A Comparative Study of Young Children's Risk-taking Behavior in China and U.S.: A Multiple-group Path Analysis

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A COMPARATIVE STUDY OF YOUNG CHILDREN’S RISK-TAKING BEHAVIOR IN CHINA AND U.S.: A MULTIPLE-GROUP PATH ANALYSIS

by

Jun Hao

A Dissertation

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Abstract


Risk-taking is inevitable, uncertain, and essential in early childhood. Researchers suggest four important factors that influence young children’s risk-taking behavior, namely, children’s temperament of sensation seeking, parents’ perception of risk, parental supervision, and society. However, there has been little effort to examine how the four factors collectively impact young children’s risk-taking behavior.

The purpose of this study was to understand (1) what role the three factors (children’s sensation seeking, parents’ risk perception, and parental supervision) play in children’s risk-taking behavior; and (2) how their relations vary by society. The current study proposed a model (Figure 1) derived from Sandseter’s (2010) framework and tested the model in China and U.S..

Participants were 106 parent-child dyads from China and 108 parent-child dyads from the U.S. Parents were surveyed to measure children’s sensation seeking, parents’ risk perception, and parental supervision. Children’s risk-taking was tested by a computerized task BART-Y. Eighteen parents participated in a follow-up interview.

Path analyses revealed that the data fitted the model well for both countries. Children’s sensation seeking and parental supervision had a direct effect on children’s risk-taking. Findings of China suggested a mediating role of parental supervision between parents’ risk perception and children’s risk-taking. Findings of the U.S. suggested a mediating role of parental supervision between children’s sensation seeking and their risk-taking. A multi-group path analysis and MANOVA analyses suggested that the model varied by country including all factors.
The findings highlight similarities and differences in early childhood risk-taking between China and the U.S., encourage further investigation of influencing factors, and suggest that prevention and intervention efforts should incorporate children’s temperament, parenting, and society to promote beneficial risk-taking and reduce harmful risk-taking in early childhood.
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Chapter One General Introduction and Literature Review

Risk-taking behavior is essential to human survival and progress, particularly for young children because risks are inevitable from birth and are a part of development (e.g., Adams, 2001; Beck, 1992; Davis & Eppler-Wolff, 2009; Delle, Fave, Brdar, Friere, Vella-Brodrick, & Wissing, 2011; Niehues, Bundy, Broom, & Tranter, 2016; Smeyers, 2010). Taking risks is an important part of learning and development (Davis & Eppler-Wolff, 2009).

Researchers suggested three factors that were associated with young children’s risk-taking behavior, namely, children’s temperament of sensation seeking, parents’ perception of risk and parental supervision. However, the findings of their relations are mixed. Moreover, society plays a vital role in the three factors (Adams, 2001; Apter, 2007; Davis & Eppler-Wolff, 2009; Douglas, 1992; Morrongiello & Lasenby-Lassard, 2007; Nystrom & Bengtsson, 2016; Sandseter, 2010). Much has remained unknown about what the role of society had played in associations with young children’s risk-taking behavior. To better understand early risk-taking behaviors in everyday life, researchers had made important advances as mentioned above. Built on previous studies, the current study first proposed a model derived from Sandseter’s (2010) conceptual framework about young children’s risk-taking behavior and then compared the model for Chinese children with that for the U.S. children to examine how the relations between young children’s risk-taking behavior and its three key factors vary by societies: such as children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision.

This chapter is divided into six sections. First, I built introduce a definition of risk. Second, I discuss three characteristics of risk-taking behavior in early childhood, that is, inevitability, uncertainty, and essentiality. Third, I review the literature about three perspectives (i.e., psychobiological, social, and cognitive) that researchers mainly use in the field of risk-
taking behavior. Fourth, I provide empirical evidence of the relations between children’s risk-taking behavior and its three factors (i.e., children’s temperament of sensation seeking, parents’ perception of risk and parental supervision). Fifth, I review the literature concerning the importance of society in children’s risk-taking behavior and the three factors. In my review, the extant research literature has not examined how the three factors collaboratively impact children’s risk-taking behavior and how their associations differ by society. In the end of this chapter, I provide an overview of the current dissertation.

Definition of Risk

Risk has multiple dimensions, including danger or threat, uncertainty, and challenge or opportunity (Nystrom & Beatrice, 2016). The concept of risk has developed over the past few centuries. Douglas (1992) argued that this concept first emerged in the context of gambling. Risk was linked to the probability of a negative or positive outcome. In the eighteenth century, risk analysis became prevalent in marine insurance. According to Giddens (2003), risk occurred during the sixteenth and seventeenth centuries when embarked on lengthy ocean voyages. At that time, the meaning of risk was associated with space. Risk exposure was adjusted according to location-specific and geographic conditions. Gradually, risk became connected to time in the world of banking. Bankers retrieved key risk results within short time windows, during which they could make better choices that resulted in better business outcomes. Then risk expanded to a variety of other contexts involving uncertainty.

Risk is a modern concept. We are now living in a “risk society” where risk has become an embedded part of modern life (Beck, 1992). While humans have always been subjected to a level of risk (i.e., natural disasters), in modern societies people are exposed to risks that are the result of the modernization process itself (i.e., human activities) (Giddens, 2003). Being involved
in risk is a way of being involved in the world of modernity. The theory of risk society (Beck, 2006) discusses the increasing realization of the ubiquitous uncertainty in the current world. With the modernization process, a global community is gradually substituting smaller local communities. Globalization is breaking national boundaries and jumbling the foreign with the native together. People must find a way to get the meaning of life in the exchange with others (Beck, 2006). During this process, everyone is encouraged to become his or her own ‘risk manager’ who calculates how their choices and actions will affect their lives (Beck, 1992). As risk becomes more understood as necessary for freedom and choice, people have begun adopting risk management skills and taking risks on purpose in their lives, such as in careers, financial investments, and relationships. By embracing risk, school children like adults in the marketplace can self-govern and be governed to explore the possibility of being a choosing individual (Bialostok & Kamberelis, 2010).

Risk is a socially constructed phenomenon. It is not objective. In our daily lives, “risk” and “hazard” are often used interchangeably. However, they have different meanings. Hazard could be objectively defined, such as an attribute of the physical or social surroundings that could lead to harm, while risk is not viewed as an objective phenomenon. Lupton (1999) argued that it was inappropriate to view risk as a quantifiable and objective danger. It is a situation or event where something of human values, including human beings themselves, has been put at stake and the outcome is uncertain (Boholm, 2003). This view is based on the assumption that daily life is characterized by uncertainty which brings unexpected pains. Aven and Renn (2009) integrated epistemological component into the definition of risk. They argued that the existence of risk was dependent upon the person who assessed the risk in contexts. The probability of a possible outcome occurring varied by individuals (Gladwin, 2008).
Risk connects the present and the future. It is dynamic. Sociological research about individuals in a “risk society” focuses on multiple effects of radically changed life-span expectations and experience during youth-adult transitions. People must use current resources that help them face unpredictable opportunities and changes in the future (Beck & Willms, 2004). In the ever-changing systems of exchange, what an individual chooses or does not will make a difference and thus influence the shape of his or her future. People constantly deal with uncertain conditions. Different results may in turn form their following reactions to risks (Grubb & Lazerson, 2004). In summary, risk is a modern concept. It is a socially constructed event or situation that involves uncertain outcomes. How people in the event or situation perceive the risk and the outcomes influence their following behaviors.

**Inevitable, Uncertain, and Essential Risk-taking Behavior**

Adams (2001) identified a variety of forms of risk, such as physical risk, intellectual risk, social risk, and economic risk. In childhood, physical risk is dominant. Risk-taking behavior in childhood is generally defined as a leap into the unknown (Davis & Wolff, 2015). Such unknown as risk, whether good or bad, are inevitable from birth. With a toddler’s first step, he is taking the risk of stepping out into the world. When a preschooler enters her new class for the first time, she is taking the risks of separating from her parents. When a young child climbs on the monkey bars, he is taking the risks of falls. When an adult drives, he is taking the risk of a car crash. In modern societies, although undoubtedly some groups of children are regarded more ‘at risk’ than their peers, the concept of risk has been applied to all children (Beck & Beck-Gernsheim, 1995; Munro, 2007; Parton, 2006). It seems that no child is now considered to be ‘safe’ because of a rapidly increasing number of unsafe features (e.g., food, pollution, media, crime) of modern life (Lee, Macvarish, Bristow, 2010).
Risk-taking behaviors do not necessarily equate to bad behaviors. Rather, risk-taking behaviors encompass multitudinous behaviors from adaptive behaviors (e.g., climbing on monkey bars, financial investment) to maladaptive behaviors (e.g., unprotected sex and reckless driving) (Blanks, 2010). Modern parents have high expectations on safety and protection of their children. Parents’ anxiety perceives many adaptive behaviors as ‘maladaptive’. With increasing fears (e.g., traffic accidents and stranger-dangers), many parents are not comfortable allowing their children play around the neighborhood alone and thus limit their outdoor play opportunities and space. A report from Ministry of Transport in New Zealand (2008) reveal that the area in which children are able to travel on their own has shrunk to one-ninth of its size of the previous generation. Almost half of U.S. preschool-aged children are not being taken outside to play by a parent on a daily basis (Tandon, Zhou, & Christakis, 2012). While 70% of U.S. mothers had daily outdoor free play when they were young children, only 31% of them reported their children did the same (Clements, 2004).

Moreover, risk-taking behaviors do not necessarily equate to negative outcome (Little, 2000). Risk-taking behaviors lead to uncertain consequences in which there are some probability of undesirable results as well as rewards (Blanks, 2016; Boyer, 2006). Although taking risks probably result in physical or mental pains, children gain and grow through risk-taking behavior. Particularly for young children, they have not had enough experience to know what is safe and what is not. They keep encountering unknown and experiencing uncertainty during which they strengthen their muscles, refresh their concept of what they are capable of, and accumulate understanding of the world (Jones, 2012).

Childhood risk-taking behavior is essential for development. A willingness to take risks is an important part of learning and development (Little, 2010). The ability to assess and manage
risks in adulthood is not something that individuals could simply obtain as a result of physical maturation. It is a skill that is learned through constant exposure to uncertain situations and unknown outcomes over time (Jones, 2007). Both parents and teachers acknowledge that children learn from their actual experience more than from being directly told about ‘should do’ things and ‘should not do’ things (Niehues, Bundy, Broom, & Tranter, 2016). In addition, a key component of happiness and well-being involves harmony, that is, the balancing of opposites, such as negative (fear) with positive emotions (joy) and loss with rewards brought by engaging in risk-taking behavior.

The majority of the extant studies focused on risk-taking behaviors with adverse results only, such as delinquency and externalizing behavior problems (Cambell, Shaw, & Gillion, 2000). It is important and interesting to have more research to get a better understand about two-sided risk-taking behaviors in early childhood.

**Three Perspectives of Risk-taking Behavior**

Taking risks is a developmental acquisition. The form of risk-taking behavior changes over the whole life (Blanks, 2016). The earliest risk-taking behavior is primarily characterized by physical risks (Morrongiello, Kane, McArthur, & Bell, 2012). Young children begin to interact with and learn from their environment through physical movements (e.g., climbing, jumping, running, riding) which trigger parents’ concern about whether those behaviors are safe (Morrongiello, Corbett, & Bellissimo, 2008). With the transition to schooling, risk-taking behavior begin to involve more school related and social risks (Blanks, 2016). In terms of both breadth and frequency, there is a prosperous looking of risk-taking behavior during adolescence. Health related and sexual risk-taking behavior become predominant (Steinberg, 2010). Accordingly, the majority of theories and research studies about risk-taking behavior have
focused on this time period. Then, the levels of risk-taking behavior gradually decline as adolescents enter their adulthood. At the same time, the forms of risk-taking behavior qualitatively change. Risks begin appearing in occupational and financial contexts (Lam & Ozorio, 2013).

From different perspectives, there have been theories, framework, and studies applied to explain risk-taking behavior. Those theories, framework, and studies come from three perspectives, psychobiological, social, and cognitive.

First, psychobiological studies emphasize biochemical and neurological processes that play a role in enhancing sensation seeking and proclivity of individuals’ risk-taking behavior (Diclemente, Hansen, & Ponton, 1996; Nelson, Bloom, Cameron, Amaral, Dahl, & Pine, 2002; Spear, 2000b). Research suggest that increase in androgenic hormones (Arnett, 1992), excitatory dopamine (Steinberg, 2008), and myelination (Paus, 2005) contributes to sensation seeking and risk-taking behavior. Those psychobiological changes suddenly accelerate during childhood and adolescence, which account for the physical maturation (Caspi, Lynam, Moffitt, & Silva, 1993) and the boom of sensation seeking and risk-taking behavior in this period. The increase of both sensation seeking and risk-taking behavior is more related to the psychobiological age than the chronological age (Martin, Kelly, Rayens, Brogli, Brenzel, Smith, et al., 2002). For example, increasing risk-taking behavior between childhood and adolescence is directly linked to changing patterns of dopaminergic activity around the time of puberty (Steinberg, 2008).

Second, theories of social development emphasize the importance of parents, peers, and teachers in childhood and adolescent risk-taking behavior. Parents are the first and important part of developmental contexts for individuals. Parents have a fundamental responsibility to protect children to be safe and support them to develop. Research (Guldberg, 2009) indicated that
parenting in contemporary societies is more complicated than ever before in terms of their role in children’s growth, academic pressure, and exposure to harmful environmental and social factors. Parents intentionally create environments to balance their children’s safety with challenge and help them assess possible outcomes of potential risk-taking behaviors to make appropriate decision (Kahneman, 2011).

As children grow, they spend increasing amount of time with peers. Adolescents’ experiences in peer relationships influence the form and the frequency of their risk-taking behavior (Miller-Johnson, Coie, Maumary-Gremaud, Lochman, & Terry, 1999). Negative friendships are significantly associated with substance use, delinquency, and risky sexual behavior. These maladaptive behaviors occur due to that adolescents are trying to release or overcome their negative feelings as a result of high peer conflict and low intimate relationship (Brady, Dolcini, Harper, & Pollack, 2009).

Teachers also affect risk-taking behavior of individuals. Nowadays, teachers may fear that they would be blamed for uncertain outcomes of students and thus limit students’ access to risk-taking opportunities. Sometimes, teachers simply choose for their students not to take a chance (Niehues, Bundy, Broom, & Tranter, Ragen, &Engelen, 2013).

Third, cognitive theories indicate that with the growth of information processing speed, memory retention and capacity, and reasoning skills improve with age, risk-taking behaviors decrease with age (e.g., Boyer, 2006; Deloache, miller, & Pierroutsakos, 1998). Health belief model (Janz & Becker, 1984) explained and predicted health related behavior change. This model includes six theoretical constructs that determine one’s health-related behavior. A study (Hao & Hsueh, 2018) in light of the Health Belief Model (Janz & Becker, 1984) found that children’s risk-taking behavior was influenced by their own evaluation of risks and safety
knowledge. With more safety knowledge and more risky evaluation, children were less likely to exhibit risk-taking behavior.

Protection Motivation Theory (Plotnikoff & Trinh, 2010) as an extension of Expectancy-Value Theory (Eccles, 1983) was originally developed to understand fear appeals and how individuals cope with them. When confronted with a risk, two types of appraisals, threat and coping, work before making a decision. Threat appraisal refers to assessing probability of getting harm, and severity of the harm, and rewards of maladaptive behavior. Coping appraisal refers to assessing the effectiveness of adaptive behavior in removing possible harm, ability of performing the behavior, and costs of employing the behavior. This theory has been applied in both children’s self-protection (e.g., Niskar, Kieszak, Holmes, Esteban, Rubin, Brody, 1998; Olsen & Erlandsson, 2004) and parents’ protection for their children in risk-taking behavior (e.g., Beirens, Brug, van Beeck, Dekker, den Hertog, & Raat, 2008).

Moreover, cognitive theorists highlight individuals’ decision-making process in risk-taking behavior. Morrongiello & Lasenby-Lessard (2007) proposed a model of psychological determinants that potentially influence children’s decision-making in risk situations. Variables they identified existed at two levels. At individual level, there were individuals’ own factors (e.g., temperament, age, gender, and experience with an activity) and family’s factors (e.g., parents’ perception, household income, neighborhood). At group level, there were societal factors (e.g., community, society).

Adams’ (2001) risk “thermostat” model described that risk-taking decision was a result of balancing individuals’ propensity to take risks and their perception of danger. Risk-taking behavior is a balancing act between positive outcomes (e.g., rewards) and negative outcomes (e.g., accidents). Sandseter (2010) revised Adams’ (2001) model for preschool young children.
and took risk-taking behavior and its influential factors in a big contextual frame (i.e., culture). Reversal theory (Apter, 2007) captures individuals’ motivation, emotions, and personality in risk-taking behavior. On the one hand, people are scared of danger and injury. On the other hand, they seek fun. Such a scary-funny feeling brings excitement that individuals pursue in risk-taking behaviors.

In summary, the psychobiological perspective supports the role of individuals’ sensation seeking in their engagement of risk-taking activities. The social perspective emphasizes the importance of parents in young children’s risk-taking behavior. The cognitive perspective offers models of risk-taking behavior that explained the relations between risk-taking behavior and its influential factors. The current study drew upon the three perspectives (i.e., psychobiological, social, and cognitive) to take children’s sensation seeking and parents’ role into account. Sandseter (2010)’s model was used as a conceptual framework to build a model in order to examine the relations between young children’s risk-taking behavior and its three important factors (i.e., children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision).

