

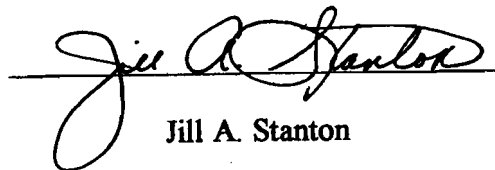
Cultural Determinants in Chinese and American Preschool
Children's Understanding of Physical
Laws and Social Rules

by

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A handwritten signature in cursive script, reading "Jill A. Stanton", is written over a horizontal line. The signature is fluid and stylized, with the first name "Jill" and last name "Stanton" clearly legible despite the cursive style.

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ABSTRACT

Developmental psychology research strives to answer the question of how children's thought processes develop. In 1998 Charles Kalish performed a study to answer the question if children interpret the limitations of physical and social laws differently. Within his study, children were presented with pictures and a story related to each picture. The children were then asked if this action in each scenario could be done. His empirical study found that children's responses to the story scenarios were generally appropriate when the conformity to limitations was voluntary versus automatic. The question he brought from his research is "what is the role of mental states and processes within understanding each case's outcomes?" The data found in Kalish's study regarding conformity and theory of mind, leads to a study regarding the prediction of higher theory

of mind through higher executive functioning skills. Sabbage, Xu, Carlson, Moses, and Lee (2001) studied the link of executive functioning skills and theory of mind between cultures. The study compared a group of U.S. preschoolers with a group of Chinese preschoolers in their executive functioning skills and theory of mind. It was found that Chinese preschoolers demonstrate superior executive functioning skills to US preschoolers; however, Chinese preschoolers' executive functioning is not predictive of their theory of mind.

Although Kalish's study (1998) and Sabbage's et al. study (2006) were different studies, they both focused on the child's understanding of mental states. The proposed study would utilize Kalish's questions and processes but apply them to a comparison between Chinese and American preschoolers in order to investigate whether or not a difference of their reasoning to conformity to social and physical laws exists. The proposed study may aid in the development of instructional strategies targeted towards schools with growing Asian populations, although, the research can not necessarily be generalized.

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Chapter One: Introduction

There are physical laws and social rules that cause people to say something cannot happen. People tend to react differently between human-intentional phenomena, or social rules, and impersonal-physical phenomena or physical rules, and make decisions based on these principles. Most children are able to distinguish between these different phenomena at a very early age (Spelke, Phillips, & Woodward, 1995). Most people in all cultures are faced with situations of this nature and conform to these principles of the physical law or social rule.

Physical laws are acts in nature which are recognized within the scientific community. They are found to hold similar properties that have been generalized through many years of experimentation. The laws of nature can be mathematically expressed through a specific mathematical equation but are not exact (Feynman, 1965). Physicists continue to modify the equations for laws, such as the speed of light. The speed of light is an example of physical speed that cannot be changed by other variables. People can interpret these laws as impersonal-physical phenomena (Kalish, 1998) the conformity to these phenomena based on the law being (im)possible. The law is not based on human actions; therefore, it may be viewed as less personal and clearer cut. For example, if a plate falls off the table, will gravity cause it to hit the floor? The law of gravity would explain the reason that the plate would in fact fall to the floor. It is a mathematical concept and inevitable. Most humans learn conformity to this type of law as they experience these phenomena growing up or study the properties behind them.

Social rules are based on human intentions and interactions. They are reliant on the presence of rules or restriction through a social framework (Shoham & Tennenholz,

1997). Conforming to social rules or conventions is based on the principle of permission. The conformity is more personal than the theory behind a physical law and the outcome is due to a person's actions. Social rules are designed to limit other's actions such as in a game or competition. For example, competitors may have a better chance of winning if they false start. Can a racer start before they are allowed to win (Kalish, 1998)? This is a dilemma of choice, which can be moral in existence.

