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Children's Use of Race in Drawing Inferences Based on Their Understanding of Race Constancy

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CHILDREN'S USE OF RACE IN DRAWING INFERENCES BASED ON THEIR UNDERSTANDING OF RACE CONSTANCY

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I would like to thank Jackson for all the good times. I will not forget you my friend.

Table of Contents

Page

List of Tables

Page

List of Figures

Page

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Abstract

Children's understanding of race constancy and their subsequent use of race as a means of drawing inductive inferences were investigated. Race constancy was determined by children's tendency to say that people could change category membership by changing their outside appearance. A second phase of the study measured how many race-based inferences children made relative to other social categories such as age or sex. The results indicated that children who had a better understanding of race constancy were also more likely to use race as a means of drawing inductive inferences. These findings support a developmental progression of race constancy and give insight to the development of potential bias and stereotypes.

Introduction

Categorization is one of the fundamental cognitive processes by which people make sense of the world. Among other applications, categories prevent us from treating each individual object or event as an entirely unique and unknown entity, categories help us to communicate with and comprehend others, and they also permit us to form expectations or draw inferences about unfamiliar objects and events. Without the ability to categorize things based on shared characteristics, every person, object, event, and experience would be viewed as individual entities making the world incomprehensible. Instead, categorization provides humans with the ability to reduce the complexity of the world into a manageable and efficient system that allows us to make inferences about new objects that we encounter (Gelman, 1988).

Although we know people have to categorize incoming information, researchers still do not fully understand the process by which categories are formed. For the first half of the twentieth century, psychological approaches to category formation took a definitional approach called the classical view. This theoretical model argues that every object is ether “A” or “not A” with no in-between cases. Furthermore, the classical view did not make any distinction between category members. Anything that meets the definition is just as good a category member as anything else (Murphy, 2002). The empirical and theoretical work during the 1970s led by Eleanor Rosch argued against the classical view (Gil-White, 2001). Researchers argued that the classical view could not explain the conceptual representations that humans might use to form the basis of classification. In real life, there are many things that cannot be discretely determined as belonging to one category or another. For example, is a tomato a fruit or vegetable? Researchers argued that each category has a prototype that best represents that category,

and the classical view does not account for this possibility. The classical view has since been replaced in popularity with the prototype and exemplar theories, which are strongly unclassical in nature and can account for the conceptual representations that humans use to form categories (Murphy, 2002).

There are three types of conceptual representations that humans might use to form the basis of classification: nominal kinds, artifacts, and natural kinds. This project will only focus on the last two. Artifacts are objects that are constructed by humans, and consequently are defined in terms of their function, rather their internal structure (Gelman, 1988). Examples include birdfeeders, buckets, airplanes, and tape recorders. According to Schwartz (1979), a "natural kind" is any object that is defined entirely by its underlying properties. These underlying properties can be considered the "essence" of the object they represent. Gelman and Markman (1987) state that "natural kinds have a deep, non-obvious basis" and also "natural kinds capture theory-based properties rather than superficial features" (p.1532-1533). Plants, animals, or other naturally occurring objects are examples of natural kinds. For example, the underlying properties (i.e., essence) create a belief of what a "bird" should be and therefore allow humans to draw inferences based upon these beliefs. The idea that humans use an object's essence to define, classify, or draw inferences about the object is what Medin and Ortony (1989) termed "psychological essentialism." Whether or not an essence actually exists within the object is irrelevant, instead, what is crucial is that humans actually believe an essence exists and consequently use it in order to form categories (Medin & Ortony, 1989). Because these beliefs are based on conceptual or internal characteristics rather than perceptual or external characteristics, research suggests that many people tend to treat natural

categories as fixed and unchanging regardless of dramatic changes in appearance (Keil, 1989).

A body of research has shown that adults tend to essentialize natural categories, meaning they categorize objects based upon non-obvious properties, which they consider unchanging and constant (Keil, 1989). Do children also treat natural kinds in a way that is consistent with psychological essentialism? Keil (1989) presented children in kindergarten, second, and fourth grade with a series of stories and pictures describing various physical changes to several animals. For example, various changes were described about a raccoon that eventually caused it to resemble a skunk (for example, dyed black, bleached white strip, given an odor). Keil found that like adults, children agreed that animal categories remained fixed regardless of external transformations. These results also showed an age-related increase in children's willingness to say animals could not change categories. The data showed that the older the participants were, the more likely they were to say that animals could not change category membership. From this research, it seems that young children understand that animal categories reflect more than external features and include deeper non-obvious properties as well (Diesendruck, Gelman, & Lebowitz, 1998). Finally, Gelman and Markman (1986) found that similar to adults, children also drew inductive inferences about novel stimuli based upon the animal's presumed essence. This body of research provides evidence that children do view animal categories in a way consistent with "psychological essentialism."

