	0.75	0.00

controlling for children's total accounts during solitary recall. There was no significant effect of culture or culture × age-group interaction on children's accounts of focal objects (Fig. 4a) and background (Fig. 4b). I also did not find any cultural or age-group effects on children's accounts of the active living beings (Fig. 4c)[2]. Thus, replicating the findings of Study 1, children's behaviors during solitary recall demonstrated the effect of age, but their behaviors were not significantly different across cultures.[3]

Parents' account during joint recall

Using parents' total accounts as a covariance, ANCOVAs on parents' accounts of focal objects and background yielded a significant main effect of Culture as well as a significant culture × age-group interaction.[4] As shown in Figure 5a, Canadian parents (M = 66.18, SD = 18.97) referred to the focal objects significantly more than Japanese parents did (M = 44.95, SD = 18.97), after adjusting for parents' total account during recall. More interestingly, this main effect of culture was qualified for the significant interaction with age-group (Table 6). For parents of 4- to 6-year-old children, the cultural variation was small, $F(1, 44) = 3.53$, $p = .07$, $\eta_p^2 = .08$, while the effect of culture was much larger for parents of 7- to 9-year-old children, $F(1, 43) = 27.83$, $p < .001$, $\eta_p^2 = .40$.

The similar patterns were found in the analysis on background accounts. In general, Japanese parents (M = 62.32, SD = 17.74) referred to the background information significantly more than Canadian parents did (M = 44.23, SD = 17.74), which was qualified for a significant culture × age-group interaction (Table 6). Although parents of both younger, $F(1, 44) = 4.85$, $p < .05$, $\eta_p^2 = .10$, and older children, $F(1, 43) = 16.37$, $p < .001$, $\eta_p^2 = .28$, demonstrated a significant effect of culture, the effect size was larger among parents with older children (Fig. 5b). There was no effect of culture, age-

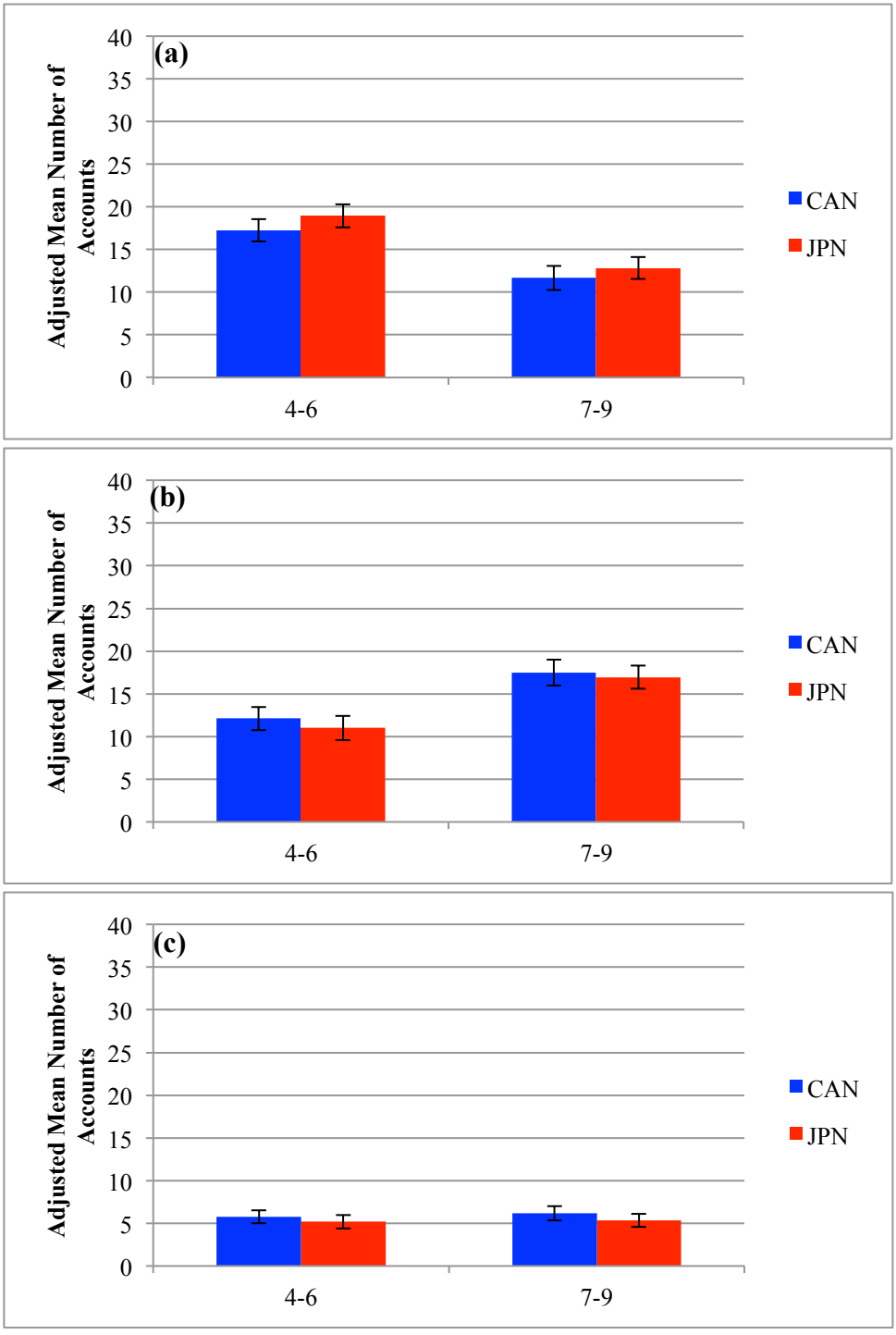


Figure 4. Children's description of observations by Culture and Age-Group during solitary recall in Study 2: Adjusted mean accounts of (a) focal objects, (b) background, and (c) active living beings.