Physical laws and social rules can sometimes be ambiguous in nature. Kalish (1998) found that children are able to distinguish between social conventions and physical laws by about age five. However, when a physical law is presented in a way in which it contains societal driven contexts, it may be unclear. For example, "A car cannot travel faster than the speed of light." The physical law is established through the reference of speed of light, which holds all characteristics of a physical law discussed above. A social context is established through the use of a car in the statement. The use of a car challenges the person with the decision of driving at the speed of light. The conformity to this statement is more ambiguous because of a desire to drive a car at a very fast speed.

Children raised in American society are generally taught to test limits and value independence. Less structured learning environments and use of computers in schools incorporates "knowledge-in-actions" versus "knowledge-in-context" throughout the history, literature, culture, and mathematics curriculum (Applebee, 1996). This knowledge in action was a shift from traditional teaching where the communication model of instruction was practiced (Land & Jonasses, 2000), which is the relay of

knowledge from an instructor to a learner. Innovative classrooms have emerged providing more independence to students in their learning.

Classes, such as the "Pegasus Program," which was an innovative gifted and talented classroom set up in Plymouth, Wisconsin during the early 1990's, have changed the way some teachers' present knowledge. Students in this class participated in independent computer courses and learned at a personal rate. The growth in technology and change in demographics across educational systems has challenged the vision of traditional teaching. Within the U.S., the 21st century learner is viewed to be independent, self-motivated, and inquisitive in learning (Ben-Jacob, Ben-Jacob, & Levin, 2000). Innovative learning is valued at all levels of education, and from an early age, students are expected to be active learners including questioning their instructors about what they are learning. Newer education models are based on the presentation of a problem and solution found through students' use of reasoning skills. Students look for the explanations supporting their ideas or premises and are taught to challenge hypotheses. Innovative techniques in teaching and learning are the movement of education in American schools built of logic based on reasoning.

Education systems around the world do not necessarily embrace America's value of learning through discovery and independent reasoning. Many Pacific Asian cultures approach education through a very different method of teaching. Unlike Western cultures, most Asian cultures are collective and meet personal goals by working through others. The Chinese seem to place high value on formal education and achieving marks or grades. Generally Chinese students are expected to perform well in school to represent the family name. Low performances are usually viewed as shameful. The Chinese

education system is a reflection of these values. Students generally learn concepts through repetition and memorization. They are not usually encouraged to question reasoning, but taught that a premise just exists. Most Chinese students do not ask why or ponder the reasoning behind a law or rule. These students are not allowed in their education to challenge premises, and unlike Western educational models, their education model generally does not value discovery and creativity in learning.

Many cultures may follow similar development within theory of mind processes. Theory of mind is the ability to make judgments or assumptions about others' mental states (Wellman, 1992). By age three most children begin to distinguish between physical phenomena and human-intentional phenomena. Preschoolers begin to understand their own mental states as well as others' around them. Voluntary conformity involves interpreting the psychological states of others, thus knowing the law and intending to comply with it (Kalish, 1998). As a result, children begin to interpret conformity to voluntary behavior. Chinese and U.S. preschoolers performed similarly on theory-of-mind tasks (Sabbage, Xu, Carlson, Moses, & Lee, 2006), while Chinese preschoolers outperformed U.S. preschoolers in executive functioning tasks. Sabbage and colleagues' research in 2006 supports advanced executive functioning in at a young age to have higher impulse control, such as seen in Chinese preschoolers. However, the process of their reasoning behind their elevated executive functioning is unknown.

Statement of the Problem

Although Kalish's study (1998) and Sabbage's et al. study (2006) were different studies, they both focused on the child's understanding of mental states. The proposed study would utilize Kalish's questions and processes but apply them to a comparison

between Chinese and American preschoolers in order to investigate whether or not a difference of their reasoning to conformity to social and physical laws exists.