Because humans are considered animals (i.e., natural kinds) researchers over the last few years have questioned to what extent adults view human categories as having essences. Anthropologist Gil-White (2001) verbally asked three questions to 59 participants from the Torgouud territory in Mongolia to determine whether they viewed

ethnicity in a way consistent with "psychological essentialism." Gil-White told participants about a Kazakh couple who had a child they did not want. At a very young age, the child was given up for adoption to a Mongol family. The child was never told of the adoption and grew up learning only Mongol customs. Participants were then asked what is the ethnicity of the child. Gil-White found that participants were more likely to say that the child would continue to be the ethnicity to which he/she was born. As mentioned, this study is not a traditional psychological study, thus its findings while insightful, should be interpreted with caution when applied to the field of psychology. Madole, Keleman, Glerum, and Webb (1999) presented 76 adults a series of twelve stories describing changes to people, animals, and artifacts. Each story was accompanied by a before and after transformation picture of the target object. Subjects were then asked to indicate to which category membership these stimuli belonged. Madole et al. found that adults essentialized race as much as animal species, and, even more surprising, adults were more likely to say that humans could change their sex than their race.

For the purpose of this project, two important conclusions can be drawn from these research findings: 1) Because humans are seen as natural kinds, they remain fixed in their respective category regardless of transformations to external appearance, and 2) humans defined as natural kinds have a presumed essence about them that can then serve as a tool for drawing inductive inferences about how members of that category may behave (Murphy, 2002). Although we know that adults view race in a manner consistent with these conclusions, we have not yet explored the nature of children's views regarding race. Therefore, do children view race in the same way, thus essentializing race and believing inferences can be made from race? Two opposing bodies of literature will be reviewed to examine this question in further detail.

Researchers have debated to what extent children's view of race is similar to that of adults. At what age do children acquire the belief that race remains constant regardless of external transformations? Is this idea something that appears during infancy or does this idea of an internal "essence" develop as children grow older? Researchers on one side of the debate have argued that young children gradually develop racial categories relying on perceptual cues rather than essentializing properties like adults (Aboud, 1988; Semaj, 1980). According to this view, children do not understand that race is related to abstract qualities, so their reasoning about race involves associating similarities rather than conceptually based categorization. Aboud (1988) reports that while adults think of a person's race as something that is inherited from his/her parents, children do not comprehend inheritance at an early age and are fooled by external features. Not only are children fooled by external features, Ramsey (1987) suggests that preschool children believe these racial features are temporary and changeable, caused by environmental conditions (for example, the tanning effects of the sun).

Correctly applying an ethnic label or identifying which doll goes with a given ethnic label is a common way to measure children's understanding of racial categories. Aboud (1988) reviewed various studies demonstrating that a significant proportion of children at 4 and 5 years of age can identify different ethnic groups fairly accurately, but it is not until age 6 and 7 the children reach close to 100% percent accuracy especially in identifying Black and White. Semaj (1980) argued that until minimal skills for classifying people according to their ethno-racial group are achieved, children would not be able to achieve racial constancy. As children's cognitive processing of racial information changes developmentally so does their ability to classify according to racial categories. Semaj (1980) asked African-American children three hypothetical questions

about the possibility of a child changing his or her race. For example, “Can a Black child become a White child if he or she really wants to?”; “Can a Black child become a White child if he or she changes the color of his or her skin with white makeup?”; and “Can a Black child become a White child if he or she changes the color of his or her skin with white makeup and puts on a white wig?” Semaj found that only 20% of 4-5 year-olds “knew” that a Black person could not become a White and 40% of the oldest children in the study (10-11) consistently said that race was unchangeable. Semaj’s results demonstrate that preschool children understand that people are classified into different racial categories, but do not fully understand the reasons or permanence of these groupings until around age 9 or 10. Furthermore, complete mastery may not occur until the child is beyond age eleven suggesting a gradual development of racial constancy. Further evidence in favor of children’s increasing cognitive understanding of race is their understanding of the cause of skin color. Research by Clark, Hocevar, and Dembo (1980) tested the extent to which children understood what causes a persons skin to be a certain color. Subjects were asked, “How is it that this person is white” or “How is it that this person is black.” Researchers found that around age 7, children were aware that there were physical origins of a person’s skin color; however, children did not make the link to the parents until after age 7.