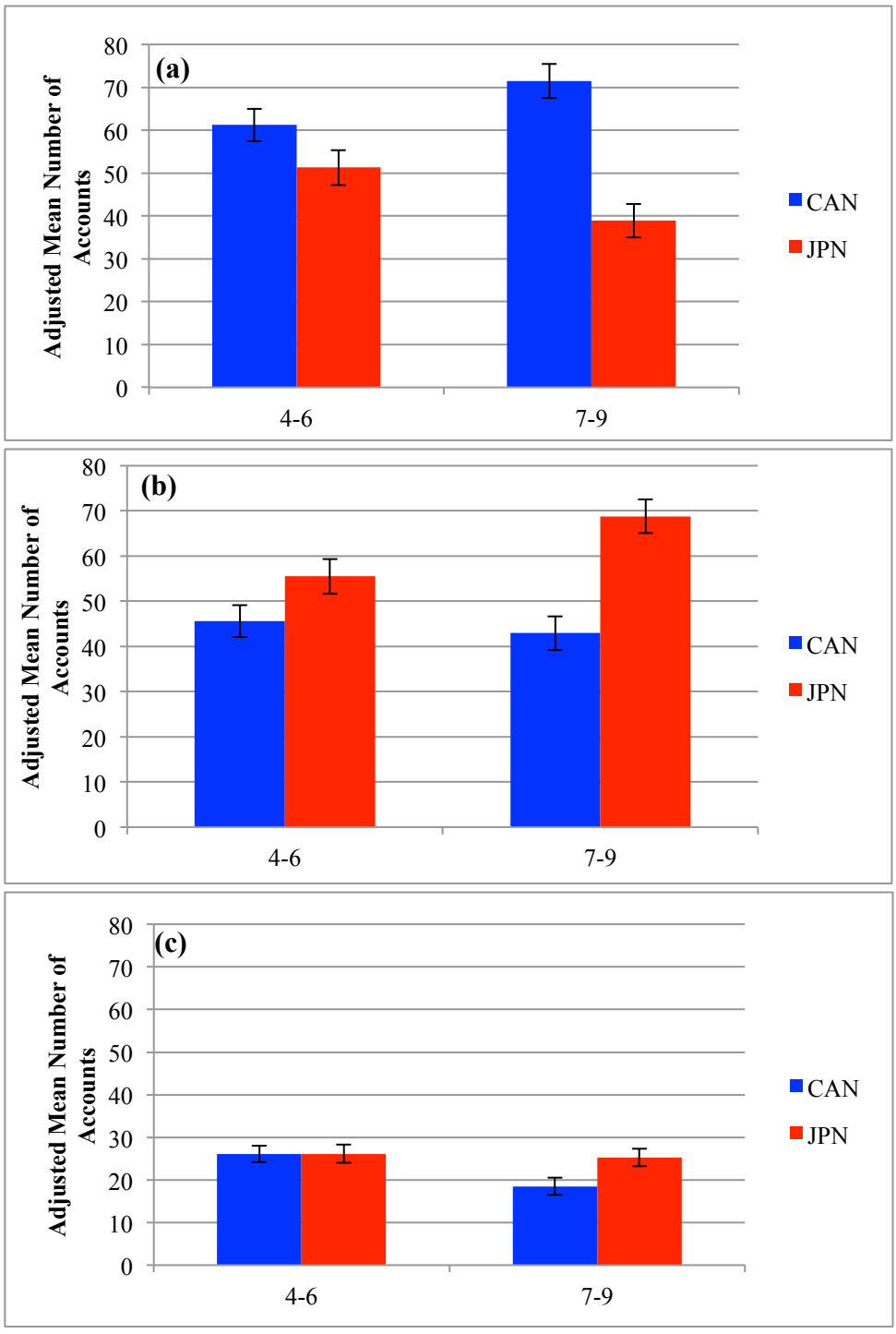


Figure 5. Parents' description of observations by Culture and Age-Group during joint recall in Study 2: Adjusted mean accounts of (a) focal objects, (b) background, and (c) active living beings.

group, or interaction between them on parents' accounts of active living beings (Fig. 5c).

In summary, the results supported my prediction of parents' behaviors. First, I found a significant cultural difference in parents' account during joint recall, such that Canadian parents made more references to focal objects than Japanese parents and Japanese parents made more references to background than Canadian parents. Second, I found a significant difference in parental scaffolding behaviors across age groups because parents in both cultures were significantly more likely to produce a larger number of accounts with older children than with younger children. More interestingly, this parental scaffolding was qualitatively different across two cultures, as seen in the larger cross-cultural differences among parents with older children than among those with younger children.

Children's account during joint recall

In parallel to the findings of parents' accounts, an ANCOVA on children's accounts of focal objects with the total number of accounts as a covariate revealed a significant main effect of culture and a significant interaction between culture and age-group (Table 6)[5]. Canadian children (M = 48.45, SD = 13.90) in general referred to the focal objects significantly more than Japanese children (M = 41.30, SD = 13.84), after controlling for the total accounts. Furthermore, a significant culture × age-group interaction demonstrated that the effect of culture was not significant among 4- to 6-year-old children, $F(1, 44) < 1$, *ns*, while 7- to 9-year-old children demonstrated a significant cultural difference, $F(1, 43) = 6.98$, $p < .01$, $\eta_p^2 = .14$ (Fig. 6a).

An ANCOVA on background accounts using children's total number of accounts yielded a marginally significant effect of culture, as Japanese children (M = 45.86, SD =

14.29) referred to the background information marginally more than Canadian children did (M = 40.53, SD = 14.35). This main effect of culture was qualified for a significant culture × age-group interaction (Fig. 6b). While the results of younger children were not significantly different across cultures, $F(1, 44) < 1$, *ns*, older children demonstrated a significant cultural variation in the number of accounts of the background information, $F(1, 43) = 5.92$, $p < .05$, $\eta_p^2 = .12$. Finally, I did not find the effect of culture, age-group, or interaction on children's accounts of active living beings (Fig. 6c).

To summarize children's behavior during joint recall, the current findings supported my hypotheses and demonstrated that older children in both cultures contributed to the parent-child joint recall more than younger children did. This increase in the total number of accounts was reflected in cultural differences in children's attention to focal objects and background among older children, and not among younger children.

Parents' role on children's behaviors

Finally, I hypothesized that parents would play a significant role in transmitting culturally unique perspectives to their children. In order to test the role of parents, I first compared children's behaviors between the solitary condition and the parent-child joint recall condition. A 2 (Culture: Canada, Japan) × 2 (Condition: Solitary, Joint) × 2 (Age-Group: 4-6, 7-9) ANCOVA with condition as a within-subject factor on children's accounts of focal objects controlling for children's total accounts during solitary and joint recall revealed a significant 3-way interaction, $F(1, 88) = 5.17$, $p < .05$, $\eta_p^2 = .06$ (Fig. 7a). To explore this Culture × Age-Group × Condition interaction, I conducted separate 2 (Culture: Canada, Japan) × 2 (Condition: Solitary, Joint) ANCOVAs for each age-

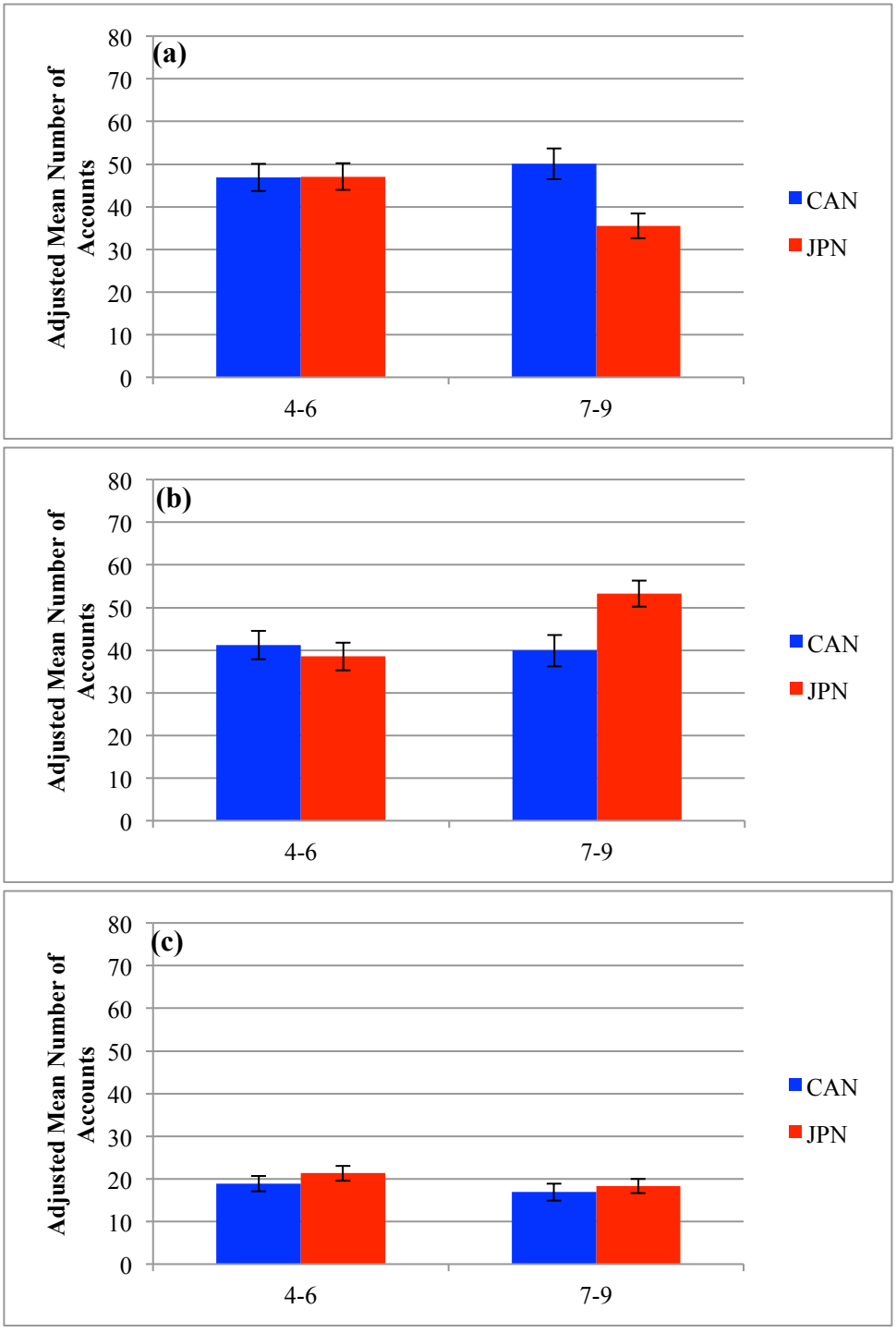


Figure 6. Children's description of observations by Culture and Age-Group during joint recall in Study 2: Adjusted mean accounts of (a) focal objects, (b) background, and (c) active living beings.