**Three Factors of Young Children’s Risk-Taking Behavior**

The existing literature from the three perspectives (i.e., psychobiological, social, and cognitive) suggest that there are three factors that play a key role in daily risk-taking behaviors of young children. The three factors are children’s own temperament of sensation seeking, parents’ perception of risk, and parental supervision. Children’s temperament of sensation seeking and parental supervision have direct effects on children’s risk-taking behavior. Meanwhile, children’s temperament of sensation seeking may have an indirect effect on children’s risk-taking behavior via parental supervision. Parents’ perception of risk may also have an indirect effect on
children’s risk-taking behavior. However, the mediating role of parental supervision plays in the two indirect relations is not confirmed by the literature. In this section, I propose three hypotheses regarding the effects of the three factors on children’s risk-taking behavior after reviewing the literature.

**Children’s temperament of sensation seeking.** The first important factor that can predict how young children take risks is their temperament of sensation seeking. Temperament is defined as a biological basis of individual differences in reactivity and self-regulation; it is moderately stable across the lifespan (Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Kagan, Snidman, Kahn, Towsley, Steinberg, & Fox, 2007; Rothbart & Derryberry, 1981). Research findings indicate that the temperament difference relates to different structures of some parts of the brain (e.g., hypothalamus) (Kagan, 2006; Kagan & Snidman, 2004). Some children come into this world with high tentativeness and cautiousness, while others are born with a tendency to act in spontaneous, bold, and even impulsive ways (Davis & Eppler-Wolff, 2009). As children mature, higher cognitive skills allow children to better regulate their attentional activities and relative behavioral reactions in accordance to different contexts, which contribute to changes of temperament traits (Rothbart & Bates, 2006).

Sensation seeking as one aspect of temperament is highly predictive of young children’s engagement in risk-taking behavior. This temperament trait is characterized by a strong need for varied, novel, and intense experiences and sensation (Zuckerman, Eysenck, & Eysenck, 1978), which could be easily observable in early childhood (Haas, Hiemisch, Vogel, Wagner, Kiess, & Poulain, 2019). Sensation seeking consists of three dimensions. They are thrill seeking, novelty seeking, and behavioral intensity, which influence young children’s perception of danger and affect their propensity to take risks. Sensation seeking increases children’s willingness to take
physical risks or social risks (Boyer, 2006; Zuckerman & Kuhlman, 2000). Positively, high sensation seeking would support resilience of individuals through effective coping, which help them better cope with stress and adversity (McKay, Skues, Williams, 2018). Sensation seeking is also negatively associated with internalizing problem behavior, such as emotional symptoms and problems in peer relationships (Haas, Hiemisch, Vogel, Wagner, Kiess, & Poulain, 2019).

However, a higher level of sensation seeking often leads to a greater propensity to engage in risk-taking behaviors (Morrongiello & Lasenby-Lseeard, 2007), including violent video games (Jensen, Weaver, Ivic, & Imboden, 2011). In addition, high sensation seeking is associated with greater vulnerability to unintentional injury, aggressive behaviors, rule-breaking behaviors, and behavioral problems (e.g., inattention) in childhood (Charles, Mathias, Acheson, & Dougherty, 2017; Cui, Colasante, malti, Ribeaud, & Eisner, 2016; Haas, Hiemisch, Vogel, Wagner, Kiess, & Poulain, 2019; Jensen, Weaver, Ivic, & Imboden, 2011; Lasenby-Lessard & Morrongiello, 2011; Morrongiello, Sandomierski, & Valla, 2010). With a high level of sensation seeking, children may become bored if activities and experiences become less stimulating and more repetitive (Zuckerman, Mangelsdorff, Neary, Brustman, & Bone, 1972). According to the literature, I hypothesized that temperament of sensation seeking had a direct effect on young children’s risk-taking behavior. With a higher level of sensation seeking, children were more likely to have a higher level of risk-taking behaviors.

Parents’ perception of risk. The second important factor is parents’ perception of risk which influences children’s risk-taking behavior appears mainly via parental supervision. As the primary caregivers of children, parents’ concern and perception are necessary to examine. Taking risks in early childhood is associated with uncertain outcomes, including potential
dangers and possible benefits (Niehues, Bundy, Broom, Tranter, Ragen, & Engelen, 2013). This uncertainty brings a dilemma in parents’ perception of risk for their young children.

On the one hand, parental concerns for their children’s safety affect their decisions to discourage or restrict children’s involvement in activities with potentially risky or uncertain outcomes (Alaszewski & Coxon, 2008). If children know that their parents perceive a risk-taking behavior as dangerous that have a serious consequence or should be avoided, they may be less likely to exhibit such behavior (Sneed, Tan, & Meyer, 2015). Parents may worry about any negative outcomes due to the perceived risk, such as physical injury (Tranter, 2005). According to a survey on parents from 14 European countries, the top concern regarding safety of young children was being hit by a car. When asked why parents found it difficult to protect their children safety and keep them from unintentional injury, the most common answer was that they were not able to watch their children constantly (Vincenten, Sector, Rogmans, & Bouter, 2005).

On the other hand, many parents recognize the importance of allowing children to engage in risk-taking activities in which children can learn from their experience of either success or failure, test children’s physical capability, develop their problem-solving skills, practice social skills, and learn to weigh the benefits and costs of taking risks (Bundy et al, 2011; Cevher-Kalburan & Ivrendi, 2016). This experience can essentially contribute to children’s resilience, confidence, and autonomy (Little, 2010). Sometimes parents feel proud of their children who can meet rather than avoid challenges with uncertain outcomes or risks (e.g., climbing a tall slippery slide, singing in front of class, learning to ride a bicycle, dealing with broken friendship) (Niehues, Bundy, Broom, & Tranter, 2016).

Parents tend to tolerate the risks if they perceive as not seriously harmful but potentially beneficial to their children (Niehues, Bundy, Broom, & Tranter, 2016). In contrast, parents
would limit children’s behavior if they perceive the behavior as potentially harmful more than beneficial. For example, although New Zealand parents acknowledge multiple benefits to be gained from exposure to risks and challenges of outdoor play, they are concerned about road safety and fear “stranger danger”. As a result, they do not have much confidence to allow their children to roam outside. Research findings indicated that five- to twelve-year-old children were rarely allowed to play in the neighborhood without supervision of adults. Only four percent could go out alone after dark. Less than one third of children went to school alone (Jelleyman, McPee, Brussoni, Bundy, Duncan, 2019). In summary, parents adjust their supervision according to how they perceive risks in their children’s activities, which in turn impact children’s engagement in risk-taking behavior.

**Parental supervision.** Parental supervision which is the third important factor has been identified as the most effective method of injury prevention (Morrongiello, 2005). In early childhood, parents tend to supervise their children by staying close-by and on-hand when needed, instead of being directly engaged with their children in the activity (Guilfoyle, 2009; Pollack-Nelson & Drago, 2002). Studies have demonstrated that parental supervision based on their risk perceptions was significantly associated with children’s risk-taking behavior. For example, parents who reported more protectiveness, safety concerns, and alertness in supervision tended to have children who were less likely to engage in risk taking (Morrongiello & House, 2004). Similar to children’s temperament of sensation seeking, I hypothesized that parental supervision should had a direct effect on young children’s risk-taking behavior. Children with parents who had a higher level of supervision may have a lower level of risk-taking behavior.

Many researchers suggest that parents’ perception of risk influences parental supervision. However, to date, the findings of the relation between parents’ perception of risk and their
supervision are still mixed. Sometimes parents’ perception of risk and their supervision do not go hand in hand all the time with practices (Guilfoyle, 2009; Morrongiello & Lasenby-Lassard, 2007). The association between parents’ supervision and their perception of risk has not always been positive. For example, the unintentional risk parents are most concerned about for their children is road accidents. However, using a car seat is not the supervision method parents use to prevent unintentional injury to their children. Instead, what parents do most in their supervision is to keep household cleaners/medicines out of children’s reach. Inconsistently, poisoning is the last risk but one in parents’ perceptions (Vincenten, Sector, Rogmans, & Bouter, 2005).

Caregivers often have misperceptions of hazards and injury risk for their children. Parents perceived bedrooms, family rooms, and yards as low risk. They perceived bathrooms and kitchens as high risk. In fact, injury risk was low in the areas (i.e., bathrooms and kitchens) perceived by parents as high risk (Vincenten, Sector, Rogmans, & Bouter, 2005). When parents’ supervision increased in the areas, their perception of risk decreased (Guilfoyle, 2009).

However, the majority of the literature suggest that parents’ perception of risk is highly predictive of parental supervision which in turn affect children’s risk-taking propensity. Parental supervision may play a mediating role between parents’ perceptions of risk and young children’s risk-taking behavior. Parents’ perceptions of risk are important predictors of how they supervise their young children in the context with potential risks (Crnica, Mujkic, & Young, 2013; Morrongiello, Sandomierski, & Spence, 2014; Sneed, Tan, & Meyer, 2015). There is a positive association between parents’ perception of risk and parental supervision (Morrongiello, Sandomierski, & Spence, 2014).

Specifically, parents constantly supervise young children and engage in children’s activities if they think it is necessary, which in turn impacts how children behave in different
situations (Morrangiello, Klemencic, & Corbett, 2008). Sometimes, if parents do not think that their children are able to manage risks, or perceive their children as vulnerable to severe injury, they are likely to invest more effort in supervision (Browne, Lewis-Michl, & Stark, 2003). Other times, they estimate the likelihood of their children being injured by assuming that children can do just fine without being closely and constantly monitored. With different perceptions, they choose either protecting children or offering them appropriate risk-taking opportunities (Davis & Eppler-Wolff, 2009; Niehues, Bundy, Broom, & Tranter, 2016). For example, children were less likely to use recreational facilities in their neighborhood if their parents perceived the neighborhood area as unsafe (Galaviz, Zytnick, Kegler, Cunningham, 2016). There were more children aged five to 13-year old being at home alone if their parents perceived their neighborhoods as safe than other children in the U.S. even if few children at these ages stay at home alone (Casper & Smith, 2002; Casper & Smith, 2004). Therefore, I hypothesized that parental supervision played a mediating role between parents’ risk perception and young children’s risk-taking behavior.

Besides parents’ perceptions, children’s temperament influences parental supervision which in turn impact children’s risk-taking behavior. Parental supervision may play a mediating role between children’s temperament of sensation seeking and their risk-taking behavior. Many parents adjust their supervision based on their children’s temperament. In a family with a few siblings, a parent can supervise one child more than the other (Morrangiello, Corbett, McCourt, & Johnston, 2006b). For example, one study shows that parents exhibit a higher level of supervision for their children with difficult temperament, by giving close attention, staying in proximity, and maintaining continuous supervision. (Schwebel, Brezausek, Ramey, & Ramey, 2004). Given the hypothesized effect parental supervision had on children’s risk-taking behavior,
I proposed another hypothesis that parental supervision played a mediating role between young children’s temperament and their children’s risk-taking behavior. However, there was little empirical evidence of the mediating role parental supervision plays in the relation between children’s temperament of sensation seeking and their risk-taking behavior. This role was even less clear when the influence of parents’ risk perception on parental supervision was taken into account.

In recent work, Sandseter’s (2010) framework conceptually linked parents’ role as a mediator to children’s temperament of sensation seeking and to their risk-taking behaviors in preschool age. Extant literature both conceptually and empirically linked parental supervision to their risk perception and children’s risk-taking behavior to parental supervision. Nevertheless, to date there has been not a more comprehensive model linking all the three factors with young children’s risk-taking behavior. Empirical research was needed to identify such a model in order to get a better understanding of childhood risk-taking and its associations with the influencing factors. The current study drew upon empirical research and Sandseter’s (2010) framework to propose and test a model consisting of relations between young children’s risk-taking behavior and its three factors, such as children’s temperament of sensation seeking, parents’ risk perception, and parental supervision. Accordingly, three hypotheses were proposed. First, children’s temperament of sensation seeking and parental supervision should have direct effects on children’s risk-taking behavior. Second, parental supervision should mediate the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior. Third, parental supervision should mediate the effect of parents’ risk perception on young children’s risk-taking behavior.
Young Children’s Risk-Taking Behavior across Societies

Risk-taking behavior in early childhood receives increasing attention in the contemporary research (Little, 2006). Many researchers define risks as uncertainties as a construct of everyday life. They argue that the ways people perceive risks and the decisions they make to deal with those risks in everyday lives are determined by their socio-cultural contexts (e.g., Douglas, 1992; Henwood, Pidgeon, Sarre, Simmons, & Smith, 2008; Lupton, 1999; Niehues, Bundy, Broom, & Tranter, 2016; Zinn, 2015). What is perceived as risk and how risk is perceived vary by the countries because societal beliefs, customs, norms, and values regard certain activities and experiences more hazardous or risky than others, suggesting possibly different perception of the society (Gierlach, 2009). The extant literature suggest that society plays an important role in the three factors of children’s risk-taking behavior: children’s temperament, parents’ risk perception, and parental supervision. In the next section, I discuss the importance of examining the associations of children’s risk-taking behavior across societies.

Temperament across societies. Cross-societal variations in temperament have been well demonstrated over the past several decades (Odden, 2009). The Australian Temperament Project (Prior, Garino, Sanson, & Oberklaid, 1987) conducted a longitudinal study to compare native-born Anglo-Australian and immigrant children and found that the former was more approaching, more adaptable, and less distractible than the latter. Lewis, Ramsay, and Kawakami (1993) found Japanese infants were less reactive in general situations and less likely to cry to inoculation than American infants. The similar difference was found between Chinese infants and American infants, with Chinese infants less reactive than American infant (Kagan, Arcus, Snidman, Wang, Hendler, & Greene, 1994).
The significant societal differences in performances related to temperament also have been found in older children. Chinese children were described as more controlled, shyer, less active, and less impulsive than children in the U.S. (Ahadi, Rothbart, & Ye, 1993). Thai parents of school children reported more concerns about low energy, low motivation, and forgetfulness, whereas European American parents of school children were concerned more about aggression and hyperactivity (Weisz, Suwanlert, Chaiyasit, Weiss, Walter, & Anderson, 1988). In line with the population differences in temperament, Asian adults show a lower level of limbic arousal and physical activity than European American adults (Lin, Poland, & Lesser, 1986).

Children develop as they participate in daily activities within their society (Rogoff, 2003), during which parents construct physical and social settings as well as cultural values and expectations. Parents let children develop and maintain certain temperament traits by valuing some behavioral characteristics not others through physical, affective, didactic, and symbolic communications (Cervera & Mendez, 2006). For example, Japanese emphasize the need for helping their child become integrated into the larger group (Tobin, Hsueh, & Karasawa, 2009; Schooler, 1996). Japanese parents are likely to encourage a close relationship, provide lulling, and thus have a passive and quiet child in comparison to American parents. A primary goal of American culture, in contrast, is to assist independence of their children (Tobin, Hsueh, & Karasawa, 2009). American parents support individual activity and expression with this goal. Correspondingly, American children are found as more physically and verbally active (Super & Harkness, 2010). Compared to American societies, Chinese society values obedience so that Chinese parents are more likely to direct their child’s attention and instruct the child’s behavior in activities (Tobin, Hsueh, & Karasawa, 2009; Super & Harkness, 2010). Accordingly, infants
from China focus more on the actions than the particular objects in comparison to U.S. infants (Waxman et al., 2016).

**Parents’ perceptions of risk across societies.** Not just do children appear to show different temperamental tendencies across societies, but also adults’ perception in different societies appear to perceive risks differently. For example, Kleinhesselink and Rosa (1991) compared 81 risks in Japanese and American perceptions. They found that Japanese perceived drugs, food, and transportation more as risks while American rated crime more as risks. Another study showed that Chinese and Arabic parents perceived the road environments as being significantly less dangerous for their children than the Vietnamese and Australian parents (Lam, 2005). In the United Kingdom, the United States, and New Zealand, parents perceive the neighborhood as a very risky place where young children may be kidnapped by strangers (Adams, 2011; Elkind, 2007; Freeman & Tranter, 2010; Furedi, 2002; Gill, 2007; New Zealand Family Violence Clearinghourse, 2009).

A study conducted in 14 European countries (Vincenten, Sector, Rogmans, & Bouter, 2005) examined parents’ perception of child safety. When asked what the risks parents are most concerned about for their young children, the top three varied significantly across countries. Ireland parents were concerned about being hit by cars, car accidents while in a car, and choking on small candies or toys. French parents were about falls, burns, and poisoning from household medicines and cleaners. For the sources of information on child safety that may influence parents’ perception, television was considered as the primary source in Portugal and Spain while own family members were mentioned most in Germany and France.

**Parental supervision across societies.** Correspondingly, the different perceptions of parents across societies have impact on how parents supervise their children. When asked what
parents would do to prevent their children aged 5 or under from unintentional injury. Germany parents would say ‘Keep household cleaners/Medicines out of reach’, ‘Use Electricity socket guards’, and ‘Use a car seat’, while Belgium parents would say ‘Watch children while playing’, ‘Watch child in the bath’, ‘Keep an eye on them while cooking’ (Vincenten, Sector, Rogmans, & Bouter, 2005). Recent research results from 61 national population-based surveys (Ruiz-Casares, Nazif-Muñoz, Iwo, & Oulhote, 2018) revealed a significant difference in prevalence of letting children stay at home alone. Europe and Central Asia had a very low prevalence of children at home alone for more than three days per week. All countries in these regions had values lower than 1%. The lowest rate was in Serbia (0.1%). However, countries of the West and Central Africa exhibited a very high prevalence of children at home alone. Among these countries, the lowest rate was in Sao (7.5%) and the highest was in Chad (35.3%).