Glerum (2002) replicated the methodology used by Madole et al. (1999) to examine whether children essentialized race in the same manner as adults. Glerum presented preschoolers, 2nd, and 4th graders stories adopted from Madole et al., (1999). Race stories introduced a person of either black or white appearance. The target was described as looking and acting like “most Black/White boys/girls” while growing up. A visit to the doctor was then described, during which the physician changed the external

characteristics of the target to resemble the opposite ethnicity. Pictures followed each story of the target's supposed biological parents or neighbors, a picture of the target before visiting the doctor, and a post transformation picture. Glerum found that older children were more resistant to the idea that a person could change racial categories than younger children. Fourth graders were more likely than 2nd graders and preschool children to indicate that race was constant regardless of changes in external characteristics. This evidence supports the idea that a cognitive shift takes place between 2nd and 4th grade, which causes children to view race as a constant with more essentializing properties.

The other side of the debate argues that children do in fact have an adult-like, "common-sense," theory of race from a very young age. Hirschfeld (1995) explains that past research in this area measured constancy by asking children if a certain property is essential to a person's identity. These types of studies typically involve a comparison of children's judgments about the possibility of racial change by altering nonessential cues (e.g., dress) with judgments about the possibility of racial change by altering essential features (e.g., skin color). Hirschfeld argues that while these studies use properties that are familiar to children, they do not involve transformations that are unfamiliar to them. For example, children may understand that skin color is important to determining racial identity, however, the actual transformation, a European American changing into a person of African American appearance, is outside their realm of experience. From this, Hirschfeld argues past research may underestimate children's understanding of race because subjects have been asked to determine a person's identity while relying on unfamiliar changes in the person's appearance. In one particular study, Hirschfeld (1995) presented children with a triad of pictures including a target and two comparison pictures.

The target picture depicted an adult, whose race, occupation, and body build were all portrayed. Each of the comparison pictures showed children that matched the target on two out of the three properties. For example, one comparison might match by occupation and body build while the other comparison would match by body build and race. Hirschfeld found that 3-, 4-, and 7-year-old children selected a comparison picture that racially matched the target more often than they selected the picture matching the targets physique or occupation. He interprets these results to support his claim that young children do in fact essentialize race just as adults do. It is arguable that the pictures presented could just have easily been associated together based on color rather than race. The unrealistic nature of the stimuli makes the color of the drawings a more salient factor when determining similarities than does body build or occupation. Past research has shown that young children do in fact use color as an important factor while sorting objects (Sugarman, 1983). To account for the possibility that children were relying on color rather than race, Hirschfeld conducted a second experiment. In this experiment, children were shown a target picture (e.g., heavyset African American male) and then they were shown two comparison pictures. One of the pictures resembled the target based on shape (e.g., light colored bulbous car) the other resembled the target based on color (e.g., black colored thin car). Hirschfeld found children are no more likely to sort based on shared color than based on overall shape. Based on these results, Hirshfeld concluded that children as young as three years of age do in fact believe that race is something that remains constant (i.e., fixed) regardless of external transformations. From this evidence, Hirshfeld suggested that young children rely more on internal properties (i.e., genetics) to classify humans into racial categories; therefore, children do essentialize race in ways similar to adults. It seems, at best, a stretch to draw support for his overall findings based

upon his second experiment. Skin color is in external attribute, which proves nothing about children's understanding of the internal basis of race. Also as noted, children rely on color as an important factor while sorting objects (Sugarman, 1983).

In a study by Landau, Smith, and Jones (1998), three- and five-year-old children were shown a novel object and told it was a "dax." When given another object of the same shape, the toddlers assumed they too were also "daxes," even if the objects differed in size, texture, and color. Based on these conclusions it would seem that shape is also an important factor for children when classifying objects. So if both shape and color are important for children at this age, it would be probable that significant differences would not be found in children's reliance upon them when sorting objects, which is exactly what Hirschfield (1995) found. His findings have often been criticized due to the unrealistic nature of the stimuli presented. Hirschfeld used drawings of figures rather than actual pictures to illustrate changes in appearance. Madole and Oakes (1999b) review a body of research, which shows that the type of stimuli used can influence whether subjects will base decisions upon perceptual or conceptual characteristics when classifying objects. This support, along with a body of contradictory evidence, raises serious questions about Hirschfield's study and the validity of its findings. Consequently, due to the conflicting evidence presented by Hirschfeld (1995), more work should be done in this area to help clarify a developmental shift from perceptual to conceptual cues in race constancy.

As previously mentioned, natural kinds such as humans: 1) remain fixed regardless of external transformations, and 2) allow for inductive inferences to be made about characteristics of that category's members. Research has shown that while adults essentialize race, children do not develop a more conceptual understanding of race constancy until around 8 years of age (Aboud, 1988; Glerum, 2002; Madole et al., 1999;

Semaj 1980). Although a conceptual, "essence-like" understanding of certain entities might be an important factor for categorization, we have not yet explored their inductive potential. More specifically, we have not yet addressed the extent to which children use race as a method of drawing inductive inferences. Although there has been a great deal of research on children's use of categories to make inductive inferences, most have only addressed this issue within the domain of objects and animals. The research that does involve human categories has been limited due to methodological issues. These issues as well as the relevant literature will now be reviewed further.