group. These analyses showed that the culture × condition interaction was significant among older children, $F(1, 41) = 8.10$, $p < .01$, $\eta_p^2 = .17$, but not among younger children $F(1, 42) < 1$, *ns*. Further simple effect analyses demonstrated that older children showed a significant cultural difference when they engaged in the joint recall activity with their parents, $F(1, 41) = 11.63$, $p < .01$, but not during solitary recall, $F(1, 41) < 1$, *ns*. As discussed in previous analyses, Canadian 7- to 9-year-olds were significantly more likely than Japanese 7- to 9-year-olds to mention focal objects during parent-child joint recall.

Another 2 (Culture: Canada, Japan) × 2 (Condition: Solitary, Joint) × 2 (Age-Group: 4-6, 7-9) ANCOVA on children's accounts of background with children's total accounts during solitary and joint recall as covariates also yielded a significant 3-way interaction, $F(1, 85) = 6.20$, $p < .05$, $\eta_p^2 = .07$ (Fig. 7b). Further analyses revealed a culture × condition interaction among older children, $F(1, 41) = 6.74$, $p < .05$, $\eta_p^2 = .14$, but not among younger children $F(1, 42) < 1$, *ns*. The interaction indicates that older children demonstrated significantly different patterns of attention to background across cultures during joint recall, $F(1, 41) = 9.78$, $p < .01$, and the effect of culture during solitary recall was not significant, $F(1, 41) < 1$, *ns*. Finally, there was no effect of culture, condition, age-group, or interaction on the number of accounts of active living beings. In summary, these analyses indirectly demonstrated parental effects on children's behavior, especially on behavior of older children. The results suggested that older children were more likely to internalize cultural perspectives when they engage in the recall activity jointly with their parents, while the results of younger children indicated that they did not internalize the culturally unique perspectives even when they engaged in the task with their parents.

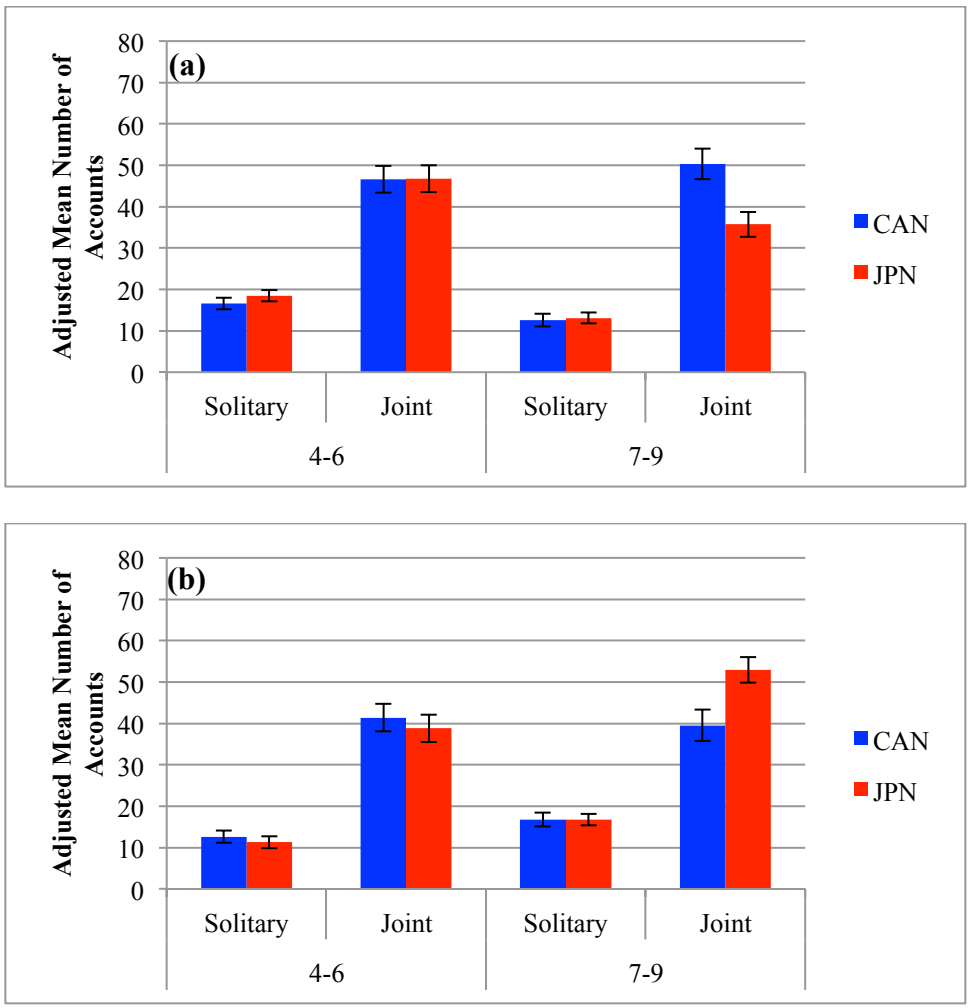


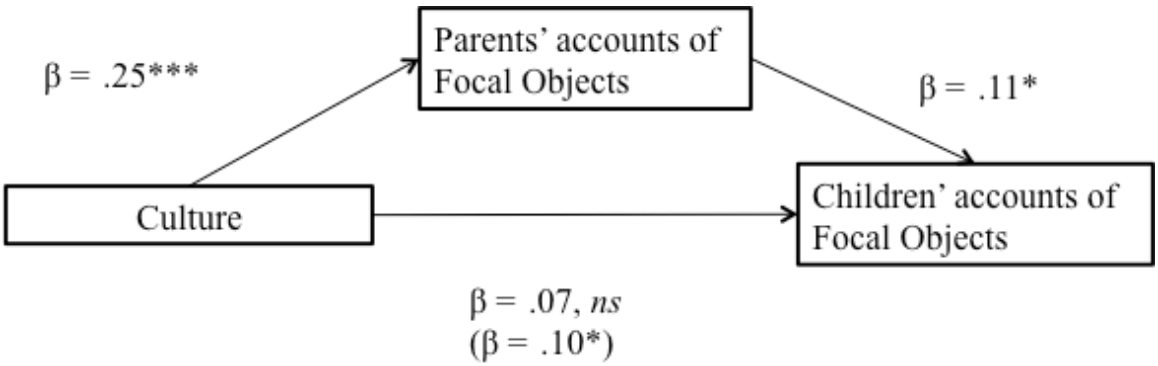
Figure 7. Children's description of observations by Culture, Condition (solitary vs. joint recall), and Age-Group in Study 2: (a) adjusted mean accounts of focal objects and (b) adjusted mean accounts of background.

Next, in order to directly examine the role of parents on children's behavior, I conducted a mediational analysis. I predicted that children's cross-cultural differences in their attention to the focal objects and to the background would be mediated by parents' culturally unique patterns of attention. Specifically, I conducted regression analyses to determine whether the effect of culture on children's attention to focal object and to background would be mediated by parents' patterns of attention.