In the United Kingdom, the United States, and New Zealand, children’s play in neighborhood without adult supervision has sharply decreased in the past two to three decades (Adams, 2011; Elkind, 2007; Freeman & Tranter, 2010; Furedi, 2002; Gill, 2007; New Zealand Family Violence Clearinghouse, 2009). Different from the above countries are Germany and Japan where children are more independent in their experience with far fewer restrictions on outdoor activities than their U.K., U.S. and New Zealand counterparts (Hillman, Adams, & Whiteleg, 1990; Freeman & Tranter, 2010; Burke, 2013). New Zealand adults used to allow young children to use adults’ tools, which surprise Japanese adults who likely rate using adults’ tools as risky for young children (Rohrmann, 1996; Smith, 1998). Compared to American parents, Chinese parents exert more control over children (Ng, Pomerantz, Deng, 2014).

In summary, children’s temperament, parents’ perception of risk, and parental supervision were contingent upon societal influences. However, the effect of society on the
associations between the factors and young children’s risk-taking behavior still remained unclear, such as whether parental supervision actually followed parents’ perception of risk in children’s activities. In addition, we had not known how variations in parental supervision by children’s sensation seeking influenced children’s risk-taking behavior. Even less clear was that how society played a role in the relations taken together. It would be necessary and interesting to examine the relations of young children’s risk-taking behavior in different societies in order to get an understanding of early childhood risk-taking behavior at the societal level.

Present Study

This study drew upon multiple theoretical perspectives (i.e., psychobiological, social, and cognitive) of risk-taking behavior as the theoretical base. Sandseter’s (2010) conceptual framework of young children’s risk-taking behavior would be adopted in the current study to propose a model and to test the associations between young children’s risk-taking behavior and its three key factors (i.e., children’s temperament of sensation seeking, parental perception of risks, and parental supervision) in Chinese and the U.S. samples.

For this research that focused on risk-taking behaviors of preschool-aged children, Sandseter’s (2010) conceptual framework offered a more appropriate approach. Previous models were available that examined risk-taking behavior (e.g., Amett, 1992; Baumrind, 1987; Furby & Beyth-Marom, 1992; Jessor, 1991), their focus on delinquency or risk-taking behavior in adolescence (e.g., drug use, alcohol consumption, and substance use) was not relevant to the risk issues in early childhood (three- to six-year old) (Morrongiello & Lasenby-Lessard, 2007). Additionally, Sandseter’s (2010) conceptual framework supports the mediating role that adult caregivers play between children’s characteristics and their risk-taking behavior. Adults are depicted as an intermediate from children’s sensation seeking to their risk-taking action.
Sandseter believes that children’s risk-taking decisions were influenced by their supervising adults’ evaluations of risky situations and their decision to act upon children’s risk-taking. Sandester (2010) also places the relations between children’s sensation seeking, adults’ role, and children’s risk-taking behavior within a large socio-cultural frame to visualize the importance of the society in which children live and act.

The current study had two purposes. The first one was to propose a model that examined how children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision impacted young children’s risk-taking behavior (Figure 1). To achieve this purpose, this study had three hypotheses to test. The first hypothesis was that children’s temperament of sensation seeking and parental supervision should have direct effects on children’s risk-taking behavior (H1: direct effect hypothesis). The second hypothesis was that parental supervision should mediate the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior (H2: supervision-mediates-temperament hypothesis). Similarly, the third hypothesis was that parental supervision should mediate the effect of parents’ risk perception on young children’s risk-taking behavior (H3: supervision-mediates-parental perception hypothesis).

The second purpose was to understand, through a comparative analysis, the relations among the three key factors above and young children’s risk-taking behavior between two different societies, China and the U.S. As discussed above, children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision of children’s activities are thought to differ significantly from country to country. Thus, this study hypothesized that the model varied by country including all the key factors (i.e., children’s temperament of sensation seeking,
parents’ risk perception, and parental supervision) and young children’s risk-taking behavior (H4: country variation hypothesis).

In order to test the hypotheses, the survey-based study used path analyses as the analytic method to examine and compare the models based on samples of China and the U.S. Path analysis is a single-indicator technique that best examines a model when there is just a single observed measure of each factor (Kline, 2010). Meanwhile, this study included a follow-up semi-structured interview with Chinese and U.S. participating parents regarding how children’s sensation seeking tendency and parents’ own risk perception influenced parental supervision in children’s risk-taking behavior. Data were collected to get an in-depth understanding and interpretation of the findings from the path analyses.

![Figure 1 Model of Young Children’s Risk-taking Behavior](image-url)
Chapter Two Method

Participants and Procedures


Chinese participants were recruited from the city C. U.S. participants were recruited from the city U. Both city C and city U are located in the mid-east region in their countries. Income per capita of the two cities were below each country’s average. In 2016, the per capita disposable income in the U.S. was $42,049, while it was $24,243 in city U (U.S. Census Bureau, 2016). The per capita disposable income in China was 23,821RMB (about $3,665) (National Bureau of Statistics of China, 2017), while it was 16,607RMB (about $2,442) in city C (Kaifeng Statistical Bureau, 2017). In addition, education level of the two cities were below each country’s average. In the U.S. there were 88% of the population that graduated from high school or higher degree while there were 85% in city U (U.S. Census Bureau, 2016). In China, there were 24% of the population that graduated from high school or higher degree (National Bureau of Statistics of China, 2011), while there were 19% in city C (Kaifeng Statistical Bureau, 2011).

City C, China. Chinese parents and children were recruited from one public kindergarten and one private kindergarten in city C. The final Chinese sample consisted of 106 parent-child dyads. The average age of children was 59.39 months (SD = 5.29), ranging from 48 to 71 months (45.28% girls) at the time of testing. All children were native Chinese speakers. The average age of parents was 35.02 years (SD = 3.54), ranging from 25 years to 44 years (75.47% mothers). All of the parents were main caregivers of their children.
City U, the United States. U.S. Parents and children were recruited from four preschools and eight childcare centers in city U. The final U.S. sample consisted of 108 parent-child dyads. The average age of children was 57.80 months (SD = 6.96), ranging from 48 months to 75 months (49.07% girls) at the time of testing. The majority of the U.S. participants were European American (54.63%) while the other participants included African American (28.70%), and Asian (11.11%), Hispanic (3.70%), and Mexican (1.85%). All children spoke English fluently. The average age of parents was 36.29 years (SD = 4.77), ranging from 25 years to 49 years (84.26% mothers). All of the parents were main caregivers of their children.

Measures

Four instruments were used to measure children’s risk-taking behavior and the other three factors (i.e., children’s temperament of sensation seeking, parents’ perception of risk, parental supervision). All instruments originally were in English. A four-member research team translated and back-translated the instruments to ensure the comparability of the English and Chinese versions. In China, all tasks were given in Chinese. In the U.S., all tasks were given in English.

Children’s temperament of sensation seeking. The Sensation Seeking Scale for Young Children (SSSYC, Morrongiello, Sandomierski, & Valla, 2010) was used to measure children’s temperament of sensation seeking. The questionnaire consisted of 27 items (Appendix B). Each item showed a scenario with options A and B from which the parent selected the one that best described his or her child. In an item of swimming pool scenario, for example, one option indicated high sensation seeking (e.g., Jump into the swimming pool) while the other option indicated low sensation seeking (e.g., Slowly get into the swimming pool). Parents selected one option that his or her child preferred in this scenario. The high-sensation-seeking option scored 1 and the low-sensation-seeking option scored 0. The total number represented the child’s
temperament of sensation seeking level. Cronbach’s alpha of this scale was .84 (Morrongiello, Sandomierski, & Valla, 2010).

**Parents’ perception of risk.** Parental risk perception entailed two dimensions: Perception of injury likelihood and perception of potential injury severity (Brown, Roberts, Mayes, & Boles, 2005). The current study took both dimensions into account. Injury Behavior Checklist (IBC, Speltz, Gonzales, Sulzbacher, & Quan, 1989) listed 17 common physical risk-taking behaviors in children 2 to 5 years of age. The parent answered a pair of questions for each risk-taking behavior listed in the IBC, one question about injury likelihood of target behavior and the other about potential injury severity of the target behavior (Appendix B).

The dimension of perception of injury likelihood, e.g., “How likely does your child get injured if …?” was measured with a 4-point scale (0 = not at all likely, 3 = very likely). Then, the dimension of perception of potential injury severity, e.g., “How serious is that injury?” was measured with a 5-point scale (0 = not serious at all, 4 = very serious). For example, for the risk-taking behavior jumping off furniture, parents answered the first question, “If your child jumps off furniture or other structures, how likely is injury to occur?”, in the dimension of perception of injury likelihood. Then parents answered the second question, “If injury occurs, how serious is that injury?”, in the dimension of perception of potential injury severity. There were 17 questions for each of the two dimensions. The scores of two dimensions were added to a total score indicating a parent’s risk perception, with a higher score representing a higher level of risk perception, as parents viewed behaviors riskier. Cronbach’s alpha of this scale was .84 (Damashek, Borduin, & Ronis, 2014).

**Parental supervision.** The Parent Supervision Attributes Profile Questionnaire (PSAPQ; Morrongiello & House, 2004) was used to measure parental supervision for preschool children.
This study used 14 items (e.g., I let my child learn from himself/herself without constant supervision.) from the PSAPQ (Appendix B) with a 5-point scale (0 = Never, 4 = All the time). The total score of 14 items represented parental supervision level.

A higher total score indicated a higher level of supervision, including more attention, closer proximity, and stronger continuity. That is, parents most of the time had attentive and proximate behaviors to prevent their child from potential risks in order to keep them safe. With a low level of tolerating their child to get close to risk, they perceived their child highly likely to get injured and so to need adults' constant protection, and strongly believed that their child's injuries can be prevented by caregivers' efforts. A medium total score would be parents who sometimes had attentive and proximate behaviors to prevent their child from risk in order to keep them safe. With a middle level of tolerating their child to access to risk, they perceived their child to probably get injured and so to need adults' protection from time to time, and partly believed that their child's injuries can be prevented by caregivers' efforts. A lower total score indicated less attention, farther proximity, and weaker continuity. Specifically, parents had attentive and proximate behaviors to prevent their child from potential risks. They had a high level of tolerating their child to access risk, perceived their child to not likely get injured and so not to need adults' protection, and tended to believe that their child's injuries were a matter of fate which could not be controlled by human's effort.

Cronbach’s alpha of this scale was .91 (Damashek, Borduin, & Ronis, 2014). This questionnaire has shown high reliability and validity in several studies (e.g., Morrongiello & Corbett, 2006; Morrongiello, & Schell, 2009; Petrass, Blitvich, & Finch, 2009).

**Children’s risk-taking behavior.** Balloon Analogue Risk Task for Youth (BART-Y, Lejuez et al., 2007) was used to assess young children’s risk-taking behavior level. The BART-Y
was a computerized task in which a red simulated balloon and a pump were displayed on the screen along with a measure of the child’s progress. The task contained 15 balloons in total. The child would learn that each mouse click pumped up the balloon to make the balloon larger and the child earned a point. The points for each balloon could be added to an overall prize displayed as a ‘prize meter’. The child received a prize at the end of the task based on the length of the ‘prize meter’. The balloon might explode at any additional click. In this case, the earned points for that balloon would be lost. Before each click, the child had to decide whether it was time to stop clicking to avoid losing the earned points or continue clicking to increase the points at the risk of bursting the balloon, thus losing all the earned points. This is a typical risk-taking behavior. Individuals need to make a decision of uncertain outcome. During this process, children have to keep balancing between positive outcomes (i.e., rewards) and negative outcomes (i.e., loosing points).

The average number of pumping clicks across all the balloons that did not burst indicated the young child’s risk-taking level (Lejuez et al., 2007; Morris, Hudson, & Dodd, 2014). A higher average number of clicks represented a higher level of risk-taking behavior. The validity of the BART-Y has been assessed. The association between individuals’ performance in BART-Y task and their real-world risk-taking remained significant even after controlling for demographic variables and children’s temperament (e.g., Lejuez et al., 2007). A longitudinal study using this task examined human participants ranging between eight to twenty-seven-year old. It showed that the laboratory risk-taking via this computerized task shared the same changing pattern with nucleus accumbens activity over time (Braams, van Duijvenvoorde, Peper, Crone, 2015). The nucleus accumbens is significantly associated with the real-life risk-taking behavior (Eaton et al., 2012). Several studies adopted the BART-Y to measure risk-taking
behavior among preschool-aged children as young as four (e.g., Lahat et al., 2012; Morris, Hudson, & Dodd, 2014). A Cronbach’s alpha of .78 showed that the internal consistency of the BART-Y was acceptable (Lejuez et al. 2007).

Data Collection

The procedures in city C and in city U remained the same as follows. On the first day of data collection, at the pickup time of kindergartens/preschools/childcare centers, classroom teachers gave parents a sealed envelope with a Parental Consent Form (Appendix A) with a question about their willingness to take part in a follow-up interview. In the envelope, they also received a battery of paper-and-pencil questionnaires (Appendix B) for obtaining children’s demographic information, assessing measures of child’s temperament of sensation seeking, parents’ risk perception, and parental supervision. Parents returned the signed form and the completed questionnaires to the classroom teachers the next day if they allowed their children and themselves to participate in the study.

With their Parental Consent Form being signed, preschoolers were verbally asked to assent for their own participation. They took part in a risk-taking behavior measure (i.e., the Youth Version of Balloon Analogue Risk Task (BART-Y), Lejuez, Aklin, Daughters, Zvolensky, Kahler, & Gwadz, 2007) in a quiet room at their own kindergarten/preschool/childcare center. Each child used about 5 minutes to complete the BART-Y task on a computer to assess their level of risk-taking behavior.

According to scores children obtained in the BART-Y task, they were categorized into three levels of risk-taking: low, mid, and high. Three parents from each of the three levels in each city would be contacted for a follow-up interview. Thus, nine Chinese parents and nine U.S. parents participated in the interviews individually. They chose time and locations of convenience
for the interviews. Audio recorded interviews lasted between 45 and 90 minutes. The interviews were transcribed either by the author or paid transcribers.

Attributes sorting was adapted as a prelude to the interviews. Sorting attributes as an exploratory method has been used in qualitative studies to facilitate parents’ reflection on their perception and supervision of children’s risk-taking activities (Moores, Akhurst, & Powell, 2000, Niehues, 2014; Rugg & Mc George, 2005). There were 20 attributes (e.g., confident, companionate) printed on a page (Appendix C). At the beginning of the interviews, parents were asked to sort the attributes they desired most for their children and then provide reasons of their top three selections. There were two reasons to use attribute sorting in the interviews. First, attribute sorting was the opening of the interviews, followed by some interview questions. The warm-up activity let parents quickly enter the interview context. Second, attribute sorting asked parents to identify what they desired most for their child. It helped parents represented some fundamental ideas underlying their parenting because in daily life parents had few opportunities to articulate their parenting philosophy. Parents could rely on their choices to continue to dig their thinking and reasons of their supervision behavior.

After attribute sorting, parents were asked initial questions in relation to their general perception and supervision of children’s risk-taking behavior. The initial interview questions (e.g., “What do you think about risk-taking behavior in your child’ development?”) were adapted from Sydney Playground Project (Niehues, Bundy, Broom, & Tranter, 2016). The interview protocols included 10 questions (Appendix C). The questionnaires parents filled also was an important source to trigger more interview questions.
Data Analyses

The analysis procedure of this study included preliminary analyses and model analyses. Preliminary analyses were conducted to examine basic relations of demographic characteristics and study variables for each sample and between the two samples. Path analyses were used to address the four hypotheses of this study by examining the model for each sample and then for both samples.

Preliminary analyses. There were four steps in preliminary analyses for each sample. First, normality of each of the four study variables (i.e., children’s temperament of sensation seeking, parents’ perception of risk, parental supervision, and children’s risk-taking behavior) was tested. Second, Chi-square test was used to examine whether there was any significant difference in the distribution of the children across demographic characteristics (i.e., children’s age, children’s gender, ethnicity, parents’ age, parents’ education, and household income).

The third step was to use Multivariate Analysis of Variance (MANOVA) tests to evaluate mean differences of the four variables by three important demographic characteristics (i.e., children’s gender, parents’ education, and household income). Research showed that children’s gender (Christensen & Mikkelsen, 2008), parents’ education and household income (Hong et al., 2008) could exert great impact on children’s risk-taking behavior. It was reasonable to examine whether the four study variables vary with respect to children’s gender, parents’ education, and household income within each country. Fourth, correlation analysis was used to test the associations between the four study variables.

Between the two samples, MANOVA tested the mean difference of each of the four factors between the two samples. IBM SPSS Statistics 26 was used for the preliminary analyses.
**Path analyses.** Path analyses were used to examine the model (Figure 1) separately for city C and city U in order to test the first three hypotheses. The first hypothesis was that children’s temperament of sensation seeking and parental supervision should have direct effects on children’s risk-taking. The second hypothesis was that parental supervision should mediate the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior. The third hypothesis was that parental supervision should mediate the effect of parents’ risk perception on young children’s risk-taking behavior. The model contained three exogenous or independent factors: children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision and one endogenous or dependent factor: children’s risk-taking behavior.

Next was a multiple-group comparison of the model between city C and city U in order to test the fourth hypothesis which was that the model varied by country including all the key factors (i.e., children’s temperament of sensation seeking, parents’ risk perception, and parental supervision) and young children’s risk-taking behavior.

LISREL 9.1 was used for the model analyses. Model fit was assessed by using the criteria set by Aldea and Rice (2006) as informed by model fit Chi-square, the comparative fit index (CFI > .90), the standardized root mean square residual (SRMR < .08), the root mean square error of approximation (good fit RMSEA < .06 or .06< fair fit RMSEA < .08), and the lower bound of 90 percent confidence interval for the root mean square error of approximation (RMSEA < .10).