Research has already shown that children essentialize animal categories, thus treating them as natural kinds (Diesendruck et al., 1998; Keil, 1989). Gelman and Markman (1986; 1987) addressed the question of the inductive potential of animal categories in children. In each trial children were shown two pictures of different animals and told a new fact about each one. A third picture was presented that looked very much like one of the first two objects but was given the same category label as the other one. Next, children were asked to infer which of the facts characterized the third picture, based on the two previous pictures. For example, on one trial children saw a tropical fish and were told that it breathed under water. Next they saw a dolphin and were told that it could not breathe under water. Then they were shown another fish, a shark, and had to decide how it would breath. Results indicated that when provided with labels, children drew inferences based on category membership rather than the physical similarity between them. Heyman and Gelman (2000a) extended this methodology to study the inductive power of personality traits in humans. Children were asked to make inferences about novel psychological properties, such as the type of game a child likes to play, using either trait label information or physical appearance. Three pictures were presented on each

trial, two comparison pictures and a target. One picture matched the target by physical appearance and the other matched by a labeled trait. Again when provided with labels, researchers found that children viewed trait information as holding greater inductive potential in making inductive inferences than physical similarity.

Diesendruck and HaLevi (2006) using a similar methodology found that when making inductive inferences both children and adults preferred social categories such as gender, social status, religiousness, and ethnicity over personality traits such as being nice, shy, artistic, and active. Furthermore, of the four social categories listed, children only consistently made inferences based on ethnicity and social status. Although this study answers several questions concerning which social categories are most influential when making inferences, it raises some additional questions at the same time. Do children rely more heavily on certain social categories than others when making inductive inferences?

Research suggests children draw from various social categories when making inductive inferences. For example, Verkuyten, Masson, and Elffers (1995) found that children used skin color and sex more than facial expression when sorting photos into categories. In the same study however, children relied on sex, but not race or facial expression, when explaining a story character's behavior (Verkuyten et al. 1995). It is evident from these studies that children do not make categorical decisions and inductive inferences based solely upon appearance. To the contrary, it seems children are using a more conceptual, systematic understanding of social categories.

As evidenced by the research findings above, most studies involving category-based inferences use a similar experimental design. A triad of pictures is shown, two of

which are comparisons and the remaining is a target. The target picture typically has one characteristic in common with each of the comparison pictures while differing on another. Children are then told novel attributes about each comparison picture and then asked to decide which is also true of the target. To illustrate, recall in Heyman and Gelman (2000a) subjects were shown a triad of pictures. One comparison picture matched the target in appearance but differed in behavioral trait while the other one matched the target by behavioral trait but differed in appearance. Subjects were then told that picture 1 likes to play “tibbits” and picture 2 liked to play “jimjams”. Next, the subjects were asked whether the target would rather play “tibbits” or “jimjams”. Subjects could either make decisions based upon physical similarity or shared behavioral trait. As discussed, in this case, behavioral traits were a more powerful factor in making inferences than physical similarity.

Although this methodology has broadened the field’s understanding of children’s inductive inferences, it is not without limitations. For example, the majority of research using this methodology employs labels in order to convey differences/commonalities between the comparison pictures. Heyman and Gelman (2000a) used labels in order to indicate personality traits (e.g., this girl is shy/outgoing). Similarly, Diesendruck and HaLevi (2004) used labels in order to indicate both personality trait (i.e., nice/not nice; shy/friendly; artistic/ not artistic; active/quiet) and social category (i.e., boy/girl; rich/poor; religious/secular; Jewish/Arabic). Heyman and Gelman (1999) argued that personality trait labels such a nice/mean can affect the way behavior is interpreted and the inferences drawn from those labels. Due to the vast amount of research that has shown that using labels can have significant effects on the inferences children make (Deak & Bauer, 1996; Diesendruck & HaLevi, 2006; Gelman, 1988; Gelman & Heyman, 1999;

Gelman, Star, & Flukes, 2002; Heyman & Gelman, 1998, 1999, 2000a, 2000b; Sloutsky & Fisher, 2004), drawing definitive conclusions from these studies can be problematic.

A second problem with research within this area deals with the nature of the stimuli used. Most studies exploring social categorization and inference development among children have used drawings of stimuli rather than actual pictures (Augoustinons & Rosewarne, 2001; Bigler & Liben, 1993; Diesendruck & HaLevi, 2004; Heyman & Gelman, 2000a, 2000b). In a study by Deak and Bauer (1996), researchers found that the stimuli used in categorization studies affected what type of inferences children made. For example, children made significantly more category-based inferences when physical objects were used during comparisons as opposed to line drawings (Deak & Bauer, 1996). These findings raise questions regarding the validity of studies using drawings as their stimuli, which unfortunately encompasses much of the research in this area.