The results of the mediational analyses on children's attention to focal objects are summarized in Figure 8a. As can be seen, culture significantly predicted parents' attention toward focal objects, $\beta = .25$, $t = 5.34$, $p < .001$, with Canadian parents being attentive to the focal objects more than Japanese parents were, after controlling for parents' total accounts. Further, parents' attention to the focal objects predicted children's attention to the focal objects after controlling for children's total accounts, $\beta = .11$, $t = 2.49$, $p < .05$. Parents' attention to focal objects fully mediated the magnitude of cultural effect on children's attention to focal objects, *Sobel* $Z = 2.16$, $p < .05$.

The pattern was very similar for the results of attention to background. Although culture only marginally predicted children's attention to the background, $\beta = .10$, $t = 1.82$, $p = .072$, I conducted the mediational model as recommended by Shrout and Bolger (2002). As shown in Figure 8b, culture significantly predicted parents' attention to background, $\beta = .26$, $t = 2.48$, $p < .001$, with Japanese parents being attentive to background more than Canadian parents were, after controlling for parents' total accounts. Further, parents' attention to the background predicted children's attention to the background after controlling for children's total accounts, $\beta = .12$, $t = 2.06$, $p < .05$, and parents' attention to background fully mediated the magnitude of cultural effect on

(a)



(b)

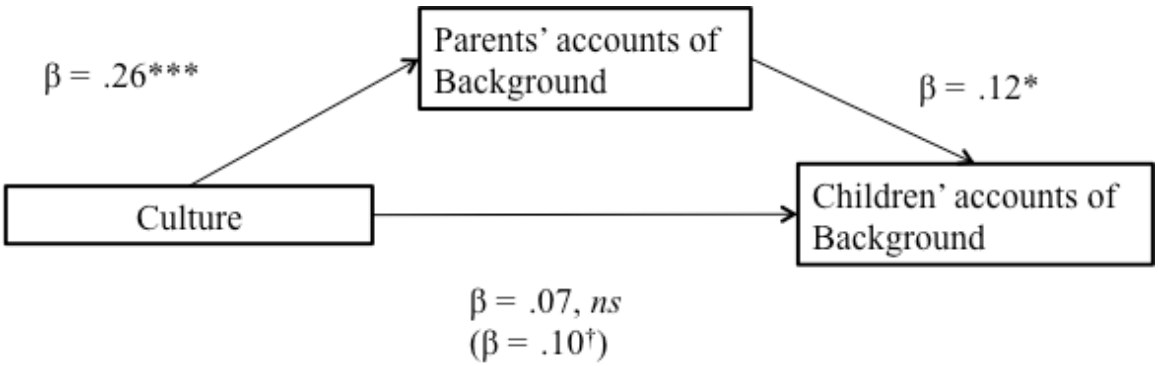


Figure 8. Mediation effects of parents' attentional patterns on children's attentional patterns to (a) focal objects and (b) background.

children's attention to background, and this mediation effect was marginally significant, *Sobel Z* = 1.92, $p = .054$. [6]

Discussion

The findings of Study 2 provide the first evidence of the importance of parent-child interaction for children to acquire culturally unique patterns of attention. The results demonstrated a significant cultural variation in parent-child joint recall and age-related changes in the dynamic interaction between parents and children.

First, as expected, parents in Canada and Japan imparted culturally unique patterns of attention to their children. Specifically, Canadian parents attended to focal objects more than Japanese parents did, while Japanese parents were more attentive to the contextual information than Canadian parents were in recalling the contents of movies with their children. These patterns of cultural variation in parents' description are consistent with previous research, demonstrating analytic cognitive styles in Canada and holistic cognitive styles in Japan (Masuda & Nisbett, 2001; Nisbett et al., 2001; Senzaki et al., 2013). Interestingly, parents' scaffolding behaviors varied depending on children's age. Parents of older children in both cultures made a larger number of accounts than parents of younger children in general. In addition, cultural differences in parents' attention to the focal and background information were particularly apparent among parents of older children, suggesting that parents make slight adjustments in imparting culturally unique perspectives to their children.

Second, as I predicted, older children's engagement in the joint recall was both quantitatively and qualitatively different than that of younger children. In general, 7- to 9-year-old children contributed to the parent-child joint recall more actively than younger

children did. Furthermore, older children's behaviors during joint recall reflected cross-cultural differences in their attentional patterns. Mirroring parents' behaviors, Canadian 7- to 9-year-old children were more likely to discuss focal objects than Japanese children were, while Japanese 7- to 9-year-olds were more likely to discuss contextual information than Canadian children were during joint recall.

Finally, parents had a great influence on children's culturally different attentional patterns. Older children were especially more likely to benefit from parent-child joint interaction in internalization of culturally unique perspectives. For older children, their attentional patterns during joint recall significantly differed from their attentional patterns during solitary recall, whereas younger children did not demonstrate different attentional patterns between joint recall and solitary recall. Furthermore, mediational analyses demonstrated that cultural differences in children's attentional patterns were fully mediated by parents' performance during joint recall.

CHAPTER 4

GENERAL DISCUSSION

The goal of the present research was to explore the development of visual attention from the cultural psychological approach, and to gain insight into the process of children's cultural learning as well as parent's scaffolding behaviors. Prior research has documented cross-cultural variation in attentional patterns among adult participants, especially between members from North American and East Asian cultures (e.g., Masuda & Nisbett, 2001, 2006; Senzaki et al., 2013). These findings were based on the assumption that people acquire culturally unique behaviors through engaging in social practices, which vary across different cultural groups reflecting the historical and ecological orientation cultural values specific to each group. However, the direct examination of the social practices available to children in relation to culturally unique cognitive development was limited. I hypothesized that the daily social interaction with parents that children experience would be one of the important foundations for them to acquire culturally unique cognitive styles. The current research focused on studying parent-child socialization practices, as this relationship has been discussed as one of the critical factors in facilitating transmission of culturally unique cognition (Bruner, 1990; Shweder et al., 2007; Vygotsky, 1978).

In study 1, I examined children's independent performance on a fish movie visual attention task among 4- to 9-year-old children in Canada and Japan. As expected, a strong effect of age was found, and the results demonstrated that older children gave more detailed descriptions of the movies than younger children, regardless of targets. This effect of age was equally strong in Canada and Japan, and no significant cultural

effects were observed when children engaged in the task independently.[7] Although the current visual attention task has been reliable in demonstrating systematic cultural variations between North American and East Asian adults (Masuda & Nisbett, 2001; Senzaki et al., 2013), the results demonstrated that children in both young and old age-groups did not show observable cultural differences in their performance, perhaps because the task required advanced language skills. Although the current findings may seem to be contradicting to previous studies that found cross-cultural differences among younger children (e.g., Imada et al., 2013; Kuwabara & Smith, 2012; Kuwabara et al., 2012), the non-significant effect of culture in the current study can be attributed to the task type. In the current study, I used a visual attention task that required verbal communication because it is appropriate in examining parental influence on children's learning of culturally appropriate attentional styles as suggested by Vygotsky (1962); however, such a task may not be suitable in finding the earliest onset of cultural differences in children's performance. It is thus important for investigators to select the task that is most appropriate for the research question.