Advanced executive function along with theory-of-mind understanding should provides students with greater abilities to engage in opportunities to distinguish between mental states and reality, and to take advantage of these experiences. The Chinese culture seems to consistently place higher value on achievement within formal education. However, on the basis of increased analytical thinking in American students when compared to Chinese students, it is hypothesized that there would be a negative relationship between the Chinese preschoolers' theory-of-mind abilities and their ability to reason with social rules or physical laws.

Definitions of Terms

For discussion of the topic of conformity to laws it is necessary to define the following terms:

Developmental psychology. Theories of how a child's thinking changes from infancy to adulthood (Grolier Education, 2002).

Culture. The learned behaviors of a group of people who have their own values, language, and set of rules (Brisk, 2008).

Physical laws. Laws of nature; generalization which are based on years of experimentation and are recognized in the scientific community (Feynman, 1965).

Social conventions/rules. Generally accepted social norms (Kalish, 1998).

Executive functioning. The ability to apply and control mental skills such as: behavior and emotions, memory, planning, problem solving, and attention (Sabbage, Xu, Carlson, Moses, & Lee, 2006).

Chapter Two: Literature Review

The role of developmental psychologists is to search for evidence to explain the path of development demonstrated by children (Grolier Education, 2002). Developmental psychology strives to explain how a child's thinking evolves from infancy through adulthood. Most current research that describes and explains children's development has predominantly been completed within Western cultures (Nelson, Scott, Holtz, and Maykut, 2000). Recently, a movement of expanding knowledge about human development into non-Western cultures has become a priority to professionals within the field of developmental psychology. Today, there is a concern for multi-cultural research and knowledge within developmental psychology textbooks and training curricula. It has deepened researchers' understanding of the intricacy and diversity in development (Boyatzis, 1992).

Since the foundation of developmental psychology, its core make up of theories and research is credited to renowned persons such as Sigmund Freud, Erik Erikson, Jean Piaget, Lawrence Kohlberg, Lev Vygotsky, and B. F. Skinner. Both Piaget and Vygotsky have dedicated their lives' work to answering the questions of the developing mind: 1) What develops? and 2) How does it develop? (Grolier Education, 2002). They also describe development as it happens in stages or as discontinuous changes. Vygotsky defined the stages of development as the progression of internalizing one environment and culture, which is related to thought and language separately. Piaget defined his stages of development as the organization of positive thought activity, which reflects the interaction with one's environment.

Vygotsky explained the development of thought as three distinct stages. During the first stage, children's thought activities appear to be random. Objects and experiences are combined in an unorganized fashion. A child may connect the appearance of a guardian with being picked up or fed. The second stage is associated with "thinking in complexities." The complexities provide a logical and consistent manner of categorizing objects and events. They are formed through contrasts in occurrences versus similarities. Children may begin to distinguish animals as dogs and cats. Within the third stage of development of thought the child forms the ability to recognize abstract properties of objects and events. Children begin to analyze information in more complicated ways. Words begin to be linked to thoughts. For example, children may start to describe features of a dog as furry or small. Vygotsky believes that play and having a mentor figure are the two most important components to successful child development. This is because children have opportunities during play to use mental tools and learn from "tutors" whom have already mastered skills (Grolier Education, 2002).

Piaget's stages reflect the intellectual process of how a child comes to know his or her world (Grolier Education, 2002). Piaget divides this process into four stages: sensorimotor stage, preoperational stage, concrete operations stage, and formal operations. The sensorimotor stage is from birth to two, when the child is first beginning to interact with his or her environment. During this stage the brain goes through the majority of changes it will experience in its lifespan. Children make gains in two crucial areas during the sensorimotor stage. They acquire object permanence and the ability to use representations to stand for something else. This stage of life begins with the child's natural reflexes and ends with using representations, possibly in combinations. The

preoperational stage is the stage of life between two years and seven years old. This stage is marked by further development of representation and beginning comprehension of the world. Children also begin to use symbols and signs for things in the environment, and they are able to begin seeing the world from another person's viewpoint. However, their ability to understand the transformation of size and shape is not yet developed. The third stage, from age seven to eleven, is the concrete operations stage. During this stage, the proportions of similar volumes in different sized containers are recognized as the same. This is an example of a concrete operation, which provides opportunities for further experimentation with various object properties. Children lack the ability to plan yet and are not systematic thinkers. The final stage defined by Piaget is the formal operations stage. Children begin to show metacognition or the understanding of thinking about thinking. They are also able to think about possible events and not just actual events and different methods of solving a problem. This stage begins at about age eleven.