Two separate studies by Madole, Eastman, Stone, and White (2005) attempted to resolve the problems mentioned above by using the same triad picture design, but the stimuli were actual pictures rather than drawings. Unlike previous studies, the comparison pictures were three children from the same social category being illustrated rather than a single picture. Madole et al. (2005) only focused on the inductive power of social categories that could be compared visually between the target and both sets of comparisons, essentially eliminating the need for labels. These social categories, which remained ambiguous and were not explicitly stated, included sex, age, and race. In determining the inductive potential of race versus sex, one set of comparison pictures was of Black males while the other was of White females. The target picture was of a Black female, so children could make a social category inference based on either race or sex. In addition, the study did not use labels to identify comparisons; they were simply referred

to as kids or people. Researchers were also interested in whether the type of characteristic used (i.e., social, biological, or individual) to describe the comparison pictures influenced which social category would be used when making inductive inferences. Will children make more inferences based on race for biological characteristics, such as the type of blood someone has, or will they make more for individual characteristics, such as what type of food someone likes? Also, Madole et al. (2005) examined the prevalence of social category-based inferences among three different age groups of children to explore whether developmental changes caused certain social categories to be used more than others when making inferences. Participants for study 1 were children of faculty at Western Kentucky University separated into three different age groups (5-7, 8-10, 18-21 year-olds). Researchers found that youngest children in the sample made more inferences based on sex than older children. They also found that for participants 8 years old and older, the specific attribute being used for the comparison pictures (i.e., social, individual, biological) did influence which social category was used for making inferences. Age-based inferences were applied mainly to individual preferences, sex-based inferences were applied to biological attributes, and race-based inferences were applied to social attributes.

The second study of Madole et al. (2005) made various changes to the stimuli and utilized a different sample. Several of the comparison questions were changed and real words were used instead of nonsense words for all trials. Children from various after school programs in Bowling Green, Kentucky participated in this study. Results showed that younger children were just as likely to use sex as a means of making inferences as older age groups. Younger children responded similarly to older children in the second study in that they were also influenced by the specific attribute being used for the

comparison pictures (i.e., social, individual, biological) when making inferences. Age-based inferences were applied mainly to individual preferences, sex-based inferences were applied to biological attributes, and race-based inferences were applied to social attributes. Therefore, the developmental change in the use of social categories to draw inferences between the two studies remains unclear.

Based upon these previous research findings, the proposed study has three objectives, all of which are designed to increase our knowledge of how children understand race and their use of race as a means of drawing inferences about novel situations. The study is composed of two separate tasks, each answering different questions.

In the inference task, we seek to answer the questions, are the inferences we make about others influenced by the person's age, sex, or race? How often do children use race as a factor when drawing inductive inferences as opposed to other social categories? Are there developmental changes in the use of social categories to draw inferences? Results from Madole et al. (2005) remain unclear regarding any developmental changes. Past research (Taylor & Gelman, 1993) results did confirm that children used social categories other than sex in order to draw inferences. The first goal of the current study is to confirm children's use of different social categories as a method of drawing inductive inferences as well as help clarify any developmental shifts taking place regarding the use of particular categories while making such inferences.

In the essentialist task, I want to see whether the age of participants influences how likely they are to accept transformations for all story types. Would the type of story influence how likely participants are to accept the transformation? Are children willing to say that an individual can change his/her race simply by changing his/her appearance? In other words at what age do children see race as fixed or constant regardless of changes to

external features? At what age do children abandon external perceptual characteristics in order to define race and instead develop a more conceptual, “theory-like”, understanding? Although the research is debated, one body has argued that this cognitive shift from a perceptual to conceptual understanding of race begins taking place between the 2nd and 4th grades (Glerum, 2002; Madole et al., 1999), while the other argues a “common sense” understanding of race is present at a much younger age (Hirshfeld, 1994). A second goal of this study is to replicate the results found by Glerum (2002) and Madole et al. (1999). Replicating these results would help clarify this area of development by confirming that children between 7 and 8 years of age view race as a natural kind, that is, immutable and essential to identity (Madole et al., 1999). Assuming these results are replicated, building from these findings, I argue that children who are more likely to say that race remains constant regardless of external changes, that is view race as a natural kind, will also use race more often than other social categories when making inferences about other people.