**Analysis of interview data.** Interview data allow the researcher to simply ‘give voice’ to their participants (Braun & Clarke, 2006). The role of the interview data was to determine whether the interview data captured something important in relation to the overall purposes. By
adapting the phases of thematic analysis (Braun & Clarke, 2006), Two researchers completed the
process of reading, coding, and interpreting the transcripts. They read and re-read the transcripts
in order to become familiar with the transcripts and aware of patterns that occur. Then, they each
generated the initial codes by registering interesting features of the data before meeting with each
other to discuss the coding issues in order to reach a consensus. Interview data were integrated
in the sections of results and discussion, with the purpose of explaining or expanding the
quantitative findings when appropriate.
Chapter Three Results

Preliminary Analyses

City C, China. Data ($N = 106$) were checked for normality across the four study variables. Results showed that all study variables met univariate normality, temperament of sensation seeking (skewness = .30, kurtosis = -.37), parents’ perception of risk (skewness = -.31, kurtosis = -.34), parental supervision (skewness = -1.10, kurtosis = 1.54), children’s risk-taking behavior (skewness = 1.84, kurtosis = 4.01).

In the following analyses, all demographics were treated as categorical factors. Children’s age was created as a dichotomous variable (i.e., four-year-old and five-year-old). Parents were categorized into ‘young’ or ‘old’ according to whether they were older than the average age (i.e., 35-year-old). City C parents’ education was combined into three categories (i.e., 25.47% lower than college, 37.74% college, and 36.79% higher than college). Due to the fact that the first two income categories, ‘lower than 30,000RMB’ and ‘30,000 - 60,000RMB,’ occupied relatively small portions (1.89% and 14.15% respectively), household income was combined into three categories (i.e., 16.04% lower than 60,000RMB, 55.66% 60,000 – 120,000RMB, and 28.30% higher than 120,000RMB).

Results of Chi-square analyses revealed no significant association across the demographic variables (i.e., children’s age, children’s gender, children’s ethnicity, parents’ age, parents’ education, and household income). Descriptive analysis was conducted to describe the differences of the four study variables (i.e., children’s temperament of sensation seeking, parents’ perception of risk, parental supervision, and children’s risk-taking behavior) by demographic characteristics in city C (Table 1).

MANOVA examined the four study variables by children’s gender, parents’ education,
and household income. As a result, there was a statistically significant difference in the four study variables based on children’s gender, \( F(4, 101) = 4.401, p = .002 \); Wilk's \( \Lambda = .85 \), partial \( \eta^2 = .15 \), parents’ education, \( F(8, 188) = 2.18, p = .030 \); Wilk's \( \Lambda = .84 \), partial \( \eta^2 = .09 \), and household income, \( F(8, 188) = 2.12, p = .036 \); Wilk's \( \Lambda = .84 \), partial \( \eta^2 = .08 \).

Specifically, sensation seeking varied by children’s gender, \( F = (1, 104) = 17.59, p < .001 \). Boys \( (M = 14.74, SD = 4.38) \) had higher scores in sensation seeking than girls \( (M = 11.23, SD = 4.18) \). However, boys’ risk-taking behavior \( (M = 10.47, SD = 7.85) \) was not significantly higher than girls’ \( (M = 7.94, SD = 5.05) \), \( F = (1, 104) = 3.69, p = .057 \). Parents’ perception of risk differed by the household income, \( F = (2, 97) = 3.95, p = .023 \). Parents with mid- \( (M = 76.05, SD = 20.54) \) or higher income \( (M = 71.50, SD = 23.92) \) perceived children’s risk-taking behavior riskier than parents with lower income \( (M = 63.59, SD = 28.19) \).
# Table 1 Descriptive Differences of Study Variables by Demographics in City C’s Sample

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Group</th>
<th>N</th>
<th>Sensation seeking</th>
<th>Parents' perception</th>
<th>Supervision</th>
<th>Risk-taking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Children's age</td>
<td>4-year-old</td>
<td>52</td>
<td>12.6 (4.52)</td>
<td>71.52 (20.94)</td>
<td>39.88 (6.07)</td>
<td>8.29 (5.65)</td>
</tr>
<tr>
<td></td>
<td>5-year-old</td>
<td>54</td>
<td>13.69 (4.69)</td>
<td>73.96 (25.08)</td>
<td>39.00 (7.56)</td>
<td>10.32 (7.70)</td>
</tr>
<tr>
<td>Children's gender</td>
<td>Boy</td>
<td>58</td>
<td>14.74 (4.38)</td>
<td>73.05 (23.06)</td>
<td>39.53 (6.83)</td>
<td>10.47 (7.85)</td>
</tr>
<tr>
<td></td>
<td>Girl</td>
<td>48</td>
<td>11.23 (4.18)</td>
<td>72.42 (23.32)</td>
<td>39.31 (6.94)</td>
<td>7.94 (5.05)</td>
</tr>
<tr>
<td>Parents' age</td>
<td>Young</td>
<td>61</td>
<td>13.62 (4.51)</td>
<td>73.23 (22.08)</td>
<td>39.75 (6.61)</td>
<td>10.29 (8.02)</td>
</tr>
<tr>
<td></td>
<td>Old</td>
<td>45</td>
<td>12.51 (4.74)</td>
<td>72.13 (24.59)</td>
<td>39.00 (7.21)</td>
<td>8.01 (4.48)</td>
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<tr>
<td>Parents</td>
<td>Father</td>
<td>26</td>
<td>12.81 (5.07)</td>
<td>69.08 (21.08)</td>
<td>38.65 (7.38)</td>
<td>10.73 (7.52)</td>
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<tr>
<td></td>
<td>Mother</td>
<td>80</td>
<td>13.26 (4.49)</td>
<td>73.96 (23.68)</td>
<td>39.69 (6.70)</td>
<td>8.87 (6.56)</td>
</tr>
<tr>
<td>Parents' education</td>
<td>Lower than college</td>
<td>27</td>
<td>12.22 (4.62)</td>
<td>80.00 (24.60)</td>
<td>41.07 (5.12)</td>
<td>10.64 (8.80)</td>
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<tr>
<td></td>
<td>College</td>
<td>40</td>
<td>13.83 (4.25)</td>
<td>71.18 (18.98)</td>
<td>39.18 (6.75)</td>
<td>10.27 (7.52)</td>
</tr>
<tr>
<td></td>
<td>Higher than college</td>
<td>39</td>
<td>13.10 (4.97)</td>
<td>69.48 (25.21)</td>
<td>38.56 (7.88)</td>
<td>7.44 (4.80)</td>
</tr>
<tr>
<td>Household income</td>
<td>&lt;60,000RMB</td>
<td>17</td>
<td>13.88 (4.21)</td>
<td>63.59 (28.19)</td>
<td>38.65 (4.30)</td>
<td>9.06 (5.33)</td>
</tr>
<tr>
<td></td>
<td>60,000-120,000RMB</td>
<td>59</td>
<td>12.71 (4.82)</td>
<td>76.05 (20.54)</td>
<td>40.42 (7.00)</td>
<td>8.29 (6.69)</td>
</tr>
<tr>
<td></td>
<td>&gt;120,000RMB</td>
<td>30</td>
<td>13.60 (4.47)</td>
<td>71.50 (23.92)</td>
<td>37.93 (7.56)</td>
<td>11.52 (7.48)</td>
</tr>
</tbody>
</table>

*Note. N = 106.*
Correlation analyses examined associations among the four study variables (i.e., children’s temperament of sensation seeking, parents’ perception of risk, parental supervision, and children’s risk-taking behavior). As a result (Table 2), children’s risk-taking behavior was positively correlated with their sensation seeking level, $r(106) = .34, p < .001$, and negatively correlated with parental supervision, $r(106) = -.22, p = .024$. Children with a higher level of sensation seeking exhibited a higher level of risk-taking. In contrast, children with a higher level of parental supervision exhibited a lower level of risk-taking. Children’s risk-taking behavior did not have any correlation with parents’ perception of risk, $r(106) = -.11, p = .256$. In addition, there was a significant association between parents’ risk perception and their supervision, $r(106) = .39, p < .001$. As parents perceived children’s behavior as riskier, they provided a higher level of supervision to protect their safety. However, children’s temperament of sensation seeking was not associated with parental supervision, $r(106) = -.01, p = .903$. 
### Table 2 Mean, Standard Deviations, and Correlations of Study Variables in City C’s Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>M (SD)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensation seeking</td>
<td>13.15 (4.62)</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parents' perception</td>
<td>72.76 (23.07)</td>
<td>-.04</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental supervision</td>
<td>39.43 (6.85)</td>
<td>-.01</td>
<td>.39**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Children's risk-taking</td>
<td>9.32 (6.82)</td>
<td>.34**</td>
<td>-.11</td>
<td>-.22*</td>
<td>--</td>
</tr>
</tbody>
</table>

*Note.* + p < .10, * p < .05, ** p < .01, *** p < .001. N = 106.

**City U, United States.** Data (N = 108) were checked normality for four study variables. Results showed that all study variables met univariate normality, sensation seeking (skewness = 1.73, kurtosis = 7.08), risk perception (skewness = -.05, kurtosis = -.19), parental supervision (skewness = -.35, kurtosis = -.03), risk-taking behavior (skewness = 1.23, kurtosis = 1.26).

Like in city C’s sample, in the following analyses, all demographics were treated as categorical factors. Children’s age was created as a dichotomous variable (i.e., four-year-old and five-year-old). Parents were categorized into ‘young’ or ‘old’ according to whether they were older than the average age (i.e., 35-year-old). Due to the fact that ‘Asian’, ‘Hispanic’, and Mexican’ were proportionally very small, ethnicity was combined into three categories (i.e., 54.63% European American, 28.70% African American, and 16.66% all others (Asian, Hispanic, and Mexican)). Like parents’ education in the city C’s sample, the city U parents’ education was combined into three categories as well (i.e., 9.26% lower than college, 32.41% college, and 58.33% higher than college). Like household in city C’s sample, the city U’s household income was combined into three categories (i.e., 19.45% lower than 60,000US dollars, 30.55% 60,000 – 120,000 US dollars, and 50.00% higher than 120,000 US dollars).

Chi-square analyses examined associations across demographic factors, including children’s age, children’s gender, ethnicity, parents’ age, parents’ education, and household
There was a significant association between ethnicity and parents’ education, $\chi^2 (4, N = 108) = 14.79, p = .005$. Parents of European American and Asian, Hispanic, or Mexican had higher degrees than African American parents. There was also a significant association between ethnicity and household income, $\chi^2 (4, N = 108) = 23.89, p < .001$. Similarly, parents of European American and Asian, Hispanic, or Mexican had higher income than African American parents. Higher education of parents was associated with higher income, $\chi^2 (4, N = 108) = 31.73, p < .001$. Descriptive analysis was conducted to describe the differences of the four study variables (i.e., children’s temperament of sensation seeking, parents’ perception of risk, parental supervision, and children’s risk-taking behavior) by demographic characteristics in city U (Table 3).

MANOVA examined the four study variables by children’s gender, parents’ education, and household income. Overall, there was a statistically significant difference in the four study variables based on children’s gender, $F (4, 103) = 4.01, p = .005$; Wilk’s $\Lambda = .87$, partial $\eta^2 = .14$. Specifically, sensation seeking varied by child’s gender, $F (1, 106) = 10.98, p = .001$. Boys ($M = 17.76, SD = 5.31$) had higher scores in sensation seeking than girls ($M = 14.23, SD = 5.78$). However, boys’ risk-taking behavior ($M = 21.63, SD = 16.07$) was not significantly higher than girls’ ($M = 17.73, SD = 14.92$), $F (1, 106) = 1.71, p = .194$. Parents’ perception of risk varied by parents’ education, $F (2, 105) = 4.33, p = .016$. Parents with lower education (e.g., lower than college degree) ($M = 80.10, SD = 26.18$) had higher scores in perception of risk than parents with higher education (i.e., college degree ($M = 58.20, SD = 21.54$) and graduate degree ($M = 56.54, SD = 24.36$). That means, parents with lower education perceived their children’s behavior as riskier than parents with higher education.
<table>
<thead>
<tr>
<th>Demographic</th>
<th>Group</th>
<th>N</th>
<th>Sensation seeking</th>
<th>Parents' perception</th>
<th>Supervision</th>
<th>Risk-taking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
</tr>
<tr>
<td>Children's age</td>
<td>4-year-old</td>
<td>64</td>
<td>15.53 (6.21)</td>
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<td>19.47 (16.00)</td>
</tr>
<tr>
<td></td>
<td>5-year-old</td>
<td>44</td>
<td>16.75 (5.13)</td>
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<td>40.86 (3.61)</td>
<td>20.08 (15.08)</td>
</tr>
<tr>
<td>Gender</td>
<td>Boy</td>
<td>55</td>
<td>17.76 (5.31)</td>
<td>56.91 (21.35)</td>
<td>41.55 (4.22)</td>
<td>21.63 (16.07)</td>
</tr>
<tr>
<td></td>
<td>Girl</td>
<td>53</td>
<td>14.23 (5.78)</td>
<td>61.70 (27.16)</td>
<td>41.13 (4.76)</td>
<td>17.73 (14.92)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>European American</td>
<td>59</td>
<td>16.73 (5.54)</td>
<td>58.97 (19.51)</td>
<td>41.00 (4.45)</td>
<td>19.07 (15.98)</td>
</tr>
<tr>
<td></td>
<td>African American</td>
<td>31</td>
<td>14.32 (6.05)</td>
<td>66.26 (31.35)</td>
<td>42.35 (4.24)</td>
<td>21.45 (14.74)</td>
</tr>
<tr>
<td></td>
<td>Asian, Hispanic, Mexican</td>
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<td>40.72 (4.92)</td>
<td>18.85 (16.20)</td>
</tr>
<tr>
<td>Parents' age</td>
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<td>15.10 (4.96)</td>
<td>56.92 (27.55)</td>
<td>41.20 (4.67)</td>
<td>20.03 (15.76)</td>
</tr>
<tr>
<td></td>
<td>Old</td>
<td>58</td>
<td>16.83 (6.37)</td>
<td>61.28 (21.31)</td>
<td>41.47 (4.35)</td>
<td>19.44 (15.53)</td>
</tr>
<tr>
<td>Parents' gender</td>
<td>Father</td>
<td>17</td>
<td>16.59 (5.76)</td>
<td>51.47 (25.20)</td>
<td>40.59 (4.57)</td>
<td>18.56 (11.72)</td>
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<tr>
<td></td>
<td>Mother</td>
<td>91</td>
<td>15.92 (5.83)</td>
<td>60.71 (24.08)</td>
<td>41.48 (4.47)</td>
<td>19.93 (16.23)</td>
</tr>
<tr>
<td>Parents' education</td>
<td>Lower than college</td>
<td>10</td>
<td>14.40 (5.19)</td>
<td>80.10 (26.18)</td>
<td>42.40 (4.17)</td>
<td>21.80 (18.50)</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>35</td>
<td>16.83 (5.76)</td>
<td>58.20 (21.54)</td>
<td>40.66 (5.43)</td>
<td>20.26 (15.32)</td>
</tr>
<tr>
<td></td>
<td>Higher than college</td>
<td>63</td>
<td>15.84 (5.92)</td>
<td>56.54 (24.36)</td>
<td>41.56 (3.93)</td>
<td>19.08 (15.44)</td>
</tr>
<tr>
<td>Household income</td>
<td>&lt;$60,000</td>
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<td>13.67 (5.46)</td>
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<td>41.95 (4.65)</td>
<td>18.78 (14.34)</td>
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<td>$60,000-$120,000</td>
<td>59</td>
<td>16.00 (6.45)</td>
<td>53.26 (21.60)</td>
<td>41.79 (3.73)</td>
<td>20.49 (16.16)</td>
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<tr>
<td></td>
<td>&gt;$120,000</td>
<td>30</td>
<td>16.96 (5.33)</td>
<td>59.26 (21.60)</td>
<td>40.83 (4.84)</td>
<td>19.61 (15.91)</td>
</tr>
</tbody>
</table>

*Note.* $N = 108.$
Correlation analyses evaluated associations among four study variables. As a result (Table 4), children’s risk-taking behavior was positively correlated with their sensation seeking level, \( r(108) = .27, p = .004 \), and negatively correlated with parental supervision, \( r(108) = -.28, p = .003 \). Children with a higher level of sensation seeking exhibited a higher level of risk-taking. In contrast, children with a higher level of parental supervision exhibited a lower level of risk-taking. Children’s risk-taking behavior did not have any correlation with parents’ risk perception, \( r(108) = -.02, p = .873 \). There was a significant negative association between children’s sensation seeking temperament and their parents’ supervision, \( r(108) = -.37, p < .001 \). For children with a higher sensation seeking level, parental supervision was lower. However, there was no significant association between parents’ perception of risk and parental supervision, \( r(108) = .07, p = .462 \).
Table 4 Mean, Standard Deviations, and Correlations of Study Variables in City U’s Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>M (SD)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensation seeking</td>
<td>16.03 (5.80)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Parents’ perception</td>
<td>59.26 (24.38)</td>
<td>- .11</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental supervision</td>
<td>41.34 (4.48)</td>
<td>-.37**</td>
<td>.07</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Children’s risk-taking</td>
<td>19.72 (15.56)</td>
<td>.27**</td>
<td>-.02</td>
<td>-.28**</td>
<td>--</td>
</tr>
</tbody>
</table>

Note.  + p < .10, * p<.05, ** p<.01, *** p < .001. N = 108.

City C versus City U. Between the two cities there was no significant difference in children’s age, $\chi^2 (1, N = 213) = 2.24, p = .134$, children’s gender, $\chi^2 (1, N = 213) = .31, p = .579$, parents’ age, $\chi^2 (1, N = 213) = 2.71, p = .100$, and parents’ gender, $\chi^2 (1, N = 213) = 2.57, p = .109$.