Piaget's research marked two limitations seen in young children: attention and memory. Attention through infancy is linked to the child's cognitive development during his or her preschool years (Santrock, 1997). Preschoolers are attracted to the predominant features of the task at hand such as material that is flashy to the eye or loud noises. Memory is described as the retention of information. Most research suggests that short-term memory and retention increase during early childhood. Children are able to retain 5 chunks of information by age 7 compared to 2 chunks at age 3. Both attention and memory play an important role in developing a child's ability to understand mental states.

Vygotsky and Piaget both demonstrated interest in the development of a child's internal thought processes (Grolier Education, 2002) and how children come to know

their world. There is a consistent interest in children developing intentional-mental states and understanding cultural norms established who he is. Kalish's (1998) research investigates whether preschoolers are able to distinguish between the automatic and voluntary conformity, which he links as well to children's mental states.

Much research has shown that children of Western descent within the preschool age of 3.1 to 4.11 years old begin to distinguish between social rules and physical laws (Kalish, 1998). Sabbage et al. (2006) further described the ability to make inferences to others' mental states as "theory of mind". Sabbage and colleagues carried out a study to demonstrate the connection of executive functioning and theory of mind within and between cultures.

To understand preschoolers' abilities to distinguish between social rules and physical laws, Kalish (1998) investigated whether children's reasoning behind conforming to actions was automatic (physical necessity) or voluntary (intentional choice). While adults are able to see the discrepancy between automatic conformity and voluntary conformity, children are just beginning to understand these premises at this age.

There was little evidence supporting children's ability to learn voluntary and automatic conformity prior to Kalish's study in 1998. However, one dated piece of support was a 1968 study of children's understanding of actions involving moral obligations, such as children's higher scores when the information was socially related versus physically necessary on Wason's (1968) task of hypothesis testing. Harris & Nunez (1996) examined, as a part of a study, a child's reasoning behind their mother's

rule to put a coat on before going outside. Most adults see this as a voluntary action. Up until this point, it was unknown if children would make the same connection.

Kalish's study (1998) provided knowledge of how children discriminate between different laws. He assessed children's reasoning to conformity through asking why the violation of both social and physical laws could not occur. We accept differently when conformity is a personal choice rather than automatic. Examples of these questions are: "Can an object travel faster than the speed of light?" compared to, "Can a car travel faster than the speed limit?" The discrepancy of reasoning between the types of questions is the object cannot travel faster than the speed of light because it is a physical law or impossible. However, a car can travel faster than the speed limit. This is possible, but societal laws state this action is impermissible. Kalish's objective was to understand the child's perception of why things can't happen. "Why can't the car exceed the speed limit?" or "Why can't people steal money?" How children responded to these questions provides further understanding of their reasoning of social conventions and physical laws. How children discriminated between social conventions and physical laws provides understanding of how environment influences children's cognitive development.

In the same study by Kalish (1998), 24 American, white children were asked a series of questions related to social conventions or physical laws. Twelve children comprised the younger group (mean = 3.7, range = 3.0 to 4.1) and twelve children (mean = 4.9, range = 4.7 to 4.11) made up the older group. Each child was given the following instructions: "I'm going to show you some pictures of some kids. These kids want to do all sorts of different things. Will you help me figure out which things they can do and which things they can't do?" (Kalish, p.709, 1998). After the stories, which were

accompanied by a drawing, the children were asked a question: "Can this boy [accomplish the action]?" Depending on the child's response of can or can't to the story, the children were asked to respond to "How" or "Why not?" The child's reasoning behind his or her answers were coded by a system comprised of three justifications: cause, reason, neutral.