Method

Participants

Eleven 6-7 year olds (mean age 7:0), 25 8-9 year olds (mean age 9:2), and 11 10-12 year olds (mean age 11:5) involved in after school programs from elementary schools in the Bowling Green, Kentucky area participated in this study. Twenty-two of the participants were female and 25 were male. Less than 1% of the participants were other than European American (African American n = 2, Middle Eastern n = 1). Approximately 283 students were enrolled in the after school programs. In order to obtain parental permission, letters of informed consent were placed in each individual student's mailbox enrolled in the after school program (Appendix A). Sixteen percent of students returned their consent form, all granting permission to participate in the study. Twenty-five percent of students attending schools that participated in this study were on free or reduced lunches. The Bowling Green City school board was contacted for permission in order to carry out testing within the school system. Testing was conducted in the afternoons after school has dismissed. Permission to conduct research during the after school programs was obtained from the directors of each individual school's program

Inference Task

Stimuli

During the first phase of testing, the researcher used a picture album replicated from Madole et al. (2005) in order to present comparison triads and target pictures to each participant. The comparison triads consisted of three individual photographs pasted onto a 4 x 6 inch index card and placed within each section of the photo album. Each individual photograph was obtained from high school yearbooks and web-based

modeling agencies and measured approximately 2 x 1.5 inches. Examples of the comparison triads are available in Appendix B.

Design and Procedure

Children were tested in the afternoon during their after school program at the school they attend. Testing sessions were scheduled based upon availability and convenience for both the child and program director. Data was collected from each individual child in two separate, 10-15 minute sessions, which took place over two days. Each session was conducted in the most private space available at that time. Before each session began, each child was informed that his or her parents had granted permission for him/her to participate. The basic instructions of the task were explained and children were given opportunities to ask questions. They were told that their participation was voluntary, and that they could quit anytime they wanted without penalty. Next, they were asked to sign an assent form indicating their willingness to participate. After receiving their assent, the children were given a more detailed set of instructions dependent upon which phase of the study was being conducted. In both phases children were seated either across or beside the examiner.

The inference task consisted of 24 trials. In each trial, participants were shown two comparison triads and a target picture. There were eight combinations that were used for the comparison triads and target pictures: young White females, young White males, young Black females, young Black males, older White females, older White males, older Black females, and older Black males. Each picture within the triad comparisons was from the same social category. Triads were constructed so that no two were identical and each one would contain a different combination of photos as well as different orders. A sentence was read describing a characteristic of each triad and then participants were

asked which characteristic the target possessed. These sentences were completely identical with the exception of one word. For example, an individual characteristic trial might read, “These kids like to convivial in their free time” while “These kids like to partition in their free time.” The participants were shown the target picture and were asked, “Does this kid like to convivial or partition in their free time?” Unfamiliar, advanced vocabulary words were used in place of age appropriate words to prevent participants from making inferences based on pre-existing knowledge or stereotypes. For example, “these kids like to convivial/partition in their free time” were used as opposed to activities such as basketball or reading.

There were three different types of trials: 1) age versus race, in which the triad and target pictures were the same in terms of sex, 2) age versus sex, in which the pictures were the same in terms of race, and 3) race versus sex, in which the pictures were the same in terms of age. In each trial, the target would share one social attribute with each triad and would differ on the other. For example, a sex versus race trial might include one triad of older White males and the other triad of older Black females, with an older Black male as the target. In this example, age is constant between all pictures but the target is White like the first triad and the same gender as the second triad. There were also six control measures in order to make sure that participants were paying attention and not choosing randomly. Participants were expected to make two control inferences for each type of social category (i.e., race, sex, and age). For example, “These kids drive cars/bikes” and “These kids go to bed early/late” were used as age control sentences in which participants were expected to make inferences based on age. The sentences that were used in each trial and their characteristic type are available in Appendix C.

Trials were presented in a quasi random order, in order to make sure that no more than two types of trials (i.e., age versus sex, race versus sex, or race versus age), characteristic types (i.e., individual, social, and biological) or social category of pictures (i.e., young black females/males, old white females/male) were presented consecutively. All subjects received the same order of trials, which is available in Appendix D.

Essentialism Task

Stimuli

During the essentialism task the researcher presented stories adapted from Glerum (2002) to communicate various changes to an object, animal, or person. A pre- and post-transformation picture of the object, animal, or person accompanied each story. The stories and accompanying pictures are available in Appendix E. Object change stories began by describing the function of the target object without specifically naming it. Next, various changes were described, which caused the function of the object to change as well. The child was then asked what they thought the object was, “still a bucket/lantern, or is it now a flower pot/birdfeeder?”

Animal change stories were written and were presented in a similar fashion. The stories introduced the animal as exhibiting behaviors characteristic of certain animals from birth (i.e., horses), but did not label them specifically as that animal. Next, after a visit to the veterinarian, the animal was given the wrong medicine, which caused various changes to the animal. The child was then asked what they thought the animal was, “still a horse/tiger, or is it now a zebra/lion?”