MANOVA evaluated mean differences across the four study variables (i.e., children’s temperament of sensation seeking, parents’ perception of risk, parental supervision, and children’s risk-taking behavior) by city. Results indicated that there were significant differences in all of the four study variables across the two cities. City U children’s ($M = 19.72, SD = 15.56$) risk-taking behavior level doubled that of city C children ($M = 9.32, SD = 6.82$), $F = (1, 212) = 39.77, p < .001$. City U children’s sensation seeking scores ($M = 16.03, SD = 5.80$) were also significantly higher than those of city C children ($M = 13.15, SD = 4.62$), $F = (1, 212) = 16.08, p < .001$. The top three sensation seeking scenarios in which city C’s young children preferred the high sensation seeking option were 93.40% “ride on a horse that moves on a merry-go-round” rather than “sit on a stationary horse on a merry-go-round”, 75.47% “play with a new toy that he/she has never played with before” rather than “play a toy that he/she has played with before”, and 73.58% “look at a book that he/she has never looked at before” rather than “look at a book that he/she has looked at before”. For the city U’s young children, the top three high sensation
seeking items selected were 87.96% “turn off the lights to see glow in the dark stickers on the ceiling” rather than “not turn off the lights and just look at the non-glow stickers”, 79.63% “sit on a spin-around toy on the floor and have someone spin them” rather than “spin other kids on the spin-around toy”, 78.70% “play with a new toy that he/she has never played with before” rather than “play a toy that he/she has played with before”.

Similarly, in city U parents’ supervision level was slightly higher than parents’ in city C, $F = (1, 21) = 5.84, p = .016$. The average score of the city U parents was 41.34 ($SD = 4.48$) while the average score of the city C parents was 39.43 ($SD = 6.85$). The top-rated item by both city C and city U parents was “I feel a strong sense of responsibility of keeping my child safe”. The most frequent supervision methods used by the city C parents were “when my child is playing, I stay close to him/her so that I can get to him/her quickly”, “I try to keep risky devices out of my child’s reach”, and “I think it is necessary to warn my child of potential dangers all the time”. The most frequent supervision items selected by the city U parents were “I feel very protective of my child”, “I try to keep risky devices out of my child’s reach”, and “I make sure I know where my child is and what my child is doing”.

In City C, parents’ scores of risk perception were significantly higher than parents in city U, $F = (1, 212) = 17.31, p < .001$. The average score of the city C parents’ risk perception was 72.76 ($SD = 23.07$) while the average score of the city U parents was 59.26 ($SD = 24.38$). The three physical behaviors city C’s parents concerned most and perceived as the highest risks were “put fingers or objects near appliances or power outlets”, “come into contact with hot objects”, and “behave carelessly in or around water hazards”, while in city U the top three concerned behaviors were “play with fire”, “refuse to use seat belt”, and “behave carelessly in or around water hazards”. In contrast, the three physical behaviors the city C’s parents concerned least and
perceived as the lowest risks were “pull/push over furniture or heavy objects”, “jump off furniture or other structures”, and “climb on top of furniture or cabinets”, while in city U the three least concerned behaviors were “jump off furniture or other structures”, “take chances on play-ground equipment”, and “play with sharp objects”.

Path Analyses

After looking into the basic relations among the four study factors and demographics, path analyses were conducted in order to test the four hypotheses of the current study. First, the model for city C and city U was examined separately in order to test the first three hypotheses. The first hypothesis was that children’s temperament of sensation seeking and parental supervision should have direct effects on children’s risk-taking behavior. The second hypothesis was that parental supervision should mediate the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior. The third hypothesis was that parental supervision should mediate the effect of parents’ risk perception on young children’s risk-taking behavior. Then, the path model was tested for the both samples simultaneously in order to examine equivalence of the model across different societies, that is, the fourth hypothesis (i.e., the model varied by country including all the study factors and young children’s risk-taking behavior).

City C, China. The goodness fit indices suggested that data fitted the model well for the city C’s sample, $\chi^2 (1, 106) = .04, p = .849, \text{RMSEA} = .00, 90\%\text{CI} = (.00, .15), \text{CFI} = 1.00, \text{SRMR} = .01$. There were no more modification indices. All path coefficients were significant except the one from children’s sensation seeking to parental supervision, $\beta < .01, t = .03, p = .974$ (Figure 2). The results showed that there was a positive association between children’s sensation seeking and their risk-taking behavior, $\beta = .33, t = 3.72, p < .001$. Conversely, there
was a negative association between children’s risk-taking behavior and parental supervision, $\beta = -0.21, t = -2.41, p = .017$. The direct effects of children’s sensation seeking on risk-taking behavior were 0.33. Higher sensation seeking was associated with higher risk-taking. The direct effects of parental supervision on risk-taking behavior were -0.21. Higher parental supervision was associated with lower level of children’s risk-taking behavior. The indirect effects of children’s sensation seeking and parents’ risk perception on risk-taking behavior were < -0.01 and -0.08, respectively. Thus, the total effects of children’s sensation seeking and parents’ risk perception on risk-taking behavior were 0.33 and -0.08, respectively.
The results of the city C’s model supported the first hypothesis that children’s temperament of sensation seeking and parental supervision had direct effects on children’s risk-taking behavior. The second hypothesis was rejected by the results that parental supervision did not mediate the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior. The results supported the third hypothesis that parental supervision mediated the effect of parents’ risk perception on young children’s risk-taking.

**City U, United States.** The goodness fit indices also suggested that data fitted the model well for the city U’s sample, $\chi^2 (1, 108) = .05, p = .816$, RMSEA = .00, 90%CI = (.00, .16), CFI = 1.00, SRMR = .01. There were no more modification indices. All path coefficients were significant except the one from parents’ risk perception to parental supervision, $\beta = .03, t = .35, p < .729$ (Figure 3). Similar to city C’s sample, the results showed that children’s risk-taking behavior was positively associated with sensation seeking, $\beta = .20, t = 2.01, p = .046$, and negatively associated with parental supervision, $\beta = -.21, t = -2.15, p = .033$. Higher risk-taking
was associated with higher sensation seeking but lower parental supervision. The direct effects of children’s sensation seeking on risk-taking behavior and parental supervision were .20 and -.36, respectively. The direct effect of parental supervision on risk-taking behavior were -.21. The indirect effects of children’s sensation seeking and parents’ risk perception on risk-taking behavior were .08 and -.01, respectively. Thus, the total effects of children’s sensation seeking and parents’ risk perception on risk-taking behavior were .28 and -.01, respectively.
The results of city U’s model supported the first hypothesis that children’s temperament of sensation seeking and parental supervision had direct effects on children’s risk-taking behavior. The results also supported the second hypothesis that parental supervision played a mediating role in the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior. However, the third hypothesis was rejected. Parental supervision did not mediate the effect of parents’ risk perception on young children’s risk-taking.

**Model comparison between city C and city U.** After examining the model for city C and city U separately, the path model was tested for the both cities simultaneously in order to test equivalence of the model across different societies. The paths’ invariance was examined by comparing constrained and unconstrained models.

In the first model (M_c), all structural parameters were constrained, which meant that all structural paths were remained to be identical. The model M_c revealed a poor fit, $\chi^2 (7, N = 214) = 17.34, p = .015, \chi^2/df < 4$; RMSEA = .12, (90 % CI .05, .19); CFI = .81, SRMR = .10 (China)

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*Figure 3 Path Model of Young Children’s Risk-taking Behavior in City U*

Note: * $p < .05$, ** $p < .01$ level, *** $p < .001$ (2-tailed).
and .08 (U.S.). There was no applicable modification provided by the modification indices. All paths were significant.

In the second model (M_α), all structural paths were released, acknowledging that the structural parameters of the model differed across two countries. M_α revealed a pretty good fit including smaller Chi-square statistics and better other fit indices than the constrained model, \( \chi^2 (3, N = 214) = .54, p = .911, \text{RMSEA} = .00, (90\% \text{CI} .00, .06); \text{CFI} = 1.00, \text{SRMR} = .01 \) (China) and .02 (U.S.). There was no applicable modification provided by the modification indices. All paths of the city C’s model were significant except the one from children’s sensation seeking to parental supervision. All paths of the city U’s model were significant except the one from parents’ risk perception to parental supervision.

The parameter estimates of the paths in M_c and M_α are shown in table 5. A Chi-square difference test was used to assess if the structural parameter estimates were identical between groups. The difference between M_c and M_α was significant, \( \chi^2_{c-u} = 16.80, \text{df}_{c-u} = 4, p = .002. \) Then, paths of the constrained model (M_c) were released, one path at a time, in order to examine which path had significant difference. As a result, two paths were significantly different between groups. They were the path from parents’ perception of risk to parental supervision and the path from children’s temperament of sensation seeking to parental supervision. Thus, the hypothesis of structural invariance across the samples of city C and city U was rejected. We accepted the fourth hypothesis that the path model differed between two groups including all the concerned factors (i.e., children’s temperament of sensation seeking, parents’ risk perception, and parental supervision) and young children’s risk-taking behavior.
**Chapter Four Discussion**

This study had two purposes. The first was to examine the effect of three factors (i.e., children’s sensation seeking, parents’ perception of risk, and parental supervision) on young children’s risk-taking behavior. The second purpose of this study was to examine the relations of young children’s risk-taking behavior with the three factors between societies.

This study has uniquely contributed to the existing research on young children’s risk-taking behavior in two ways. One unique contribution is to demonstrate the mediating role that parental supervision plays in children’s risk-taking behavior. The other unique contribution is to reveal the importance of society in children’s risk-taking behavior. This study shows that not only three factors of children’s risk-taking behavior but also their relations vary across societies.

The current study first proposed a model of preschoolers’ risk-taking behavior and examined the model in samples from China and the U.S. The discussion starts with similarities of children’s risk-taking behavior shared between the two societies’ samples, followed by cross-society differences. Interview data are integrated in the discussion and used to explain or expand the quantitative findings when appropriate. Lastly, limitations and implications are discussed.
**Similarities of Children’s Risk-taking Behavior between China and the U.S.**

Built upon extant literature, this study used Sandseter’s (2010) conceptual framework to build and examine a new model of young children’s risk-taking behavior for samples of China and the U.S. This model consisted of relations between children’s risk-taking behavior and its three factors (i.e., children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision). By examining the quantitative and the interview data, this study suggests that similarities existed between the samples from China and the U.S. First, parents in the two cities could tolerate their children’s risk-taking behavior more or less when they supervise children due to that parents perceived risk as inevitable. Second, parents in the two cities perceived children’s risk-taking behavior as both beneficial and harmful. Third, the first hypothesis was supported in both samples. That is, children’s temperament of sensation-seeking and parental supervision had direct effects on children’s risk-taking behavior. Fourth, besides the three factors proposed in the model, other factors (e.g., demographic characteristics and children’s own evaluation of risk-taking behavior) emerged from our data that may play a role in the model.

**Parents’ tolerance of children’s risk-taking in their supervision.** For the risk-taking behaviors listed in the questionnaire for measuring parents’ perception of risk, all parents in the two cities in the interviews believed that risk-taking behavior in early childhood was inevitable. Injury occurred in everyone’s life and there was no exception. Young children learned about their environments and the world by the constant physical movement. Accessing risky stuff was children’s daily life. A four-year-old Chinese boy’s father said, “he is a child. How could a child does not have any injury? As a parent, I cannot protect him any time anywhere to prevent him from any injury. Sometimes even I stay with him, he still hurts”.

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With an understanding of the injury inevitability, parents could tolerate their children’s injuries to different extent in their supervision. With more positive perception, some parents were more tolerant and accepting of their children taking risks and getting injuries than other parents. For example, when asked if they were afraid of getting hurt or injury of their children in daily physical activities, a U.S. mother of two children said:

Not at all. We are not helicopter parents that hover over our kids. My children have scrapes and bruises all over all the time because we encourage them to get out and play and do things. That could possibly, like, we encourage them to jump on the trampoline, knowing that a lot of kids break their bones on the trampoline. My husband and I are not scared of the possibility of physical injury and not overprotective at all.

In contrast, some parents had a low tolerance for children’s risk-taking. They could accept children’s injury at a minimum level. For example, a Chinese mother of a four-year-old boy who could tolerate only minor injury said, “falling down and being skinned a little is acceptable. Fracture is too much I cannot bear”.

**Parents’ perception of two-sided risk-taking in early childhood.** All parents in the interviews could recognize that risk-taking behaviors in early childhood had both positive and negative sides. On the one hand, parents perceived that taking some risks was necessary and beneficial for children’s learning and development. In activities and environments involving risks, children got excitement and happiness and obtained opportunities of gaining new experiences. For example, a Chinese mother described that her five-year-old son was very happy and excited when he tried something risky:

He thrives on excitement. Some time ago, we brought him to a theme part in city Nanchang. He rode the fast roller coaster and skied. Very high. He screamed all the time.
I knew that he was scared. I did not know why he liked to challenge those things. He looked very nervous but very excited.

In line with previous research (Niehues, Bundy, Broom, & Tranter, 2016), parents thought that taking risks brought opportunities, whether the outcome was a success or a failure. Children obtained new experiences as well as overcame their barriers as they accomplished some new challenges.

On the other hand, parents were always aware of the downside of this kind of behavior. Their first reaction was “getting hurt physically or emotionally” when asked about the disadvantages if their children engaged in risk-taking activities. For instance, a U.S. mother of a five-year-old girl said:

I guess the negative part would be like not having enough of that balance (between the positive and negative parts) and taking too many risks, like risks that there would be no reason to take. If somebody just had such a strong risk-taking personality that she just needed that rush her whatever. I do not think that is a good thing. It is dangerous maybe.

Parents in the two countries recognized both positive and negative sides of children’s risk-taking behaviors. They believed that the risk-taking experience as a necessary part of a full range of experiences contributed to build and sustain happiness, confidence, and resilience for young children. Parents wanted their children to be able to overcome own fears and deal with frustrations which children could learn and practice during risk-taking experiences. However, parents expressed their struggles to let children go and learn through making mistakes due to that the harmful consequences may occur. Parents may focus more on protecting children and keeping them safe as the parents emphasized more on the negative side of risk-taking behaviors than the positive side. Almost all the parents we interviewed said that it is a more dangerous
world than before. They would never let their children do the things they did as children (e.g., playing all over the neighborhood without adult supervision).

**Direct effects.** For both samples, findings of the path analyses suggested that children’s temperament of sensation-seeking and parental supervision should have direct effects on children’s risk-taking behavior. Consistent with previous findings, sensation seeking was highly predictive of individuals’ engagement in risk-taking behavior (Boyer, 2006; Zuckerman & Kuhlman, 2000). Our results showed that children who obtained higher scores in temperament of sensation seeking scale were more likely to get higher scores in the BART-Y test, which means that those children clicked more to pump up each balloon bigger. Conversely, a lower level of sensation seeking was associated with a lower level of risk-taking behavior.

Temperament traits are found to be moderately stable over time. When measurement error is controlled, the stability rises to as high as .80 (Pedlow, Sanson, Prior, Oberklaid, 1993; Rothbart & Bates, 2006; Sanson, Hemphill, & Smart, 2004). A large meta-analysis of studies by Roberts and DelVecchio (2000) showed moderate stability of temperament over time. The cross-time correlations were .35 between 0 and 2.9 years old, .52 between 3-5.9 years old, and .45 between 6-11.9 years old. The stability of temperament may increase in adolescence and young adulthood and reach the peak after middle adulthood (Rothbart & DelVecchio, 2000).

The stability of temperament may indicate stability of risk-taking behavior over time. Kennedy and Chen (2009) examined children’s risk-taking behaviors at the beginning, one month, three months, and six months after a behaviorally based intervention. As a result, participants increased their safety behaviors, but risk-taking behaviors remained unchanged. A study (Josef, Richter, Samanez-Larkin, Wagner, Hertwig, & Mata, 2016) suggested that risk-taking propensity could be understood as a trait with moderate stability. The level of risk-taking
propensity typically decreased across the lifespan although significant variations occurred across
domains. Developmentally, knowing early sensation seeking may let parents and teachers
understand children’s current styles of risk-taking behavior as well as anticipate children’s future
performance in risk-taking situations.

Besides children’s temperament of sensation seeking, parental supervision had a direct
effect on children’s risk-taking behavior in both cities. Our finding suggested that children
showed a lower level of risk-taking behavior if their parents supervised closer and protected
more. This finding supported the idea that parental supervision has been identified as the most
effective method of injury prevention (Morrongiello, 2005). In this study, both Chinese parents
and the U.S. parents “feel a strong sense of responsibility of keeping the child safe”. The most
frequent supervision method shared by Chinese parents and the U.S. parents was “try to keep
risky devices out of the child’s reach”.

Other factors. Besides the factors of the model, there were other factors that emerged in
the study that may play a role in the model of young children’s risk-taking behavior for both
cities. Those factors included demographic characteristics (e.g., children’s gender, parents’
education, and household income) and children’s own evaluation of risks.

Consistent with previous research (Christensen & Mikkelsen, 2008; Hong et al., 2008),
our findings demonstrated that children’s gender, parents’ education, and household income
were important influences in young children’s risk-taking behavior and its factors. Compared to
girls, boys had higher sensation seeking and more risk-taking behaviors. Boys were more prone
to risky behaviors and injury due to that they were more likely than girls to take risks in daily
activities, and that they received less adult supervision than girls (Reading et al. 2009; World
Health Organization 2008).
Parents’ income and education may also impact children’s risk-taking behavior and its factors. In city C, parents with mid- or higher income perceived children’s risk-taking behavior much riskier than parents with lower income. This was probably because that parents who earned more spent longer time on working than other parents in China (Fan, 2019). Higher-income parents may have less time to stay with their children. In addition, affluent housing may be filled with more household items (e.g., furniture, and electrical equipment) that potentially present hazards to young children (Li & Jin, 2006). Those parents with higher income concerned more about their children’s safety and thus perceive the children’s behavior as riskier than their peers. Moreover, the data show a trend that education in parents seems to serve as a protective factor despite of a nonsignificant result, $F = (1, 103) = 2.44, p = .093$. On average, children who had parents with education higher than college ($M = 7.44, SD = 4.80$) had a lower level of risk-taking behaviors than children who had parents with college education ($M = 10.27, SD = 7.52$) or lower ($M = 10.64, SD = 8.80$). Previous evidence showed parental education was negatively associated with childhood injury risks (Bishai, et al., 2008). Their educational level was found to be associated with injury prevention adherence and injury recognition capacity (Ince, Yalcin, Yurdakok, 2017).