The coding system was developed to score the children's level of understanding to their reasoning. A variety of responses by a child could be coded as cause or reason. A response was coded as cause if the child made reference to a physical restriction or any changes needed to conclude the action. For example, "He's not tall enough to touch the ceiling." Statements containing possibility or impossibility were included in the cause justification. "It is impossible for a boy to grow a beard" (Kalish, p. 709, 1998). Reason justifications were coded to responses that inferred a social command or unwanted consequences ("His parents won't let him;" "He will ruin his shoes"). The child provided an interpretation of complying with rules set by people, such as parents or teachers or understanding consequences to actions. The neutral responses included unclear stances to the stories ("He has to take his shoes off;" "He needs to sleep") and using category in responses ("Because he is not a girl;" "Boys don't fly"). These responses were ambiguous or empty.

Kalish (1998) compiled evidence supporting that by age five children understood the difference between automatic and voluntary conformity to laws. When compared to adult assumptions about when conformity is automatic or a voluntary choice, children's justifications were appropriate. This distinction involves the complex process of knowing the law and planning to follow it. The role of mental states and applying these mental

states to produce an outcome is involved in the process of reason. For example, it is inferred from the justification “he can’t because his shoes would get wet” (Kalish, 1998) that the child wishes for dry shoes. The mental state of the child in the story was provided in the response of the child being asked, which is explained through theory of mind.

Theory of mind is described and explained by the ability to make inferences about others’ mental states. The cognitive process of understanding mental states underlies the ability to engage in complex social interactions. Thus a higher theory of mind could be positively correlated to the ability to produce appropriate reason to social restrictions and physical laws.

The evolution of theory of mind began with Premack and Woodruff (1978), investigating chimpanzees’ ability to forecast human actions. The interest spread to other developmental psychologists, such as Wimmer and Perner (1983), who linked children’s understanding of false beliefs or what was once believed is actually wrong. Studies compiled by Wellman (1988) introduced a criterion that must be met in order to distinguish the presence of theory of mind: (a) the child must prove to have basic constructs for defining reality, (b) the basic constructs must be organized into logical systems, and (c) the child must have developed a casual-attribution framework of human behavior. Wellman found that beginning at age two, children are capable of directing representations, such as those seen in pretend play, which differ from reality. Wellman and his colleagues (1988) demonstrated that children at 4 years of age might have difficulty with false-belief tasks; however, they do not show difficulty with representations that differ from the way the world is. For example, young preschool-aged

children understand that mental images of objects differ from real objects. They are also able to predict other's behavior based on other's desires.

Furthermore, in the field of theory of mind, the understanding of mental states is referred to children's developing perceptions of mental activity. Theory of mind is an important social tool for children. It provides the cognitive processes of explanation, prediction, and manipulation of behavior of others (Wellman, 1992). Gaining theory of mind also may be influential in the development of particular forms of reasoning.

Preschoolers have an understanding that people hold minds, which are a summation of their beliefs, desires, and emotions (Meltzoff, Gopnik, & Repacholi, 1999). Prior to this age, children do not recognize that people may have beliefs that differ from their own (Ritblatt, 2000). By age 5, children grasp a more mature theory of mind that allows them to interpret human action in a mental framework by acknowledging that people may have different thoughts and beliefs (Astington, 1993).

Many studies regarding theory of mind connect individual's theory of mind tasks to executive functioning tasks (Sabbage et al., 2006), such as response inhibition, problem-solving skills, and working memory. The understanding of children's abilities in theory of mind provides understanding of the link between perceived inputs and human behaviors that are tied to these perceptions.