People change stories began by introducing a person as either white or black in appearance. The person was described as looking and acting like “most black/white boys/girls” while growing up. Next, a visit to the doctor was described, during which the

doctor made various changes to the person in order for them to resemble the opposite ethnicity. The child was then asked what they thought the person was now, “still a black/white person, or now a white/black person?”

Object and animal “before” and “after” photos were obtained from on-line websites using the search engines Google and Yahoo. Photos of people were obtained from high school yearbooks. The photos were manipulated using morphing software (e.g., Morph X) available on-line in order for race changes to seem more plausible. All pictures were printed onto plain paper at a size of approximately 3 x 5 inches. The pictures were also laminated to increase durability and prevent wear.

Design and Procedure

During phase two, each child was read eight brief stories describing a change in the physical appearance of an animal, object, or person. Four of the stories involved changes of physical characteristics that typically identify a person’s race. The four remaining object and animal stories were used as control conditions. Each child received all possible race transformation combinations in terms of direction of change (i.e., white to black or black to white) and stimulus gender.

The stories were presented in a quasi-random order such that no more than one control or race story were presented consecutively. Appendix F lists the order in which the stories were presented. At the conclusion of each story, participants were asked to verbally indicate the category membership of the stimulus (i.e., is this person still a black person, or is he now a white person), and their responses were recorded accordingly.

Results

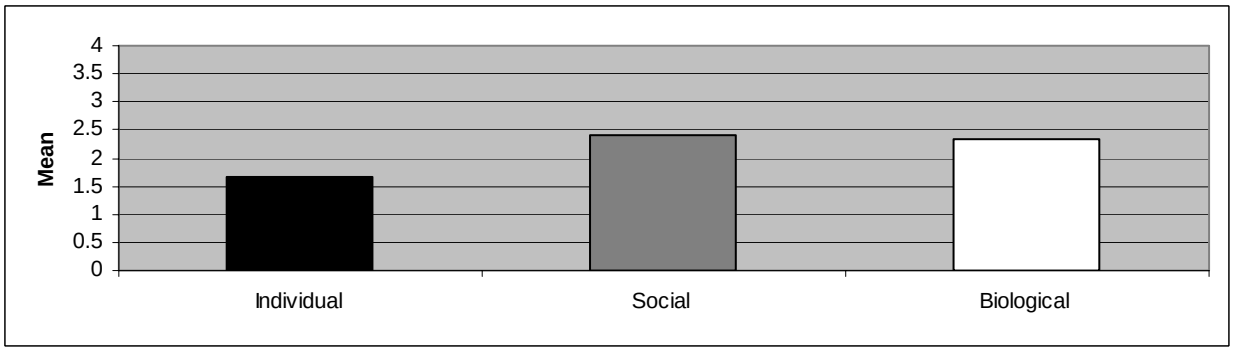
Data obtained from African American participants were omitted due to the low number of participants (N = 2). Data were omitted because African Americans' understanding of race could possibly be different from European Americans' understanding; thus, altering the results.

Inference Task

For the inference task, each trial was followed by a question allowing participants to make an inference based on the sex, age, or race of the target picture. Control stories were omitted; therefore, a minimum of 0 and a maximum of 12 inferences could be made for each social category (i.e., race, sex, and age). I predicted a main effect of attribute type when making inferences; thus, the specific type of attribute (i.e., individual, social, and biological) would influence which social category would be used for making inferences. Specifically age-based inferences were predicted to be applied mainly to individual preferences, sex-based inferences to biological attributes, and race-based inferences to social attributes. The number of race based inferences, sex based inferences, and age based inferences was analyzed using three separate 3 (Age group: 6-7, 8-9 and 10-12) x 3 (Attribute type: individual, biological, and social) mixed model ANOVAS. Age group was a between subject variable and attribute type was a within subject variable.

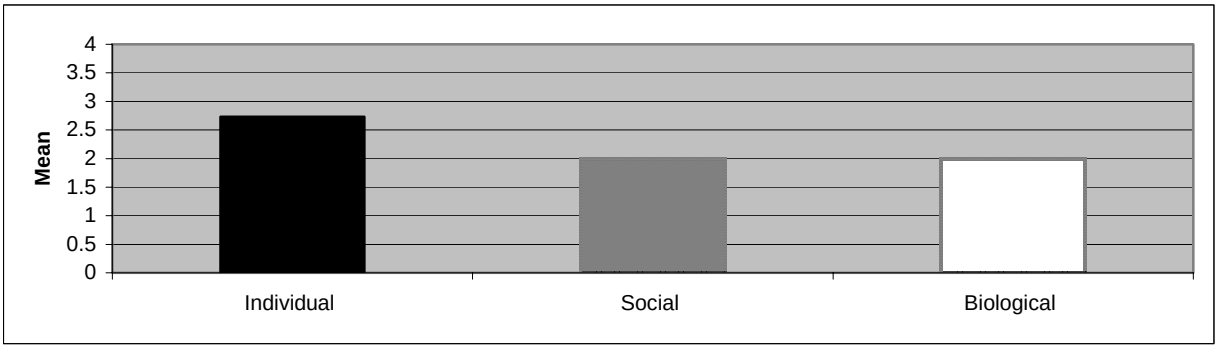
The analysis of race based inferences resulted in a main effect of Attribute Type, $F(2, 84) = 8.16$, $p < .01$. Children were less likely to make inferences based on race on Individual trials ($M = 1.67$) than either Social $F(2,84) = 11.61$, $p < .01$ or Biological $F(2,84) = 12.84$, $p < .01$ trials.