In city U, parents with education lower than college perceived children’s risk-taking behavior much riskier than parents with college education or higher. Their education was found to be positively related to the household income. There was a certain trend toward significance ($F = (1, 107) = 2.61, p = .078$) in the association between parents’ perception of risk and household income was not significant. Parents in the lower-income families ($M = 68.62, SD = 27.65$) perceived children’s risk-taking behaviors as riskier than parents in the middle- ($M = 53.26, SD = 21.60$) or higher-income ($M = 59.26, SD = 21.60$) families. That is, parents viewed
their children’s activities as more dangerous and the outcomes as more harmful if they earned less money or received less education than other parents. This finding was consistent with previous research in the U.S. Norman (2018) found that low-income parents were more than twice as likely as high-income parents to concern frequently that their children would be physically harmed at school. Lower-income parents were more likely to express concerns about their children being victims of violence than those with higher income. Lower-income parents rated their neighborhood as only a “fair” or “poor” place to raise children, while higher-income parents viewed their neighborhood as an “excellent” or “very good” place for children (Pew Research Center, 2015).

Moreover, parents interviewed in both China and the U.S. identified the importance of children’s own evaluation in their risk-taking behaviors. Parents believed that children thought before they engaged in risky situations. Children were capable observers and thinkers. They often evaluated their own capability and possible outcomes according to situations before they took actions to access to risky issues. The children may do the things they perceived as safe even though parents perceived as dangerous. For example, a U.S. mother of a five-year-old girl said:

The thing, really, I can remember her doing that I am not comfortable with, is she climbs the banister of our stairs, on the outside of the stairs up to the second floor. But she has never fallen and never gotten hurt. To her it is not a big deal. She is fine. She is fine to do things that are physically daunting or could lead to injury.

A Chinese mother of a four-year-old boy shared a similar observation:

My son knows what is dangerous and what is not. He uses scissors, kitchen knife, and fruit knife. I warned him before that they were dangerous and that he may cut his fingers. He responded to me that, “mom, it was okay” and he would be careful. It turned out that
he never got injured with those appliances. Never.

Children’s evaluation of their risk-taking behavior and possible outcomes may influence their decisions whether they exhibit the behavior. They tend to take actions if they perceive as not harmful while they may stop if they evaluate the behavior as too dangerous.

**Differences of Children’s Risk-taking Behaviors between China and the U.S.**

Despite similarities, our results revealed significant differences in both factors and the relations of the model between the two samples. Preliminary results suggested that all factors of the model, including children’s risk-taking behavior, differed between city C and city U. Findings of the path analyses supported the mediating role of parental supervision between children’s temperament of sensation seeking and their risk-taking behavior in the sample of city U, but did not support the mediating role in the sample of city C. In contrast, the findings supported the mediating role of parental supervision between parents’ perception of risk and children’s risk-taking behavior in the sample of city C, but did not support the mediating role in the sample of city U.

**Differences in factors.** The findings of ANOVA analyses revealed that the factors of the model varied between the two cities. The city U’s sample had higher scores in children’s temperament of sensation seeking, children’s risk-taking behavior, and parental supervision than the city C’s sample. On the contrary, city C’s sample scored higher in parents’ perception of risks than city U’s sample.

Variations in children’s temperament across China and the U.S. have been well demonstrated in the literature. Chinese infants were found to be less reactive than American infants (Kagan, Arcus, Snidman, Wang, Hendler, & Greene, 1994). Moreover, Chinese children were more controlled, shyer, less active, and less impulsive than the U.S. children (Ahadi,
Rothbart, & Ye, 1993). Similarly, our study found that the city U’s children scored higher in sensation seeking than city C’s children. This means that the U.S. children in the present study were characterized by a strong need for varied, novel, and intense experiences and sensation. They sought more thrill, novelty, and behavioral intensity in their activities than Chinese children, which in turn increased the U.S. children’s propensity to take more physical risks than the Chinese peers.

Correspondingly, the city U’s parents exerted a higher level of supervision than the city C’s parents in daily childrearing. The difference in supervision might result from the difference in risk-taking behaviors of children in the two countries. Previous research showed that parents could adjust their supervision based on children’s attributes (Morrongiello, Corbett, McCourt, & Johnston, 2006b; Schwebel, Brezausek, Ramey, & Ramey, 2004). They gave more attention, stayed with children closer, and kept the children in view more of the time if their children had behavioral attributes that were likely to increase risky behaviors (Morrongiello & McArthur, 2018). In comparison to the Chinese peers, therefore, the higher risk-taking level of the U.S. children contributed to the U.S. parents who gave closer attention, stayed in more proximity, and maintained higher continuous supervision to their children in order to keep children safe and protect them.

**The mediating role of parental supervision.** Another significant difference between city C and city U was the mediating role of parental supervision in children’s risk-taking behaviors. The second and the third hypotheses focused on the mediating role of parental supervision in the model. The data of the city U”’s sample supported the second hypothesis that parental supervision should mediate the effect of the children’s temperament of sensation seeking on young children’s risk-taking behavior. A child who was born with a temperament of
high propensity to recklessly take risks can become more inhibited and thoughtful by receiving constant parents’ control, while a child who is naturally cautious would become a bold risk-taker by receiving continuous parents’ encouragement (Davis & Eppler-Wolff, 2009). The city U’s model showed that children’s temperament of sensation seeking had both direct and indirect effects on their risk-taking behaviors. The indirect effect was mediated by parental supervision. This finding indicated that how parents supervised their children was associated with their children’s temperament of sensation seeking.

In the interviews, U.S. parents emphasized that it was the temperament as an innate trait that determined children’s different behaviors and influenced parents’ supervision. They believed that some children were born with high tentativeness and cautiousness, while others came into this world with a tendency to act impulsively, boldly, and even recklessly. For example, a mother compared her two children and said:

She is very different probably because even as a baby when she would fall down when she was learning to walk out, she would sit there for a second and we said you were okay, get up. And she would get up. She just knows like she's tough. Her brother is the kind of child that if he tried to play basketball and was not good at it, he would not want to do it again. So we try to teach him like you have to keep trying, you are not great about everything. But with her they did not matter even if she was awful at it. She would do it just because she thinks it is fine.

A mother of two sons also emphasized that it was the temperament that made their children behave differently. The mother attributed her children’s difference to their own temperament. She did not think that parents’ expectations and treatment account for the differences of her boys:
I do not criticize his (the younger son) sensitivity. He is crying about something. It is like that is not something to cry about. It just could be personality because you know my older one, he does not cry very much at all. I do not think we started out treating them differently. We do not try to treat them differently. They do not have separate expectations either.

Children’s temperament of sensation seeking played a significant role in parental supervision in the U.S. sample. The possible explanation was that in this study the majority of the U.S. families had more than one child. In the same family environment, parents were inclined to attribute the differences of their children to children’s own characteristics rather than family factors. As they responded to children who had different temperament traits and behaved differently, their supervision varied. This finding was consistent with previous research that children’s temperament affected their interactions with parents and parents’ reactions to them (Chong, 2016).

In contrast, Chinese model did show the mediating role of parental supervision between children’s temperament of sensation seeking and their risk-taking behaviors. The path from sensation seeking to parental supervision was not significant, which means that Chinese parental supervision was not associated with their children’s temperament of sensation seeking.

There are two possible explanations for the nonsignificant relation. First, Chinese parents do not emphasize the role children’s temperament plays in their parenting practice. Similarly, Lee and her colleagues (2012) did not find a significant relation between children’s temperament and parenting in a Chinese sample. The relation existed significantly only if the parents have an authoritarian parenting style. Interview data of this study suggested that individuals’ innate traits were not important considerations when parents supervised their children’s activities. Parents
were inclined to follow their expectations for children rather than children’s attributes. For example, in the interviews almost all parents of boys expressed their expectations that boys should be bolder and take more risks than girls whether they perceived as bold or timid. They wanted their boys to challenge more physical risks, push their own limits, and become stronger through failures. Parental supervision adjusted for this expectation. A Chinese mother of a four-year-old boy said:

Sometimes my child is a little bit timid. He dared not to give a try if there was no previous experience. He is boy, not a little girl who could be delicate. A little boy will undertake bigger responsibilities in his future. When he was two years old, I encouraged him to climb on big and small rocks in a square. I persuaded him to try but he refused to do it all the time.

A Chinese boy’s father shared a similar idea, “I often educated him that how could a boy have no wounds on his body. I used to play soccer when I was young and got wounds all over the place. Those wounds were honors for boys”.

The second explanation of the nonsignificant association between children’s sensation seeking and parental supervision would be in relation to grandparents’ involvement. Grandparents take care of young children in the majority of families in China. (Chen, Zhang, & Chen, 2014; Doblin-MacNab & Yancura, 2017; Song, Deng, Shen, Cai, & Wang, 2016). Although young children receive their parents’ care mostly, grandparents’ involvement in childcare is necessary, and in most cases, taken for granted (Chen, Zhang, & Chen, 2014; Yang, 2013). In the interviews some parents mentioned the importance of grandparents’ role in their supervision for children’s risk-taking behaviors. Opinions of grandparents carried important weight in how parents deal with risky issues for the children. A mother gave an example:
Usually it is her grandparents who take care of her. Her grandparents were very careful. They were afraid of her falling and prevented her from any potential risk. I once wanted my child to take roller skating classes with her friend. But her grandparents did not want her to skate due to the possible danger. They said several times. Finally, I gave up because I did not want to go against her grandparents.

The data of the China’s sample supported the third hypothesis that parental supervision should mediate the effect of parents’ perception of risk on young children’s risk-taking behavior. The China’s model showed that parents’ perception of risk had indirect effect on their children’s risk-taking behaviors. The indirect effect was mediated by parental supervision. This finding indicated that parental supervision was associated with how parents perceived risks in their children’s daily activities.

In line with previous research (Niehues, Bundy, Broom, & Tranter, 2016), parents would limit children’s behavior if they perceived their child’s activity as potentially harmful more than beneficial. In contrast, they could tolerate the risks and even gave encouragement if they perceived the behavior as not so harmful as potentially beneficial to the child. For example, a Chinese mother in the interview said:

We do not encourage him to do things risks that we feel are dangerous to him. But we do encourage him to take risks that would help him. For instance, he does not like to go into a bouncy house with other kid. To him he perceives that as a risk. But we do not perceive that as a risk. So, we try to encourage him to do that because that is what a typical kid should do and that is how he becomes better socially. I mean he should be able to bounce in the bouncy castle. That is normal.

Another Chinese mother shared a similar experience:
He attempted many risky things even if I restricted him. I did not stop him forcefully but paid more attention on him and closely stayed with him, just in case. If he did not listen to me, I preferred excluding dangerous elements around him to restricting his behavior.

Chinese parents adjusted their supervision according to their perceptions of risks in different situations. Parents evaluated possible outcomes of children’s behaviors and took actions in their supervision in order to offer both protection and autonomy for their children simultaneously. Accordingly, children’s risk-taking behaviors increased or decreased.

Unlike the China’s model, U.S.’s parental supervision did not mediate the relation between parents’ perception of risks and children’s risk-taking behaviors. The path from parents’ perception of risks to parental supervision was not significant, which means that the U.S. parents’ supervision was not associated with how they perceived risks. This result confirms previous research (Guilfoyle, 2009).

Interestingly, the U.S. parents knew well about the inconsistency between what they thought and what they did. Their supervision did not always follow their risk perception in children’s activities. Although they perceived that some risk-taking behaviors were beneficial for children’s development, they could not overcome their own fear to tolerate their children to do such behaviors. A mother who was a preschool teacher said:

A lot of times when we are cooking at home and he wants to help us cut with a knife. I am afraid he might stab himself. There are tons of the scenarios I can come up with. I think that is very very appropriate for children to cook and participate in cooking. And that is as an educator and is somebody that has studied this kind of stuff. I do think that is very very important to allow children to be involved in that for so many reasons. As a parent that I guess I can only explain my hesitation by saying that I do fear that he is
going to poke a knife in his eyes that you cannot overcome that. But I do think that it is very very appropriate.

When asked if she was a protective mother, another mother answered, “I would say so. I try to not hover him, you know, when we when we go to the park because I want him to meet other kids and have fun. Maybe get hurt. (Laughing) I mean I do not want him to get hurt. But just experience being a kid. But yes, I would say I am very protective.”

Moreover, parents’ own experience about risk may account for the inconsistency between parents’ perception of risks and their supervision was parents’ own experience. Parents emphasized that how they supervised their children was heavily influenced by how they were raised by their own caregivers. Many of the parents used their own experiences of growing up as references to supervise their children. Parents were likely to follow what their caregivers did in their childhood. A father explained why he did not allow his sons to use a knife in the kitchen:

My grandparents and my mom always told me that, ‘listen, you are kids, we are adults, we have got in the kitchen.’ That’s is the background I come from, watching them cook, was not allowing me to involve, and I did try to pick up a knife. So, that is where I come from. I just know what was taught to me by my grandparents and by my mother. That is my background where I get opinions on what a child was allowed to do.

In addition, parental supervision altered by their prior engagement in risk situations. Those parents who received less adverse outcomes from their risky activities may be more tolerant of their children’s risk-taking behaviors (Franken, Gibson, & Rowlan, 1992). Therefore, it would be important to consider and examine the role parents’ previous experience played between their perception and supervision in future study.

Limitations
This study had a few limitations. First, this study was conducted in the central area of China and of the U.S. Education and financial income of Kaifeng and Memphis had been lower than the national average. It would be most appropriate to interpret the findings within the areas. China and the U.S. are large countries with significant diversity. Populations from other areas are likely to have different demographic, economic, and social characteristics which may alter attributes of both children and parents. Future work should recruit large samples from varying areas to overcome this limitation.

Second, besides the three factors (i.e., children’s temperament of sensation seeking, parents’ perception of risk, and parental supervision) of the model, several other potential factors emerged and may take on importance in young children’s risk-taking behaviors, such as children’s own evaluation of risks, grandparents in China, self-experience of the U.S. parents. Hao and Hsueh (2018) found that children’s risk-taking was influenced by their evaluation of risky behaviors. They exhibited more risky behaviors if they viewed the behaviors as unlikely to result in injury. Some studies suggested that grandparents were more protective and effective than parents in childrearing (Bishai et al., 2008; Henretig, Durbin, Kallan, & Winston, 2011). Our interview data also revealed the effect of grandparents on parental supervision. In addition, the interview data uncovered parents’ own prior experience about risks as an important source to influence parental supervision. These potential factors and their interactions with the current factors call for research on a more comprehensive model of young children’s risk-taking behavior.

Third, despite the variety of data collected (e.g., a computerized task BART-Y), the study relied more heavily on parent-report data (surveys and interviews). Although the two types data were adequate to achieve the two purposes of this study, it would be intriguing to also create
objective measures by having real-life observation scales, particularly for children’s sensation seeking, parents’ perception of risks, and parental supervision. By collecting both self-report and objective rating data, future researchers could exclude the differences in parents’ understanding of the surveys caused by culture and language.

Fourth, this study revealed both similarities and differences in the factors and the model of young children’s risk-taking behavior between the two cities. However, extant literature was limited to provide a deeper and stronger discussion for this study. Some possible explanations of the findings lack support of empirical evidence (e.g., the role of grandparents may account for the nonsignificant relation between children’s temperament of sensation seeking and parental supervision). It has been well demonstrated that Chinese grandparents take part in daily childrearing in majority of Chinese families (Chen, Zhang, & Chen, 2014; Doblin-MacNab & Yancura, 2017; Song, Deng, Shen, Cai, & Wang, 2016). It still remains unclear how grandparents’ involvement interrupts adjustment of parental supervision for children with different sensation seeking levels. Until now, research has primarily focused on how sensation seeking relates to the development of undesirable behaviors in adolescence, such as drug and alcohol abuse, gambling, and high-risk sexual behaviors (Okuda et al., 2020). The field focusing on sensation-seeking and its two-sided outcomes (i.e., positive and negative) in early childhood has received far less attention. To explore more supportive explanations and get a better interpretation of the cross-societal findings in young children’s risk-taking behaviors, we need more quantitative and qualitative research.

**Implications**

The current effort to identify factors and their pathways to childhood risk-taking has important implications for future research. This study offers possible guidance for the design and
implementation of programs to prevent harmful risk-taking as well as of approaches to promote beneficial risk-taking. This study sheds light on theoretical and practical implications for the field of young children’s risk-taking behavior, as discussed in the previous sections. In this section, I briefly summarize these ideas.

Theoretically, while Sandseter’s work (2010) was the first framework that considers risk-taking of preschool-aged children at both individual level and societal level, there had been no empirical supportive evidence for the framework. This study proposed an operational model with measurable factors built upon Sandeter’s conceptual relations of young children’s risk-taking behaviors. Researchers are encouraged to use the model as a base to begin with future studies.

Second, this study went beyond individuals’ immediate environments to recognize the importance of the large societal context in children’s daily risky issues. Risk-taking was not isolated and objective. This behavior was dependent upon children’s own traits, family characteristics, societal influence, as well as their relations. The findings could let us return to the social nature of risk. Risk-taking dynamically changed by people and contexts.