Little research has been done cross-culturally in the field of theory of mind. In some Asian cultures, children may show superior executive functioning to U.S. children (Sabbage et al., 2006). One existing support to more mature executive functioning is that Chinese preschoolers are expected to show impulse control by age 2, rather than U.S. children from whom we do not have the same expectations until preschool. Chinese

preschools place higher value on impulse control than U.S. preschools (Tobin, Wu, & Davidson, 1989). Another existing factor in demonstrating higher executive functioning may be a genetic link to attention-deficit hyperactivity disorder (ADHD), which is correlated with a lower performance on executive functioning. The 7-repeat allele of the dopamine receptor gene, associated with ADHD, is carried by only 1.9% of Southeast Asians, compared to 48.3% of Americans, which suggests that US preschoolers may have a genetic predisposition to ADHD compared to most Asian preschoolers (Sabbage et al., 2006).

Sabbage et al. (2006) carried out a study to demonstrate the connection of executive functioning and theory of mind within and between cultures. Their participants included 109 Chinese preschoolers from ages 3.0 to 4.11 years and 107 American preschoolers of identical age. The U.S. preschoolers had zero to five siblings while the Chinese preschoolers did not have siblings, due to China's one child law. Both groups of preschoolers were of the same socio-economic class and the sample ratio of girls to boys was consistent between groups. Participants were tested through measures of verbal ability, theory of mind, and executive functioning. These tasks were presented to the preschoolers individually during two, taped sessions. The results showed that Chinese and U.S. children in the study showed no significant difference in their verbal abilities and theory of mind tasks; however, Chinese preschoolers did outscore their American counterparts in executive functioning tasks. No cultural bias was observed in the formatting or presentation of the task; therefore, it may be strongly suggested that on the type of tasks tested, Chinese preschoolers show advanced abilities in executive functioning.

The piece of the study which is of concern is the split between Chinese preschoolers' performances on executive functioning tasks and theory of mind tasks. Particularly, the task of expression seen in executive abilities should predict the child's theory of mind abilities. Chinese preschoolers did not demonstrate a correlated relationship between their advanced ability to inhibit responses and their theory of mind (Sabbage et al., 2006).

The findings to the study done by Sabbage et al. (2006), suggested that advanced executive functioning does not predict advanced theory of mind between cultures. The influence of environmental factors may be eminent in the development of perceiving mental states of others and applying reason to the voluntary actions of others. One environmental factor may be that Chinese and American children differ in the number of siblings they have. China law, prohibiting more than one child per family restricts Chinese children from having brothers or sisters. The number of siblings within the household can somewhat predict development of theory of mind (Sabbage et al., 2006). Chinese children, as a result, may have fewer occasions available to talk with other children about mental states. Therefore, differences in children's reasoning of conformity to social rules and physical laws may also be seen between cultures.

A study by Nelson et al. (2000), based on Kalish (1998), compared Tibetan refugee children living in exile in Northern India to children in the United States matched by age, gender, and approximate years of formal schooling. The children were read, in their respective language, short stories accompanied by line drawings. Each story would end with a question. For example, "Here is a little boy who wants to turn into a bird and fly away. Can he do that? Can he turn into a bird?" Following the child's response he or she

was asked “How?” or “Why not?” The interpretation provided by the child was coded using Kalish’s (1998) system. Nelson’s et al. (2000) study suggests that a child’s ability to distinguish between social conventions and physical laws are seen in both Tibetan and U.S. students by age five. There was a similar trend demonstrated within the result of cause justifications; however, the reason justification was slightly, but not significantly, higher in Tibetan students. The results suggest that cultural different could play a role in the child reasoning of conformity to social and physical laws.