In order to investigate the learning context children experience in their daily lives, I examined parent-child socialization practices in a joint recall activity in Study 2. Children's performance in solitary recall in Study 2 replicated findings of Study 1, and showed that 4- to 9-year-old children did not demonstrate culturally unique patterns of attention when they solitary engaged in the visual attention task that required verbal description and recall. Furthermore, results confirmed my hypothesis because Canadian and Japanese parents were substantially different in the ways they interacted with their children. During joint remembering task, Canadian parents were more likely to discuss

focal objects than Japanese parents were, while Japanese parents were more likely to discuss contextual information than Canadian parents were. These findings revealed that parents in Canada and Japan indeed interpreted movies differently, and the way they did so reflected culturally unique worldviews. Canadian parents' patterns of attention reflected an analytic pattern of attention, while attentional patterns found among Japanese parents reflected a holistic pattern of attention. Furthermore, parents in Canada and Japan imparted these culturally shared meanings to their children through shared activities. Shared meaning and shared activity are considered to be the primary components that construct culture (Greenfield, Keller, Fuligni, & Maynard, 2003). Taking the developmental approach allows us to empirically examine these fundamental components of culture, and how they are transmitted across generations.

Moreover, examining cultural variation in learning contexts provides theoretical implications for cognitive development by suggesting alternative developmental pathways for children of various cultural groups. The current findings provided empirical support to Vygotsky's sociocultural-historical theory by examining parent-child interaction as the process of cultural learning. Specifically, the results of Study 2 revealed that parents guided children's attention in a way that was unique to their cultural group in joint recall, but only the older children, and not the younger children, demonstrated cultural learning of attention. Furthermore, when children's behaviors in solitary and joint recall conditions were compared, only older children demonstrated the improvement in cultural learning during the parent-child joint recall activity, which suggests that only the older children were in the maturing process (i.e., zone of proximal development) of culturally appropriate perspectives.

Jerome Bruner and his colleagues focused on the importance of scaffolding, which is the parental guidance during parent-child socialization practices. Bruner suggests that scaffolding requires adults to know children's understanding levels and adjust guidance depending on children's levels (Wood et al., 1976). In the current study, parents with older children were more likely to attend to culturally unique targets than parents with younger children were. Thus, these findings provide empirical support to Bruner's assumption, and demonstrate that parents indeed adjust their guidance according to the level of children's development. Bruner also suggested various functions of scaffolding. For example, scaffolding behaviors may help maintain children's engagement in the task, regulate children's emotional reaction such as frustration that may be resulted from the task difficulty, and act as demonstration of desired behaviors. Some previous research suggests that types of strategies parents employ in assisting children's cognitive development may differ across cultures (e.g., Azuma, Hess, Kashiwagi, & Conroy, 1980; Cheung, & Pomerantz, 2011). In the current studies, parents scaffolding behaviors in teaching culturally unique perspectives were especially strong among parents with older children. Although this finding may be counter-intuitive, this pattern can be interpreted easily when children's behaviors are taken into consideration. In the joint recall task, only the older children demonstrated cross-cultural differences. In other words, older children were more attuned to their parents' teaching; in turn, parents may have been responding with even more strongly culturally unique communicational patterns to those children whose communicational patterns were in synch with their parents. Parents with younger children, on the other hand, may have been less concerned in teaching culturally unique communicational patterns, and may be

more concerned about keeping children's interests in completing the task. Future research should examine possible cultural variations as well as age-related changes in scaffolding behaviors.

Several studies have examined cross-cultural variation in attention to multiple events among Mexican-heritage families (Chavajay & Rogoff, 1999; Correa-Chávez, Rogoff, & Mejía Arauz, 2005; Rogoff, Mistry, Göncü, Mosier, 1993). These studies have demonstrated that both mothers and children from Indigenous communities of Mexico tend to demonstrate simultaneous awareness, which is evident in higher frequent alternation of attention among multiple events at the same time, compared to European American mothers and their children. Although there may be similar outcome behaviors between simultaneous awareness found among Mayan families and holistic patterns of attention found among East Asian participants, the theoretical frameworks are different. To interpret cross-cultural differences between Mayan families and European American families, Rogoff (2003) suggests that simultaneous awareness is a reflection of cultural differences in learning styles. In Mayan cultures, observational learning is expected for children, and this learning style requires the learner to divide attention among multiple events occurring simultaneously, in contrast to the dominant instructed learning style in European American cultures, in which the learner is expected to focus his or her attention to the directed goals. This hypothesis is supported by a study that shows a reduction of simultaneous awareness among Mayan children whose mothers received schooling experience, particularly Western-style schooling (Chavajay & Rogoff, 2002). Conversely, holistic patterns of attention found in East Asian participants are theorized as the reflection of the holistic worldview commonly shared in East Asian cultures (Nisbett,

2003). As discussed earlier, members of East Asian cultures tend to share a worldview that suggests the nature of the world is interconnected, and in order to appreciate the characteristics of the focal objects, understanding of the whole unit, including contextual and background information, is necessary. Thus, in contrast to the Mayan children's simultaneous awareness, East Asian participants' holistic patterns of attention have been observed in various situations unrelated to observational learning (e.g., Nisbett & Masuda, 2003; Nisbett & Miyamoto, 2005). Such results are generally consistent even among East Asian adults who have received Westernized education, such as the international college students tested in the U.S. or other Western countries. Similarly, in the current study, children whose parents received formal schooling also demonstrated culturally unique patterns of attention. Thus, I maintain that underlying assumptions accountable for divided patterns of attention for Mayan Mexican families and East Asian families are different.

Why 7- to 9-year-old children demonstrated cultural learning and 4- to 6-year-old children in the current study did not show it in joint recall? There are a variety of developmental changes that occur during these periods. First, a large body of research suggests that the underlying mechanisms of memory differ between preschool- and school-age children, especially as those mechanisms related to strategies. For example, compared to school-age children, preschool-age children are much less likely to use tactics such as rehearsing (Flavell, Friedrichs, & Hoyt, 1970; Gathercole, Adams, & Hitch, 1994), categorization (Bjorklund & Zaken-Greenberg, 1981), and metamemory (Henry & Norman, 1996). Thus, it can be suggested that children's visual memory may be similar across cultures before they start using various strategies. Other important

sociocognitive development includes the understanding of Theory of Mind. In contrast to involuntary attention (such as the automatically fixated attention to moving cars), voluntary attention is less imperative to biological survival, and cultural differences in attentional patterns are subtle in this sense. For children learning cultural values and perspectives, understanding the fact that other people have different perspectives and intentions may be crucial. Future research should investigate these factors that may help us further understand the age difference in cultural learning in joint activities.

A limitation of the current study lies within the use of the cross-sectional method to examine the developmental pattern of culturally unique attention. Future research should examine the development of parent-child socialization practices using a longitudinal study design. The results of Study 2 demonstrated that parents' scaffolding behaviors differed depending on children's age, showing that parents with older school-age children were more likely to provide parental inputs in culturally unique manners than parents with younger preschool-age children. It would be interesting to examine how this parent-child relationship might evolve over time. Future research should also employ a longitudinal assessment following the same group of children in order to validate the impact of sociocultural effect on cognitive development. Our current comparison of younger and older age-groups is based on age-group averages, and the potential individual differences cannot be discussed. An increasing number of studies have demonstrated within-cultural differences (e.g., Grossmann & Varnum, 2011; Hong & Chiu, 2001), and it is important to examine developmental trajectories of both cross-cultural and within-cultural differences in cognitive styles. It also would be interesting to examine the development of culturally unique cognitive development across lifespan.

For example, would adolescents demonstrate more deviant patterns of cognitive styles from the cultural norm? When these children become parents themselves, would their behaviors become similar to the traditional thinking styles in their culture? Such investigation would provide us with further understanding of the transmission and maintenance as well as change in cultural ideas. Some research examining cultural differences in cognitive development by measuring different neural activities in brain functions has suggested that cultural differences may be smaller among older adults, in their 60s and older, than among young adults, who are in their 20s and 30s (Chee, Zheng, Goh, Park, & Sutton, 2011; Goh & Park, 2009; Park & Huang, 2010). Li (2007) proposes a theoretical model to predict behavioral plasticity of the interaction between cultural and biological influences on human cognition, and suggests that biological influences may be more dominant and cultural influence would be minimal at the two ends of the lifespan development: namely, during early childhood and late adulthood. Empirical examinations should be conducted to test such prediction and further investigate the interactive relationship between cultural and biological factors.