Third, although risk-taking has been widely associated with negative outcomes among adolescents and adults, the current examination of a risk-taking model in early childhood offered unique contribution that risk-taking behavior could play both positive and negative roles in child development as a function of how to deal with it. Like the context provided by the BART-Y test, modest elevations of many risk-taking behaviors listed in the measurement of parents’ risk perception may be beneficial and appropriate for preschoolers’ development. For example, playing with sharp objects (e.g., scissors and kitchen knife) results in harmful consequences or beneficial learning. On the one hand, children may cut themselves without careful use of the sharp tools. On the other hand, appropriately using these tools let them practice fine muscles,
obtain joy, and accumulate practical experience of life. This study revealed the two-sided nature of risk-taking behavior in early childhood.

Practically, parents and teachers who are struggling with young children’s risk-taking behaviors may derive advice from the findings. Children’s risk-taking behavior is not a standardized issue that applies across all different situations. Besides children’s own traits, caregivers’ perceptions and behaviors as well as societal influences work collaboratively to impact on early childhood risk-taking. Due to the important mediating role of parental supervision, we could decrease harmful risk-taking behaviors by changing parents’ perceptions about risks and increasing parental supervision. Meanwhile, adjusting parents’ perception and supervision are able to encourage children’s appropriate risk-taking activities. A recent study (Okuda et al., 2020) suggests that although high sensation seeking is related to undesirable behaviors, this trait is also associated with complex and creative occupations. It appears that high sensation seekers who live in maladaptive backgrounds are more likely to engage in delinquency, while those who come from adaptive contexts are more likely to engage in activities with positive risks. By learning more about strategies in supervision and improving societal contexts, we could protect our children with different temperament from engaging in problematic behaviors as well as guide them to express their traits in a healthy manner in risky situations.

Moreover, the group-comparison differences allow parents and educators to understand better about and thus to improve their own situations. For example, the China’s model and the U.S.’s model were different in the path between children’s temperament and parental supervision, which reminds Chinese caregivers that children’s temperament may have not be valued in daily parenting. Also, as a China-specific factor the effect of grandparents on parental supervision needs to be realized and could be utilized in collaboration with parents’ effort to deal
with Chinese children’s risk-taking issues. In turn, the nonsignificant path between parents’ risk perception and parental supervision may let the U.S. parents recognize the dilemma in their perception of risks and face the inconsistency between what they perceive and how they supervise for children’s risk-taking behaviors. The findings revealed that even if parents believed that taking some risks were necessary and beneficial for their children’s learning and development, they could not overcome their inner fear about the potential injury chance that their children may encounter and thus restrain the children’s activities. This finding could help the U.S. parents and educators reflect on their thoughts and behaviors and try to find a better balance between them in order to deal with children’s risk-taking issues.

Conclusion

Through two different types of data, this study is the first to examine young children’s risk-taking behaviors as a result of multilevel (i.e., individual, family, and societal) characteristics, considered individually and as a whole. The study assessed preschoolers’ risk-taking behaviors in relation to an individual characteristic (i.e., children’s temperament of sensation seeking), family factors (i.e., parents’ risk perception and parental supervision), and the big society. A clear message from the findings is that children’s risk-taking behaviors vary by not only each of the factors but also the relations between the factors. As a first attempt of its kind, this dissertation provides an initial step in a larger project moving toward two goals: (1) to further understand the complexity of young children’s risk-taking behavior, including the mediating role of parental supervision and other possible factors like children’s own evaluation of risks; and (2) to devise programs for teachers and parents to use with preschoolers. Attaining these two goals may offer a window through which we can protect preschoolers from maladaptive risk-taking behaviors and guide them to engage in adaptive risk-taking behaviors.
Theoretically and practically, this study has its unique implications and contributions.
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Appendices

Appendix A Parental Consent for Research

Dear Parent:

My name is Jun Hao, a doctoral candidate in Educational Psychology and Research at the University of Memphis. This letter is to invite you and your child participating in my dissertation study *A Comparative Study of Young Children’s Risk-Taking Behavior in the U.S. and in China*. This study helps examine how children’s temperament, parents’ risk perception, and parental supervision influence children’s risk-taking behavior in different cultures, the U.S. and China. Dr. Yeh Hsueh (yehhsueh@memphis.edu) is my advisor who supervises this study. Please read the following carefully and feel free to ask any questions you may have about the study.

In this study, each child will come directly from the classroom to a playroom or a preschool office. First, I will greet the child. Next, I invite the child to play a game on the computer screen used to assess the child’s risk-taking behavior. A red simulated balloon and a pump are displayed on the screen along with a measure of the child’s progress. The child will learn that each mouse click will pump up the balloon to make the balloon larger and the child earns a point. The points for each balloon could be added to an overall prize displayed as a ‘prize meter’ (Figure 1). The task contains 15 balloons in total. The child will receive a prize at the end of the task based on the length of the ‘prize meter’. The balloon might explode at any click (Figure 2). In this case, the points for that balloon will be lost. Before each click, the child needs to decide stopping clicking and saving his or her points for that balloon or continuing clicking to potentially increase both the points earned and the risk of exploding the balloon. When the game ends, each child will get a goodie bag with small toys for his or her participation. The whole process lasts for 5 minutes.

![Figure 1](image1.png) ![Figure 2](image2.png)

Your child would enjoy the brief session to click the mouse to pump up balloons and accumulate points to earn a maximum prize, which is playful and entertaining like a game. Your child might get a pleasure from the experience. There have been no known risks for your child involved in completing the survey study using an interactive computer program as designed for this study. I will make an effort to develop rapport with each child, and make the child feel at home.
You will receive **five dollars** as monetary compensation after you complete the questionnaires in the envelope. You will receive **extra ten dollars** after you participate in an individual 30-min interview at your convenient time and location. The preschool/kindergarten and University of Memphis do not have a fund set aside for compensation in the case of study related injury. It is very unlikely that any adverse incidents will take place during your child’s participation in this study.

Data in this study will not be used for any other purposes than this study. I will not share the questionnaires and the individual information on the questionnaire with the classroom teacher and the school director. All the completed records of the questionnaires will be stored in a locked file cabinet in the office accessible only by me. As data are entered in my computer, I will replace all participants’ names with ID numbers for all questionnaires immediately after the data collection. No other people will get access to the corresponding names for ID numbers. I will be the only person who may store, organize and open the data files. When the data need to be deleted, I will delete the file from the hard drive manually so that it is permanently deleted.

You or your child has the right to decide to discontinue participation anytime without any questions or negative consequences for the child. If you have any questions about this study or its possible effect, please feel free to contact Jun Hao at jhao@memphis.edu OR [9016267603 (U.S.) or 18609904832 (China)]. Really appreciate your support to this study!

**I have read this informed consent document and the material contained in it has been explained to me. I understand each part of the document, all my questions have been answered, and I have talked with my child. My child and I freely and voluntarily choose to participate in this study.**

Your Signature: ______________________________________________________
Name of your child: __________________________________________________
Date: __________________________
________________________________________

**Note**: Please take time to complete the questionnaires in the envelope after you have signed this consent form and return the complete questionnaires and this form in the envelope to the classroom teacher. You can leave a note if you want to know your child’s performance in the risk-taking testing game “pumping up balloons”. If you don’t want your child and yourself to be involved in this study, just return the blank form and the questionnaires in the envelope to the classroom teacher. Thank you so much! Best regards!

Are you willing to participate in an individual 30-min interview to know more about your child’s risk-taking behavior and talk about your risk perception and supervision for your child at your most convenient time and location? The interview might be audio-recorded. You will receive **extra ten dollars** after the interview. If YES, please leave your contact information **HERE**:
Chinese Version of Appendix A 致家长信

亲爱的家长：

您好，我是郑俊，目前就读于美国孟菲斯大学教育心理系。我想邀请您和您的孩子参与我的博士论文项目《通过多组路径模型分析中国与美国年幼儿童风险行为的比较研究》。以下我会详细介绍这个研究项目，期待得到您的了解与支持！

一、研究目的

本研究旨在调查中美幼儿气质类型、家长对于幼儿风险行为的观念、家长的看护行为、以及社会文化背景这四个因素对幼儿风险行为的影响。

二、研究步骤

如果您和孩子参与这个研究，您将收到一份调查问卷（请见附件）。该问卷用于调查幼儿的基本信息（如，性别、年龄、民族）、家庭信息（如，父母学历）以及可能影响幼儿风险行为的四个因素，即幼儿气质类型、家长对幼儿风险行为的观念、家长的看护行为、以及社会文化背景。

您完成问卷并返给班级老师后，在幼儿园一活动室或者教室，我会单独邀请您的孩子完成一个“打气球”的电脑小游戏用于测试幼儿的风险行为水平。在游戏中，幼儿在屏幕上看见一个红色的小气球和一个积分尺（如图一）。幼儿点击一下气球下的“打气”按钮，气球就增大一点。持续点击“打气”，气球会持续增大。如果点击积分尺下面的”收集积分“按钮，当前气球的得分就会被累积到积分尺，然后屏幕出现一只新的小气球。气球增大过程中有随时爆炸的可能（如图二），爆炸气球的得分就会丢失。幼儿在每次点击鼠标打气前，需要作出权衡：是停止打气收集当前气球的已有得分，还是冒着气球可能爆炸的风险继续打气由此获得更多得分。游戏一共有 15 个气球，最后根据积分尺中所累积的积分，幼儿能够获得相应的小礼物。整个游戏大约 5 分钟。

之后，我将邀请完成问卷并且有意愿参与访谈的家长进行大约半小时的一对一交流，具体时间地点再与您协商。如果您有兴趣，我将把通过游戏和问卷了解到的孩子的特点与您分享和交流。

三、潜在的教育价值

- 让研究者、教育者及家长了解中美幼儿感觉寻求维度的气质类型的异同
- 让研究者、教育者及家长了解中美幼儿家长对幼儿风险行为观念和看护行为的异同
- 让研究者、教育者与家长了解不同文化背景下，幼儿风险行为与其影响因素之间关系的变化

四、研究保密性与联系方式

研究所有流程都将遵照相关研究规范，保护参与者的隐私和权益。所有调查信息只用于研究本身的目的，绝对不会公开。如果您有任何问题，请联系郑俊（邮箱：jhaomemphis.edu；电话：185-1871-9901）。

如果您同意参与本研究并允许您的孩子参与，请您百忙中抽出 20 分钟完成问卷（请见附件）并返回给老师。非常感谢您对本研究的大力支持！祝您一切顺心如意！

孩子姓名：

父母签名：
Appendix B Young Children’s Risk-taking Questionnaires

Dear Parent,

Please take approximate 15 minutes of your time to complete the questionnaires after you have signed the form of Parental Consent for Research. Really appreciate your time and big support!

**Basic Demographic Information**

1. Your child's name:

2. Child's birthday (year and month, e.g., 2000.10):

3. Child's gender (circle one):
   a. Boy
   b. Girl

4. Child’s ethnicity (Please identify):

5. Your age (e.g., 35):

6. You are (circle one):
   a. Mother
   b. Father
   c. Grandparent
   d. Other (please specify):

8. Are you the primary caregiver of your child?
   a. Yes
   b. No

7. Your education:
   a. Elementary school
   b. Middle school
   c. High school or secondary school
   d. Junior college
   e. College school
   f. Graduate school

8. Your household annual income:
   a. Less than $30,000
   b. $30,000 - $60,000
   c. $60,000 - $90,000
   d. $90,000 - $120,000
   e. More than $120,000
# Sensation Seeking Scale for Young children

Please read the two options (a/b) of each item and select the one you think that your child prefers

**My child prefers to:**

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Go to a zoo where the animals are not in cages</td>
<td>Go to a zoo where the animals are in cages</td>
</tr>
<tr>
<td>2</td>
<td>Listen to soft, gentle music</td>
<td>Listen to loud, bouncy music</td>
</tr>
<tr>
<td>3</td>
<td>Chase a cat around a house for fun</td>
<td>Pet a cat sitting on his/her lap</td>
</tr>
<tr>
<td>4</td>
<td>Watch kids on a merry-go-round at an amusement park</td>
<td>Watch kids riding on a big roller coaster at an amusement park</td>
</tr>
<tr>
<td>5</td>
<td>Watch a video of a car exploding</td>
<td>Watch a video of a car being built</td>
</tr>
<tr>
<td>6</td>
<td>Walk through a field of flowers</td>
<td>Climb to the top of a big hill</td>
</tr>
<tr>
<td>7</td>
<td>Turn off the lights to see glow in the dark stickers on the ceiling</td>
<td>Not turn off the lights and just look at the non-glow stickers</td>
</tr>
<tr>
<td>8</td>
<td>Listen to a soothing story before bed</td>
<td>Listen to an exciting story before bed</td>
</tr>
<tr>
<td>9</td>
<td>Jump into the water in a swimming pool</td>
<td>Slowly get into the water in a swimming pool</td>
</tr>
<tr>
<td>10</td>
<td>Look out the window while it is softly raining</td>
<td>Look out the window while it is thundering and lightning</td>
</tr>
<tr>
<td>11</td>
<td>Go to a playground that he/she always goes to</td>
<td>Go to a new playground where he/she had never been before</td>
</tr>
<tr>
<td>12</td>
<td>Watch a video that he/she has never seen before</td>
<td>Watch a video that he/she has seen before</td>
</tr>
<tr>
<td>13</td>
<td>Play a game that he/she has played before</td>
<td>Play a new game that he/she has never played before</td>
</tr>
</tbody>
</table>
14  a  Play with a new toy that he/she has never played with before  
    b  Play with a toy that he/she has played with before
15  a  Look at a book that he/she has looked at before  
    b  Look at a book that he/she has never looked at before
16  a  Play with a group of children he/she doesn’t know well  
    b  Play with a group of children he/she knows well
17  a  Go down a slide feet first  
    b  Go down a slide fast headfirst
18  a  Climb high on the jungle gym  
    b  Swing gently on a swing set/Climb high on the jungle gym
19  a  Sit on a stationary horse on a merry-go-round  
    b  Ride on a horse moves on a merry-go-round
20  a  Ride a tricycle fast  
    b  Ride a tricycle slowly
21  a  Walk along and balance on a curb when out for a walk  
    b  Walk on the sidewalk when out for a walk
22  a  Climb a chair to put his/her teddy on a shelf  
    b  Put his/her teddy on a shelf without climbing a chair
23  a  Jump as high as he/she can on a trampoline  
    b  Bounce gently on a trampoline
24  a  Jump into a ball pit  
    b  Slowly get into a ball pit
25  a  Run and slide around on a slippery carpet in stocking feet  
    b  Walk on the carpet
26  a  Ride fast on a rocking horse  
    b  Rock gently in a rocking chair
27  a  Sit on a spin-around toy on the floor and have someone spin him/her  
    b  Spin other kids on the spin-around toy
Parents' Risk Perception Scale

Please read each item and select the one you think that best describes you.

<table>
<thead>
<tr>
<th>Items listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 If your child runs out into the street, how likely is injury to occur?</td>
</tr>
<tr>
<td>0. Not at all likely</td>
</tr>
<tr>
<td>1.2 If injury occurs, how serious is that injury?</td>
</tr>
<tr>
<td>0. Not serious at all</td>
</tr>
<tr>
<td>2.1 If your child jumps off furniture or other structures, how likely is injury to occur?</td>
</tr>
<tr>
<td>0. Not at all likely</td>
</tr>
<tr>
<td>2.2 If injury occurs, how serious is that injury?</td>
</tr>
<tr>
<td>0. Not serious at all</td>
</tr>
<tr>
<td>3.1 If your child rides bike in unsafe areas, how likely is injury to occur?</td>
</tr>
<tr>
<td>0. Not at all likely</td>
</tr>
<tr>
<td>3.2 If injury occurs, how serious is that injury?</td>
</tr>
<tr>
<td>0. Not serious at all</td>
</tr>
<tr>
<td>4.1 If your child plays with fire, how likely is injury to occur?</td>
</tr>
<tr>
<td>0. Not at all likely</td>
</tr>
<tr>
<td>4.2 If injury occurs, how serious is that injury?</td>
</tr>
<tr>
<td>0. Not serious at all</td>
</tr>
<tr>
<td>5.1 If your child puts fingers or objects near appliances or outlets, how likely is injury to occur?</td>
</tr>
<tr>
<td>0. Not at all likely</td>
</tr>
<tr>
<td>5.2 If injury occurs, how serious is that injury?</td>
</tr>
</tbody>
</table>
6.1 If your child leaves the house without permission, how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

6.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

7.1 If your child refuses to use seat belt or to stay seated in car, how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

7.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

8.1 If your child plays with sharp objects (e.g., scissor or knife), how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