Chapter Three: Discussion and Critical Analysis

The system of education ultimately is a reflection of the larger culture it exists within. One view of education focuses on the 21st century learner, viewed to be independent, self-motivated, and inquisitive in learning (Ben-Jacob, Ben-Jacob, & Levin, 2000). Innovative learning is valued at all levels of education, and, from an early age, students are expected to be active learners including questioning their instructors about what they are learning. The system catering to the independent learner also encourages the analytic thinking and the challenge of premises and theories. On the contrary, other systems demand more discipline be placed on learners. For example, Sabbage et. al. stated Chinese preschools demand children as young as two years old show impulse control. These systems seem to value learning through a more disciplined system. Research results of children of these systems seem to indicate demonstration of superior executive functioning skills; however, the same superior skills are not present in their intentional-mental states or theory of mind.

Conformity to Rules and Laws

Kalish studied preschoolers' understanding of conformity to social and physical laws which cannot be violated. Within his study, Kalish (1998) emphasized whether children were forecasting voluntary or automatic conformity in several scenarios. Voluntary conformity is defined as "indicating behavior as socially forbidden and would cause an unwanted outcome". An automatic conformity was seen as "understanding that conformity is due to a physical constraint upon the action". Prior research to Kalish's study in 1998 supported the idea that children share adultlike understanding in their thought processes, although, they might be limited by whether children distinguish

between the social (voluntary) and physical (automatic) limitations (Schultz & Wellman, 1997). For example, do children distinguish between the limitations of floating in air differently from the restriction against hitting another person?

Results from Kalish's study

Developmental psychology research strives to answer the question of how children's thought processes develop. In 1998 Charles Kalish performed a study to answer the question if children interpret the limitations of physical and social laws differently. Within his study, children were presented with pictures and a story related to each picture. The children were then asked if this action in each scenario could be done. The correct response included the action could not happen. When the child responded with "it can't", the child was then asked "how" or "why not?" The child's responses were coded into three types of responses: cause, reason, and neutral. Kalish found that children's responses to the story scenarios were generally appropriate when the conformity to limitations was voluntary versus automatic. Children seemed to consider the differences between impermissibility and impossibility. Some responses were coded as neutral as a result of failing to reference a constraint on the action due to cause or reason. Furthermore, both younger (ages 3.0 to 4.1) and older children (ages 4.7 to 4.11) provided more cause than reason validation to physical actions. The older group also provided more reason than cause explanations for social situations. Although, the younger group did provide reason responses to social actions, too many responses were coded as neutral to provide any statistical significance.

Essentially, Kalish found that children ages 3.0 to 4.11 have an understanding, which is similar to adults, of the difference between actions that are impermissible and

those that are impossible. The question he brought from his research is “what is the role of mental states and processes within understanding each case’s outcomes?”

Theory of mind – Chinese v. American preschoolers

Previous to 2001, much of the research linked advanced executive functioning to advanced theory of mind skills. Wellman (1992) promoted children by age three as having a theorylike conceptualization of mind. He stated that children understand the difference between thoughts and beliefs versus what is actuality. Sabbage, Xu, Carlson, Moses, and Lee (2001) studied the link of executive functioning skills and theory of mind between cultures. The study compared a group of U.S. preschoolers with a group of Chinese preschoolers in their executive functioning skills and theory of mind. It was found that Chinese preschoolers demonstrate superior executive functioning skills to US preschoolers; however, Chinese preschoolers’ executive functioning is not predictive of their theory of mind. Their study showed that highly developed executive functioning forecasts highly developed theory of mind within cultures but not between cultures.

Limitations on Research

There may be some relevant limitations to the study of Chinese and U.S. preschoolers’ conformity to social and physical laws. Studies by Ruffman, Perner, Natio, Parkin, and Clements (1998) link the number of siblings to the child’s development of theory of mind. Siblings within a household provide increased opportunities for children to talk about their mental states with one another. Chinese law prohibits more than one child per household; therefore, the opportunities to discuss their mental states with another person, other than parents, at an early age is not as forthcoming as U.S. preschoolers who mostly come from families of multiple siblings.