In order to establish parent-child socialization practices as a proximal cause of children's acquisition of culturally unique cognitive styles, it is important to demonstrate how children's performance would change before and after they engage in a joint-activity with their parents. An A-B-A design that compares children's post-joint-activity performance against baseline performance may be useful. However, past research suggests that an empirical demonstration of this learning effect may be challenging, especially with younger children. For example, Radziszewska and Rogoff (1998, 1991) demonstrated that 9- to 10-year-old children learned better planning skills through

working with adults and peers. In their studies, children were first asked to imagine going to grocery shopping with either an adult partner or a peer partner. Then they were post-tested with the imaginary grocery-shopping task that showed that children were more likely to use more advanced planning skills after working with an adult partner. However, with a similar paradigm, Gauvain and Rogoff (1989) did not find the effect of social learning on planning skills among 5-year-old children. In another study, Rogoff and her colleagues (Rogoff, Radziszewska, & Masiello, 1995) also examined the effect of cultural learning on cognitive development among 3- to 4-year-old children. In the experimental group of this study, children were asked to work on a maze task with their mother, and later researchers post-tested children's ability to solve the maze independently. In the control group, children spent the same amount of time solving the maze from the beginning to the end independently. Surprisingly, results suggested that the outcome of children who initially worked on the maze with their mothers did not differ from the children in the control group. These findings suggest that acquiring behaviors from social learning may take some time, especially for younger children, and engaging in the task jointly with their parents or with adult partners may not result in the immediate change in children's behaviors. There is another challenge in applying this pre-test and post-test paradigm to demonstrate the learning effect of culturally unique cognitive styles. Kitayama and his colleagues (Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009; Na, Grossmann, Varnum, Kitayama, Gonzalez, & Nisbett, 2010) have demonstrated relatively low correlation among various cultural tasks. In these studies, researchers asked university students to engage in the various cultural tasks, including the fish movie used in the current study, and found that although these tasks reliably yielded

systematic cross-cultural variations between North Americans and East Asians at the aggregated level, the correlations among the outcomes of the task within individual participants were very small. Imada et al. (2013) also tested a variety of visual attention tasks with 4- to 9-year-old children, and they found cross-cultural variation between American and Japanese children at the aggregated level, but within individual correlations among these tasks were small. These studies pose the issue that finding tasks that can be used during pre-test, learning, and post-test phases may be particularly challenging. One possibility of using the A-B-A design is using the same research stimuli and task as the current study. For example, after the child engage in the solitary recall task, the child and the parent may jointly watch a movie, during which time they discuss their observation with each other. After the movie ends, only the child recalls the content of the movie without any help from his or her parents. In such a design, children's recall may reflect how they interact with their parents during joint observation.

In addition to parent-child socialization, future studies should examine how different socialization factors such as schooling (Cole, 1996) and peer influences (Haun & Tomasello, 2011) may interact with the influence of parenting on cultural cognitive development. It may be particularly interesting to test the current paradigm among peers. Vygotsky suggested that the ZDP could be prompted not only among parent-child interactions, but also social interactions that children experience with skilled peers. An empirical examination is necessary to test how children may learn culturally unique attentional patterns from more skilled peers; however, it can be speculated that the effects of scaffolding and cultural learning during peer interaction may be smaller than the effects observed between adults and children. for example, prior research by Gauvain,

Rogoff, and their colleagues have tested learning of planning behaviors, and revealed that children show better planning when planning with an adult than with a peer in both early and middle childhood (Gauvain, 1991; Gauvain & Rogoff, 1989; Radziszewska & Rogoff, 1988). The authors suggest that the difference between adult and peer collaborators is due to the way the collaborator (i.e., the teacher in this context) attends to the behaviors of the learner. While the adult collaborator attend to the learner's behavior with an emphasis on the coordination of the strategies to reach the single primary goal, the peer collaborator tends to focus on the immediate outcomes with seemingly less focus to the big picture. Future studies should examine whether the similar patterns would be observed in the domain of visual attention.

The development of attention has been of interest to many developmental scientists, educators, and parents, as attention relates to a wide range of important cognitive development such as problem solving, reasoning, motivation, and self-regulation (Ruff & Rothbart, 1996). Although healthy development of attention has been discussed as an important foundation of children's cognitive development, developmental pathways may substantially differ across various cultural contexts. For example, several studies have demonstrated that East Asian children tend to outperform North American children in tasks that require cognitive flexibility (Carlson, 2009; Lewis, Koyasu, Oh, Ogawa, Short, & Huang,2009; Sabbagh, Xu, Carlson, Moses, & Lee, 2006), and more recently, Imada et al. (2012) have shown that context sensitivity mediated this relationship between culture and the development of cognitive flexibility. Future research should investigate the relationships among culture, attention, and other cognitive processes.

Another implication of the current study relates to the development of sociocognitive skills (e.g., Callaghan et al., 2011). The current task of joint remembering between parents and children can be considered as an extension of joint attention. Joint attention occurs when two individuals attend to the same object or an event together, while both participants monitor each other's attention to the target of the mutual interest and coordinate their own action during the joint activity (Tomasello, 1999). Children's ability to establish joint attention has been studied extensively as joint attention has a strong relationship with both social and cognitive development (e.g., Moore & Dunham, 1995; Tomasello, 1999). Although joint attention is studied primarily with infants, it facilitates children's later development through participation in the culture, as suggested by Bruner (1995). In line with Bruner's theoretical assumption, the current research suggests that the importance of joint attention for children's learning, through which children learn culturally appropriate ways to interpret their surroundings, remains during early and middle childhood.

Conclusion

All humans participate in cultures. As Rogoff notes, "As a biological species, humans are defined in terms of our cultural participation" (p. 3, Rogoff, 2003). Hence, it is a central fact that our understanding, perception, and learning are situated in the sociocultural context (Lave & Wagner, 1991). However, research on the cognitive development has predominantly focused on individual learning and on how knowledge representation changes over time. One of the striking differences between humans and non-human animals is the degree to which humans engage in social learning. While many animals engage in learning to a great degree, most non-human animals' learning is

largely based on the individual leaning mechanism. In a sharp contrast, a great proportion of human learning is based on the social learning mechanism, such as imitative learning and instructional learning (Richerson & Boyd, 2006; Tomasello, 1999). Humans thus acquire a great deal of behaviors thorough social interaction. In the current study, I examined the process of social interaction as a source of transmission and acquisition of culturally unique ways of processing information.

By examining parent-child interaction across two cultures, the current research was able to demonstrate that children grow in the environment that contains rich cultural practices and socialization patterns. In other words, cognitive development occurs in a social and cultural context, and through social interaction, parents help children to organize information in a way that is suitable for a culturally shared perspective. In particular, the current study examined sociocultural origin of the development of culturally unique patterns of visual attention, and found significant cross-cultural differences in how parents and children jointly attended to and remembered movies depicting an underwater world. The joint remembering task administrated in a laboratory was designed to simulate everyday interactions parents and children engage in, such as storytelling, reading books, watching movies, and remembering various events together. Based on the current findings, I argue that such daily interactions and joint activities between parents and children provide opportunities for parents to teach their children how to process materials in a culturally appropriate manner, and for children to learn culturally appropriate perspectives.

Endnotes

1. I also conducted 2 (Culture) × 2 (Age-Group) × 2 (Gender) ANOVAs on the number of descriptive accounts of observations. There were no main or interaction effects of gender on the number of accounts of the focal objects, $F < 1$. On the number of accounts of the background, there was a main effect of gender, $F(1, 92) = 4.57$, $p < .05$, $\eta_p^2 = .05$, as girls ($M = 36.53$, $SD = 24.76$) were significantly more likely to discuss the background than boys were ($M = 32.96$, $SD = 21.84$). This main effect was qualified for the 3-way interaction, $F(1, 92) = 9.72$, $p < .01$, $\eta_p^2 = .09$. Simple effect analyses demonstrated that a main effect of gender was significant only for older Japanese children, $F(1, 23) = 14.13$, $p < .01$, $\eta_p^2 = .43$. Japanese 7- to 9-year-old girls ($M = 71.63$, $SD = 18.14$) were significantly more likely to discuss the background than Japanese boys of the same age group were ($M = 39.00$, $SD = 21.63$). There was no significant main effect or interaction effect of gender on the number of accounts of active living beings.