8.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

9.1 If your child pulls/pushes over furniture or heavy objects, how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

9.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

10.1 If your child puts objects or nonfood items in mouth, how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

10.2 If injury occurs, how serious is that injury?
<table>
<thead>
<tr>
<th>0. Not serious at all</th>
<th>1. Slightly serious physical damage</th>
<th>2. Somewhat serious physical damage</th>
<th>3. Fairly serious physical damage</th>
<th>4. Very serious physical damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.1 If your child &quot;take chances&quot; on playground equipment, how likely is injury to occur?</td>
<td>0. Not at all likely</td>
<td>1. Somewhat likely</td>
<td>2. Pretty likely</td>
<td>3. Very likely</td>
</tr>
<tr>
<td>11.2 If injury occurs, how serious is that injury?</td>
<td>0. Not serious at all</td>
<td>1. Slightly serious physical damage</td>
<td>2. Somewhat serious physical damage</td>
<td>3. Fairly serious physical damage</td>
</tr>
<tr>
<td>12.1 If your child tries to climb on top of furniture or cabinets, how likely is injury to occur?</td>
<td>0. Not at all likely</td>
<td>1. Somewhat likely</td>
<td>2. Pretty likely</td>
<td>3. Very likely</td>
</tr>
<tr>
<td>12.2 If injury occurs, how serious is that injury?</td>
<td>0. Not serious at all</td>
<td>1. Slightly serious physical damage</td>
<td>2. Somewhat serious physical damage</td>
<td>3. Fairly serious physical damage</td>
</tr>
<tr>
<td>13.1 If child explores places that are off limits, how likely is injury to occur?</td>
<td>0. Not at all likely</td>
<td>1. Somewhat likely</td>
<td>2. Pretty likely</td>
<td>3. Very likely</td>
</tr>
<tr>
<td>13.2 If injury occurs, how serious is that injury?</td>
<td>0. Not serious at all</td>
<td>1. Slightly serious physical damage</td>
<td>2. Somewhat serious physical damage</td>
<td>3. Fairly serious physical damage</td>
</tr>
<tr>
<td>14.1 If your child plays carelessly or recklessly, how likely is injury to occur?</td>
<td>0. Not at all likely</td>
<td>1. Somewhat likely</td>
<td>2. Pretty likely</td>
<td>3. Very likely</td>
</tr>
<tr>
<td>14.2 If injury occurs, how serious is that injury?</td>
<td>0. Not serious at all</td>
<td>1. Slightly serious physical damage</td>
<td>2. Somewhat serious physical damage</td>
<td>3. Fairly serious physical damage</td>
</tr>
<tr>
<td>15.1 If your child comes into contact with hot objects, how likely is injury to occur?</td>
<td>0. Not at all likely</td>
<td>1. Somewhat likely</td>
<td>2. Pretty likely</td>
<td>3. Very likely</td>
</tr>
</tbody>
</table>
15.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

16.1 If your child behaves carelessly in or around water hazards, how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

16.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

17.1 If your child teases and/or approaches unfamiliar animals, how likely is injury to occur?
0. Not at all likely  1. Somewhat likely  2. Pretty likely  3. Very likely

17.2 If injury occurs, how serious is that injury?
0. Not serious at all  1. Slightly serious physical damage  2. Somewhat serious physical damage  3. Fairly serious physical damage  4. Very serious physical damage

**Parental Supervision Attribute Scale**
Please read each item and select the one you think that best describes you

<table>
<thead>
<tr>
<th>Items listing</th>
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<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>0. Never</td>
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<tr>
<td>2</td>
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<td>0. Never</td>
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<tr>
<td>3</td>
</tr>
<tr>
<td>0. Never</td>
</tr>
<tr>
<td>4</td>
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</tbody>
</table>
5 I let my child learn from his/her own mistakes.

6 I try to keep risky devices (knife, lighter, etc.) out of my child’s reach.

7 I encourage my child to take risks if it means having fun during play.

8 There is at least one adult (e.g., myself or babysitters) who is watching my child.

9 I let my child take some chances in what he/she does.

10 I feel a strong sense of responsibility of keeping my child safe.

11 I feel very protective of my child.

12 Childhood injuries can be prevented by adults’ effort.

13 I think it is necessary to warn my child of potential dangers all the time.

14 I think that my child needs adult supervision all the time.
Chinese Version of Appendix B
《幼儿风险行为的相关因素调查问卷》

请您仔细阅读每一道题目，并选择与实际情况最为贴近的选项。并希望这份问卷能让您更了解您的孩子和您的教育行为。

幼儿基本信息

1. 幼儿出生年份 [单选题]
   ○2010 ○2011 ○2012 ○2013
   ○2014 ○2015 ○2016 ○2017

2. 幼儿出生月份 [单选题]
   ○1 月 ○2 月 ○3 月 ○4 月
   ○5 月 ○6 月 ○7 月 ○8 月
   ○9 月 ○10 月 ○11 月 ○12 月

3. 幼儿性别 [单选题]
   1）男     2）女

4. 幼儿民族 [单选题]
   1）汉族     2）少数民族

5. 您是孩子的 [单选题]
   1）母亲     2）父亲     3）祖辈     4）其他（请注明）：

5-1. 您是孩子日常的主要看护人和照料人么 [单选题]？
   1）是     2）否

6. 您的年龄 (请填写，如 35)：

7. 您已经获得的最高学历文凭证书是 [单选题]：
   1）小学    2）初中    3）高中或者中专    4）大专    5）大学    6）研究生及以上

8. 您的 [家庭] 年收入 [单选题]：
   1）少于 3 万    2）3 万-6 万    3）6 万-9 万    4）9 万-12 万    5）12 万以上

注：您完成问卷之后，想邀请您进行大约 30 分钟的一对一访谈以进一步了解您的育儿方式和育儿理念。如果您有兴趣，我将通过“打气球”小游戏和问卷了解到的孩子的特点与您分享和交流。如果您同意参与访谈，请在这里留下您的联络方式（具体时间和地点再与您协商）；
幼儿气质类型

1. 二者相比，您的孩子可能更喜欢［单选题］
   1）去野生动物园（动物没关在笼子里）  2）去传统动物园（动物关在笼子里）

2. 二者相比，您的孩子可能更喜欢［单选题］
   1）听舒缓、轻柔的音乐    2）听大声、节奏感强的音乐

3. 二者相比，您的孩子可能更喜欢［单选题］
   1）在家里追逐猫/狗    2）抚摸猫/狗

4. 二者相比，您的孩子可能更喜欢［单选题］
   1）在游乐场看别的孩子玩旋转木马    2）在游乐场看别的孩子玩过山车

5. 二者相比，您的孩子可能更喜欢［单选题］
   1）看有汽车爆炸内容的视频    2）看有汽车组建内容的视频

6. 二者相比，您的孩子可能更喜欢［单选题］
   1）在花园散步    2）爬高山

7. 二者相比，您的孩子可能更喜欢［单选题］
   1）把房间灯关上，在黑暗中看天花板上的夜光贴纸    2）不关上房间的灯，看天花板上的贴纸

8. 二者相比，您的孩子可能更喜欢［单选题］
   1）睡前听温情的故事    2）睡前听刺激的故事

9. 二者相比，您的孩子可能更喜欢［单选题］
   1）一下跳进泳池    2）慢慢进入泳池

10. 二者相比，您的孩子可能更喜欢［单选题］
    1）在窗前看下小雨    2）在窗前看打雷闪电

11. 二者相比，您的孩子可能更喜欢［单选题］
    1）去常去的游玩场地    2）去之前没有去过的游玩场地

12. 二者相比，您的孩子可能更喜欢［单选题］
    1）看之前没有看过的电视节目    2）看之前看过的电视节目
13. 二者相比，您的孩子可能更喜欢 [单选题]
   1）玩之前玩过的游戏       2）玩之前没有玩过的游戏

14. 二者相比，您的孩子可能更喜欢 [单选题]
   1）玩之前没有玩过的玩具     2）玩之前玩过的玩具

15. 二者相比，您的孩子可能更喜欢 [单选题]
   1）看之前看过的书     2）看之前没有看过的书

16. 二者相比，您的孩子可能更喜欢 [单选题]
   1）与不熟悉的小朋友玩耍     2）与熟悉的小朋友玩耍

17. 二者相比，您的孩子可能更喜欢 [单选题]
   1）脚朝下滑滑梯     2）头朝下滑滑梯

18. 二者相比，您的孩子可能更喜欢 [单选题]
   1）在攀爬架/网的高处攀爬     2）在攀爬架/网的低处攀爬或者缓缓荡秋千

19. 二者相比，您的孩子可能更喜欢 [单选题]
   1）坐在静止的旋转木马上     2）乘坐移动的旋转木马

20. 二者相比，您的孩子可能更喜欢 [单选题]
   1）快快地骑儿童三轮车     2）慢慢地骑儿童三轮车

21. 二者相比，您的孩子可能更喜欢 [单选题]
   1）走在马路沿（牙）上     2）走在行人道上

22. 二者相比，您的孩子可能更喜欢 [单选题]
   1）踩着板凳把玩具放在架子高处     2）不踩板凳把玩具放在架子低处

23. 二者相比，您的孩子可能更喜欢 [单选题]
   1）在蹦床上尽力跳到最高     2）在蹦床上轻轻跳

24. 二者相比，您的孩子可能更喜欢 [单选题]
   1）一下跳进海洋球的池子里     2）慢慢进入海洋球的池子里

25. 二者相比，您的孩子可能更喜欢 [单选题]
1）在地板上跑着并滑起来              2）在地板上走

26. 二者相比，您的孩子可能更喜欢 [单选题]
   1）在摇马上快速摇摆              2）在摇马上轻轻摇摆

27. 二者相比，您的孩子可能更喜欢 [单选题]
   1）坐在可以旋转的玩具上，让别人把他/她旋转起来
   2）推可以旋转的玩具，使别的小朋友旋转起来

家长对幼儿风险行为的态度

1.1 如果孩子跑到街道上去，您认为孩子受伤的可能性有多大？[单选题]
   1）不会受伤              2）有点可能              3）很有可能              4）极有可能

1.2 如果孩子出现以上行为并且受伤，会有多严重？[单选题]
   1）不会受伤              2）轻微小伤              3）受伤但不严重              4）较为严重              5）非常严重

2.1 如果孩子从家具上往下跳，您认为孩子受伤的可能性有多大？[单选题]
   1）不会受伤              2）有点可能              3）很有可能              4）极有可能

2.2 如果孩子出现以上行为并且受伤，会有多严重？[单选题]
   1）不会受伤              2）轻微小伤              3）受伤但不严重              4）较为严重              5）非常严重

3.1 如果孩子在不安全的区域骑自行车，您认为孩子受伤的可能性有多大？[单选题]
   1）不会受伤              2）有点可能              3）很有可能              4）极有可能

3.2 如果孩子出现以上行为并且受伤，会有多严重？[单选题]
   1）不会受伤              2）轻微小伤              3）受伤但不严重              4）较为严重              5）非常严重

4.1 如果孩子玩火，您认为孩子受伤的可能性有多大？[单选题]
   1）不会受伤              2）有点可能              3）很有可能              4）极有可能

4.2 如果孩子出现以上行为并且受伤，会有多严重？[单选题]
   1）不会受伤              2）轻微小伤              3）受伤但不严重              4）较为严重              5）非常严重

5.1 如果孩子把手指或物品放进电源插座里或放在电器周围，您认为孩子受伤的可能性有多？
   1）不会受伤              2）有点可能              3）很有可能              4）极有可能

5.2 如果孩子出现以上行为并且受伤，会有多严重？[单选题]
   1）不会受伤              2）轻微小伤              3）受伤但不严重              4）较为严重              5）非常严重
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<th>内容</th>
<th>选项</th>
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<tr>
<td>6.1</td>
<td>如果孩子未经允许离开家，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>6.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>7.1</td>
<td>如果孩子拒绝乘座儿童安全座椅，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>7.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>8.1</td>
<td>如果孩子玩尖利物品（如，刀和剪刀），您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>8.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>9.1</td>
<td>如果孩子挪动家具或者很重的东西，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>9.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>10.1</td>
<td>如果孩子把不可食用的东西放进嘴里，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>10.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>11.1</td>
<td>如果孩子在游乐设施上做一些冒险行为，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>11.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>12.1</td>
<td>如果孩子攀爬家具，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
<tr>
<td>12.2</td>
<td>如果孩子出现以上行为并且受伤，会有多严重？（单选题）</td>
<td>1）不会受伤   2）轻微小伤   3）受伤但不严重   4）较为严重   5）非常严重</td>
</tr>
<tr>
<td>13.1</td>
<td>如果孩子探索不让玩耍的区域，您认为孩子受伤的可能性有多大？（单选题）</td>
<td>1）不会受伤   2）有点可能   3）很有可能   4）极有可能</td>
</tr>
</tbody>
</table>

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13.2 如果孩子出现以上行为并且受伤，会有多严重？ [单选题]
1）不会受伤  2）轻微小伤  3）受伤但不严重  4）较为严重  5）非常严重

14.1 如果孩子玩耍起来很不管不顾，您认为孩子受伤的可能性有多大？ [单选题]
1）不会受伤  2）有点可能  3）很有可能  4）极有可能

14.2 如果孩子出现以上行为并且受伤，会有多严重？ [单选题]
1）不会受伤  2）轻微小伤  3）受伤但不严重  4）较为严重  5）非常严重

15.1 如果孩子触摸高温的东西，您认为孩子受伤的可能性有多大？ [单选题]
1）不会受伤  2）有点可能  3）很有可能  4）极有可能

15.2 如果孩子出现以上行为并且受伤，会有多严重？ [单选题]
1）不会受伤  2）轻微小伤  3）受伤但不严重  4）较为严重  5）非常严重

16.1 如果孩子在水池很近的地方乱跑乱跳，您认为孩子受伤的可能性有多大？ [单选题]
1）不会受伤  2）有点可能  3）很有可能  4）极有可能

16.2 如果孩子出现以上行为并且受伤，会有多严重？ [单选题]
1）不会受伤  2）轻微小伤  3）受伤但不严重  4）较为严重  5）非常严重

17.1 如果孩子接近或逗玩陌生的动物，您认为孩子受伤的可能性有多大？ [单选题]
1）不会受伤  2）有点可能  3）很有可能  4）极有可能

17.2 如果孩子出现以上行为并且受伤，会有多严重？ [单选题]
1）不会受伤  2）轻微小伤  3）受伤但不严重  4）较为严重  5）非常严重

家长对幼儿风险行为的看护

1. 孩子在玩耍时我待在孩子附近以便出现什么状况我可以迅速作出反应。 [单选题]
1）从不  2）偶尔  3）有时  4）经常  5）总是

2. 我鼓励孩子去尝试新事物。 [单选题]
1）从不  2）偶尔  3）有时  4）经常  5）总是

3. 我一定要知道孩子在哪里以及在干什么。 [单选题]
1）从不  2）偶尔  3）有时  4）经常  5）总是

4. 我让孩子在没有大人看管的情况下独自玩耍。 [单选题]
1）从不  2）偶尔  3）有时  4）经常  5）总是

5. 我让孩子从自己的错误中吸取教训并学习经验。 [单选题]
1）从不  2）偶尔  3）有时  4）经常  5）总是
6. 我尽量让孩子远离一切危险物品（如，刀和打火机等）。【单选题】
   1）从不   2）偶尔   3）有时   4）经常   5）总是

7. 只要孩子从玩耍中获得乐趣，哪怕存在一定风险我也会鼓励孩子去尝试。【单选题】
   1）从不   2）偶尔   3）有时   4）经常   5）总是

8. 我确保至少有一位成年人在照看孩子。【单选题】
   1）从不   2）偶尔   3）有时   4）经常   5）总是

9. 我让我的孩子冒险尝试一些事情。【单选题】
   1）从不   2）偶尔   3）有时   4）经常   5）总是

10. 我对孩子的安全负有很大的责任。【单选题】
    1）非常不同意   2）不同意   3）中立   4）同意   5）非常同意

11. 我对孩子的保护欲很强。【单选题】
    1）非常不同意   2）不同意   3）中立   4）同意   5）非常同意

12. 我认为通过大人的努力可以防止孩子受伤。【单选题】
    1）非常不同意   2）不同意   3）中立   4）同意   5）非常同意

13. 我认为时刻提醒孩子可能存在的危险是有必要的。【单选题】
    1）非常不同意   2）不同意   3）中立   4）同意   5）非常同意

14. 我认为我的孩子随时需要大人照看。【单选题】
    1）非常不同意   2）不同意   3）中立   4）同意   5）非常同意
Appendix C Interview Materials

Attributes

- Able to accept mistakes and learn from them
- Able to make good decisions
- Assertive
- Compassionate
- Confidence
- Courage
- Curiosity
- Independent
- Joy
- Kind
- Passionate
- Power
- Recognition
- Resilient
- Sense of belonging
- Self-content
- Socially just
- Spirituality
- Wealth
- Wisdom

Questions

1. What are the three most important attributes you selected for your child and why?
   您认为对您孩子来说最重要的三个品质是什么？为什么？

2. What do you think about risk-taking behavior in your child’s development?
   您怎么看孩子成长过程中出现的风险的行为？

3. Why does your child do something risky?
   您觉得孩子为什么会做一些有风险的事情？

4. How do you describe the behavior style of your child?
   您会怎么描述孩子的行为风格？

5. What are the advantages and disadvantages of taking risks for young children?
   孩子喜爱挑战风险、尝试风险的利与弊？
6. The media often portrays contemporary parents as over-protective. Do you view yourself as an over-protective parent?
现在媒体描述父母的形象都是非常保护孩子，您觉得自己对孩子的保护欲强么？

7. What would do if your child did something dangerous?
如果孩子在做危险的事情你会怎么做？

8. How do you evaluate risks of child’s behaviors?
您如何判断孩子行为的风险水平呢？

9. Do you let your child learn from her/his own mistakes, any example?
你会让孩子从他的错误中学习么？譬如什么事？

10. What do you think the role of failure and injury in your child’s development?
您觉得失败和受伤对孩子成长的作用是什么？
Appendix D IRB Approval

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<tbody>
<tr>
<td><strong>Title:</strong> Mediating Role of Parents' Supervision in Young Children's Risk-Taking Behavior: A Comparative Study</td>
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<td><strong>Creation Date:</strong> 12-25-2017</td>
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<td><strong>End Date:</strong> 3-9-2019</td>
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<td><strong>Status:</strong> Expired</td>
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<td><strong>Principal Investigator:</strong> Jun Hao</td>
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<td><strong>Review Board:</strong> University of Memphis Full Board</td>
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<td><strong>Sponsor:</strong></td>
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