Kalish (1998) expressed a concern within the interpretation of results in his study. Many children provided uninformative responses, which as a result could not be interpreted as cause or reason. The ambiguous responses were coded as neutral and not used in the final interpretation of results. Another concern within the study was the amount of interpretation placed on the coders. The interpretation of cause, reason, and neutral responses was a conservative process and human error could have happened.

There may be forecasted limitations to working with Chinese preschoolers. A general concern is working with the language barrier. It is imperative to completely train the interpreters to ensure the most accurate data and work with preschoolers who attend a comparable preschool.

Implications o Future Research

Developmental psychologists seek to describe and depict the role of development in children. Since its origin as a discipline within the scientific field, theorists such as Sigmund Freud, Erik Erikson, Jean Piaget, Lev Vygotsky, and B.F. Skinner have dedicated their lives' work to finding the path of development of children and adolescents. The majority of research has focused on describing children's development within families of Western decent. However, as the disciplines within the field of development evolve to include more diverse needs, more diverse research is needed.

There is some information known about Chinese preschoolers' development of reasoning. Research in China is restricted and possibly more complicated than performing research in the United States. In 2001 a study of preschoolers' conformity to social and physical laws was completed in India with Tibetan refugees. The study found similar results to Kalish's result on U.S. preschoolers. However, until 2001 no known

studies were completed with Chinese mainland preschoolers regarding reasoning or development. One empirical study compared executive functioning and theory of mind and found that Chinese preschoolers' executive functioning skills are not predictive of their theory of mind (Sabbage et al., 2001). No other research comparing U.S. and Chinese preschoolers' reasoning has been done since. In order to contribute to this foundational knowledge base, future cross-cultural research studies comparing Chinese and U.S. children could be done in order to distinguish and identify further cultural variation within development and education.

The proposed study is based on Kalish's (1998) study, which will hold similar properties of age, gender, and comparable preschool programs. The implications for further research in duplicating Kalish's (1998) may provide more in-depth knowledge of how diversity of cultural systems affects education.

Within the field of development and educational systems across the United States, diversity has become an area of concern. By the year 2030, the Asian, African Americans, and Hispanic minority groups will make up over one third of the United State's population (Bush, Damminger, Daniels, Laoye, 2005). The need for better knowledge, understanding and instructional strategies within a diverse population is imperative to ensure children will continue to receive a quality education. Existing research has brought forth the question of cultural differences in development of children's reasoning and what impact this has on education and success within the United States school systems. Future research will provide opportunities to address these questions in an Asian population for whom importance within the U.S. system has increasing value.

Summary

Developmental psychology research strives to answer the question of how children's thought processes develop. In 1998 Charles Kalish performed a study to answer the question if children interpret the limitations of physical and social laws differently. Within his study, children were presented with pictures and a story related to each picture. The children were then asked if this action in each scenario could be done. His empirical study found that children's responses to the story scenarios were generally appropriate when the conformity to limitations was voluntary versus automatic. The question he brought from his research is "what is the role of mental states and processes within understanding each case's outcomes?" The data found in Kalish's study regarding conformity and theory of mind, leads to a study regarding the prediction of higher theory of mind through higher executive functioning skills. Sabbage, Xu, Carlson, Moses, and Lee (2001) studied the link of executive functioning skills and theory of mind between cultures. The study compared a group of US preschoolers with a group of Chinese preschoolers in their executive functioning skills and theory of mind. It was found that Chinese preschoolers demonstrate superior executive functioning skills to U.S. preschoolers; however, Chinese preschoolers' executive functioning is not predictive of their theory of mind.

Although Kalish's study (1998) and Sabbage's et al. study (2006) were different studies, they both focused on the child's understanding of mental states. The proposed study would utilize Kalish's questions and processes but apply them to a comparison between Chinese and American preschoolers in order to investigate whether or not a difference of their reasoning to conformity to social and physical laws exists. The

proposed study may aid in the development of instructional strategies targeted towards schools with growing Asian populations.

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