2. Again, 2 (Culture) × 2 (Age-Group) × 2 (Child's Gender) ANCOVAs using the total accounts as a covariate were performed on all dependent variables. The significant effects of gender were found only with the following two outcomes. First, there was a 3-way interaction on children's accounts of background during children's solitary recall, $F(1, 84) = 4.15$, $p < .05$, $\eta_p^2 = .05$. This 3-way interaction was further examined through simple effect analyses, which demonstrated that the effect of gender was significant only with Canadian younger group, $F(1, 21) = 4.98$, $p < .05$, $\eta_p^2 = .19$. Canadian boys at ages 4 to 6 ($M = 7.70$, $SD = 2.94$) were more likely to discuss background than Canadian girls ($M = 5.02$, $SD = 2.94$), and I did not find any other significant effects of gender on children's accounts. Second, there was a significant main effect of children's gender on

parents' accounts of the background information, $F(1, 84) = 4.80$, $p < .05$, $\eta_p^2 = .06$. Parents with girls were more likely to discuss background ($M = 56.88$, $SD = 20.42$) than parents with boys ($M = 48.74$, $SD = 15.02$) were, after adjusting for parents' total account during recall. Although previous research with adults demonstrated the effect of gender in addition to the effect of culture (Doherty et al., 2008), such that female adults showed greater context sensitivity than male adults within their own cultural groups, the effect of gender has not been demonstrated within the literature of cultural differences in children's attentional patterns (e.g., Duffy et al., 2009; Imada et al., 2012; Kuwabara & Smith, 2012). The results of the current studies showed an inconsistent effect of gender on both parents' and children's attentional patterns. Future research should examine this issue with more equally distributed larger samples.

3. In order to make a direct comparison between children's solitary recall in Study 2 and the results of Study 1, I also conducted a 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANOVAs on the raw scores on children's solitary recall in Study 2. These analysis confirmed the hypothesis and revealed a significant main effect of Age-Group on the number of accounts to the focal objects, $F(1, 89) = 20.12$, $p < .001$, $\eta_p^2 = .19$, to the background, $F(1, 89) = 7.24$, $p < .001$, $\eta_p^2 = .45$, and to active living beings, $F(1, 89) = 17.97$, $p < .001$, $\eta_p^2 = .17$, with older group making a larger number of accounts to all targets regardless of cultural groups. Replicating the findings of Study 1, there was no significant effect of culture on children's attention during solitary recall of the first two movies.

4. I also report the results of the same analysis using the raw scores on parents' report during joint recall. Examining attention to the focal objects, a 2 (Culture: Canada, Japan)

× 2 (Age-Group: 4-6, 7-9) ANOVA demonstrated a main effect of age, $F(1, 89) = 12.00$, $p < .001$, $\eta_p^2 = .12$, such that parents with older children made a larger number of accounts of the focal objects ($M = 68.04$, $SD = 49.34$) than parents with younger children ($M = 41.39$, $SD = 30.46$). There was also a main effect of Culture, $F(1, 89) = 11.14$, $p < .001$, $\eta_p^2 = .11$, such that Canadian parents ($M = 67.83$, $SD = 47.25$) referred to the Focal objects more than Japanese parents ($M = 42.12$, $SD = 34.41$). When the raw scores were used, the interaction between Age and Culture was not significant, $F < 1$. Examining attention to background, A 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANOVA demonstrated a main effect of age, $F(1, 89) = 4.91$, $p < .001$, $\eta_p^2 = .03$, such that parents with older children made a larger number of accounts of background ($M = 65.81$, $SD = 41.57$) than parents with younger children ($M = 41.59$, $SD = 23.00$). There was also a main effect of Culture, $F(1, 89) = 4.91$, $p < .001$, $\eta_p^2 = .03$, such that Japanese parents ($M = 62.00$, $SD = 40.57$) referred to the background more than did Canadian parents ($M = 45.52$, $SD = 27.83$). The interaction effect between Age and Culture was not significant, $F(1, 89) = 2.21$, $p = .14$.

5. Although older children's total number of accounts was different across cultures and the total number of accounts was applied as a covariate, I also report the results of the same analysis using the raw scores on children's report during joint recall. Examining attention to the focal objects, A 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANOVA demonstrated a main effect of Age, $F(1, 89) = 48.83$, $p < .001$, $\eta_p^2 = .36$, such that older children made a larger number of accounts of the focal objects ($M = 63.72$, $SD = 39.36$) than younger children ($M = 24.00$, $SD = 20.15$). There was also a main effect of Culture, $F(1, 89) = 8.32$, $p < .001$, $\eta_p^2 = .09$, such that Canadian children ($M = 51.61$, SD

= 42.30) referred to the Focal objects more than Japanese children (M = 36.70, SD = 29.68) in general. When the raw scores were used, the interaction between Age and Culture was significant, $F(1, 89) = 15.42$, $p < .001$, $\eta_p^2 = .15$, and further analysis demonstrated that the effect of Culture was only significant among older children, $F(1, 87) = 15.85$, $p < .001$, $\eta_p^2 = .26$, and not among younger children, $F(1, 89) = 1.05$, *ns*. Examining attention to background, A 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANOVA demonstrated a main effect of age, $F(1, 89) = 61.50$, $p < .001$, $\eta_p^2 = .41$, such that older children made a larger number of accounts of background (M = 61.74, SD = 29.85) than younger children (M = 23.48, SD = 14.31). Neither the main effect of Culture nor interaction between Culture and Age interaction were significant, Fs < 1. These results were largely due to cross-cultural differences in the baseline of children's sheer volume of accounts. Canadian older children made a larger number of accounts in total, which contributed null-effect of culture on the number of accounts referring to the background. As reported in the main text, after controlling for the total number of accounts, the Cultural effect on children's attention to the focal object was still significant, suggesting that over and beyond sheer differences in the total volume across cultures, Canadian older children were more likely to attend to the focal objects than Japanese older children during joint recall. After controlling for the total volume, Japanese older children were more likely to attend to the background than Canadian older children, as reported in Study 2.

6. Although preceding analyses confirmed my hypotheses that parents' attentional patterns fully mediated cultural effects on children's attention, it is also possible that children's patterns of attention mediate cultural effects on parents' attentional patterns.

This reverse model was also tested, and the results revealed that culture significantly predicted children's attention to focal objects, β = .25, t = 5.34, p < .001, after controlling for children's total accounts. In turn, children's attention to focal objects predicted parents' attention to focal objects, β = .25, t = 5.34, p < .001, and when this mediator was included, the initial cultural effects on parents' attention to focal objects, β = .25, t = 5.34, p < .001, was reduced to β = .25, t = 5.34, p < .001. Although this mediator effect was significant, *Sobel* Z = 1.92, p = .054, the direct effect of culture on parents' attentional patterns remained significant, indicating that children's attention partially mediated cultural effects on parents' attention to focal objects. The mediational effect of children's attention on parents' attention to the background was also tested. First, culture significantly predicted children's attention to the background after controlling for children's total accounts, β = .25, t = 5.34, p < .001, and children's attention significantly predicted parents' attention to the background, β = .25, t = 5.34, p < .001. When this mediator was included, the initial path from culture to parents' attention, β = .25, t = 5.34, p < .001, was reduced to β = .25, t = 5.34, p < .001. Again, this mediating effect of children's attention was significant, *Sobel* Z = 1.92, p = .054; however, children's attention only partially mediated cultural effects on parents' attention to the background. Taken together, these analyses demonstrated that the influences of parents' and children's attention were bidirectional, but parents' influence on children's attention was stronger than the other way around.

7. In order to keep the consistency of the data analysis method across studies, I reanalyzed the results of Study 1 using the same method of ANCOVA as in Study 2. Using the total number of accounts as a covariate, a 2 (Culture: Canada, Japan) × 2 (Age-

Group: 4-6, 7-9) ANCOVA on the number of accounts referring to the focal fish revealed a main effect of age-group, $F(1, 95) = 12.76$, $p < .001$, $\eta_p^2 = .12$, such that younger children referred to the focal fish relatively more than older children. In addition, a main effect of culture emerged, $F(1, 95) = 7.19$, $p < .01$, $\eta_p^2 = .07$, indicating that the Canadian children regardless of their age-group referred to the focal fish than the Japanese children when the total number of accounts were controlled for. There was no significant interaction between age-group and culture. Another 2 (Culture: Canada, Japan) × 2 (Age-Group: 4-6, 7-9) ANCOVA on the number of accounts referring to the background with a total number of accounts as a covariate resulted in a main effect of age-group, $F(1, 95) = 12.32$, $p < .0o1$, $\eta_p^2 = .12$, such that older children remembered the background more than younger children regardless of culture. Also, a main effect of culture was significant, $F(1, 95) = 4.14$, $p < .05$, $\eta_p^2 = .04$, indicating that in both young and old groups, Japanese children referred to the background than Canadian children when the total number of accounts were held consistent. Again, the interaction between age-group and culture was not significant. Lastly, there was no effect of age-group, culture, nor interaction on the number of accounts referring to the active living beings.

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Appendix A

Instructions of Study 1.

The initial instruction:

English: "I am going to show you 4 movies, and I will ask you some questions. They are very short movies, and I will ask you to remember what you see. We will watch each movie twice, so you can remember them well. You are going to tell me what you see when the movie ends."

Japanese: *"Imakara, 4 tsuno video wo miruyo. Totemo mijikai video de, miowattara, donna video ka, kuwasikuosietekudasai tokikimasu. Yoku oboete irareruyouni, 2 kai zutu mimasu. Miowattara, naniwo mitaka ohanasi sitene."*

At the end of movie presentation and beginning of the recall task:

English: "Can you tell me what you saw?"

Japanese: *"Nanwo mimashitaka?"*

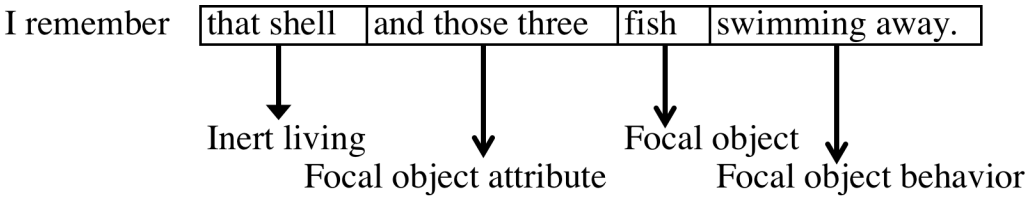
Prompts used during recall:

English: "Is there anything else?"; "Can you tell me anything else?"

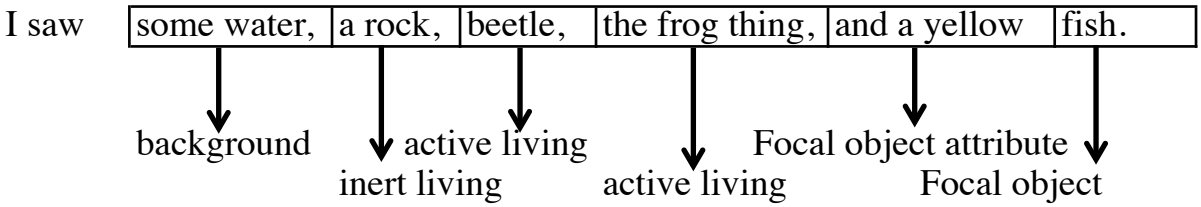
Japanese: *"Hokaniwa arimasuka"; "Hokani oboeterukotoha aru?"*

Appendix B

Sample coding.



Categories:	Counts #
Inert living:	1
Focal objects:	3
Total accounts #	4



Categories:	Counts #
Background:	1
Inert living:	1
Active living:	2
Focal objects:	2
Total accounts #	6

Appendix C

Sample parent-child conversations during joint recall.

Canadian dyad from the young group.

P: So what makes you think he's a bass?

C: There's sort of a greenish color like that one.

P: Were there a lot of different fish in this one?

C: hmmhmm

P: What did you like best about this?

C: the green water

P: What do you like about the water?

C: I like green.

P: That's a good color. Anything else that you remember? What did we see in this last movie?

C: A bass, a salmon I think, a snail, a frog type thing, more seaweed, green water.

P: Was there anything else in there?

C: Fish

P: Fish! Yea

Japanese dyad from the young group.

P: Yes, the color of ocean was different.

C: Yeah, the ocean color, it was blue again, it was all blue

P: Yeah, kind of like this (pointing the blue shirt of the child). It was greenish blue.

C: It was a little light greenish color, the ocean was. And there was a large fish, another fish with red eyes that was medium, and I think there was another medium fish.

P: Oh I didn't realize the red-eye fish, but I was looking at the sea-slug and the shell.

C: Yeah, and there were trees growing.

P: That's right, they had different types of seaweeds.

C: They looked like Christmas trees.

P: Yes, there were a few trees growing, but I can't remember how many.

C: I don't know.

Canadian dyad from the old group.

C: 4 fishies

P: 4 fishies. Were they big or little?

C: big

P: and how many little ones?

C: 2

P: oh you're so good

C: and um there were 2 snails

P: yes and how many bugs?

C: 1

P: what kind of bug?

C: water beetle

P: think so?

C: yup

P: and what was that one other little guy that was down here (points at bottom of blank screen)

C: it was a tadpole

P: a tadpole and where were the bubbles coming from do you remember?

C: the fishies mouth

P: which ones? The little fishies or the big ones?

C: the bigger ones

P: was it?

C: the little fishie but

P: and the ones at the back?

C: yeah it was the one up top, not the one down low

P: can you tell me anything else about the fish?

C: umm

P: what about the big fish at the front, what about them?

C: they were very colorful

P: they were, were the little fish colorful?

C: not really they were just blue

P: they were just blue, poor little fish.

C: yeah

P: anything else?

C: nope. Oh there were shells!

P: yeah we said that already. How many?

C: there were 2 I think shells

P: yeah? Snails?

C: 2 shells, there were shells on the bottom

P: oh yeah they were on the bottom too, yup.

Japanese dyad from the old group.

P: Ok, what did you think first?

C: There was seaweed growing on the rock.

P: Yes, there were 2 rocks.

C: No there were 3.

P: 3? Were there 3 rocks?

C: Yup.

P: I thought there were 2, but ok, 3 rocks. And seaweeds were growing around here (pointing right side).

C: Yes.

P: Right next to it, umm, was there a sea urchin?

C: Yes, I think so. It was brown.

P: And there was a large, what is it called? The large one over here (pointing down).

C: The red one.

P: It's called coral. It was red. It was pretty big and did you see the shadow?

C: Yes.

P: Ok, and the fish came from this way. The green ones first.

C: Yes. And 7 yellow fish.

P: And there were 2 blue fish with stripes on.

C: Yup, that's all.

P: No there is more. Was the ocean green?

C: No it was blue.

P:Yes, it was blue, and were there bubbles?

C:Yes.

P: There were bubbles? Ok, and what about the bottom? Was there a sea ground?

C: Yes, there were gravels on the bottom.

P: Yeah? What else… I thought it was ocean. The water color was different, right?

C: Yes.

P: The fish looked different too. What else?

C: Nothing else.