Figure 1. Race Based Inferences



Analysis of age based inferences resulted in a main effect of Attribute Type, $F(2,84) = 10.28$, $p < .01$. Children were more likely to make inferences based on age on Individual trials ($M = 2.73$) than either Social $F(2,84) = 12.43$ ($M = 2.00$) or Biological $F(2,84) = 17.99$ ($M = 2.00$) trials.

Figure 2. Age Based Inferences



Analysis of sex based inferences resulted in no main effect of Age, $F(2,4) = 1.29$, $p = .29$. Analysis of sex based inferences also resulted in no main effect of Attribute, $F(2,4) = .15$, $p = .86$.

Essentialism Task

For the essentialism task, each story was followed by a question in order to measure whether children thought category membership had changed. Each child was given a score of 1 for each response that indicated a change in category membership and

a score of 0 for each response that indicated that category membership did not change. Therefore, lower scores indicated that children essentialized the membership of that category. Given that there were two stories of each, animal and artifact transformation stories had a minimum score of 0 and a maximum score of 2.

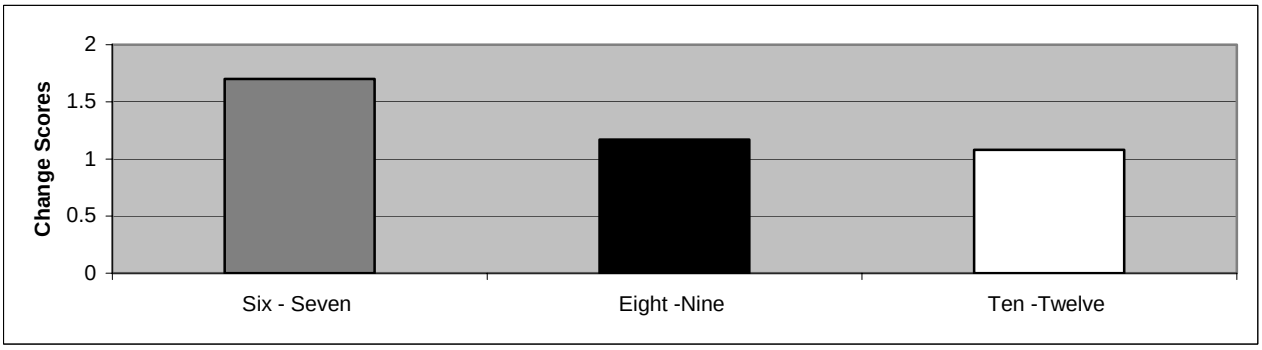
Because previous studies have found a main effect of direction of transformation (Glerum, 2002) the four race change stories were broken down into two white to black transformations and two black to white transformations. Thus, each direction of transformation had a minimum score of 0 and a maximum score of 2.

The first analysis examined whether change scores were significantly different across the four types of transformation stories. Previous research has reported that children begin to essentialize animal category membership by age seven (Keil, 1989) and racial category membership around the fourth grade (Glerum, 2002; Madole et al., 1999). I hypothesized that this finding would be replicated, arguing that older children were less likely to accept transformations than younger children. Second, I predicted that there would also be a main effect of story type. That is, participants would say that artifacts could change category membership but animals and people could not. In order to evaluate these hypotheses, scores were entered into a 3 (age group: 6-7, 8-9, and 10-12) x 4 (story type: artifact, animal, black to white, and white to black) repeated measures ANOVA.

The analysis resulted in a main effect of Age, $F(2,6) = 3.29$, $p < .05$. Younger children ($M = 1.70$) were more likely to say that an object, animal, or person changed their category membership than were 8-9 year old children ($M = 1.17$), $F(1,42) = 5.32$, $p < .01$. Also, 6-7 year old children were more likely to say that an object, animal, or person changed their starting category than were the oldest children ($M = 1.08$), $F(1,42)$

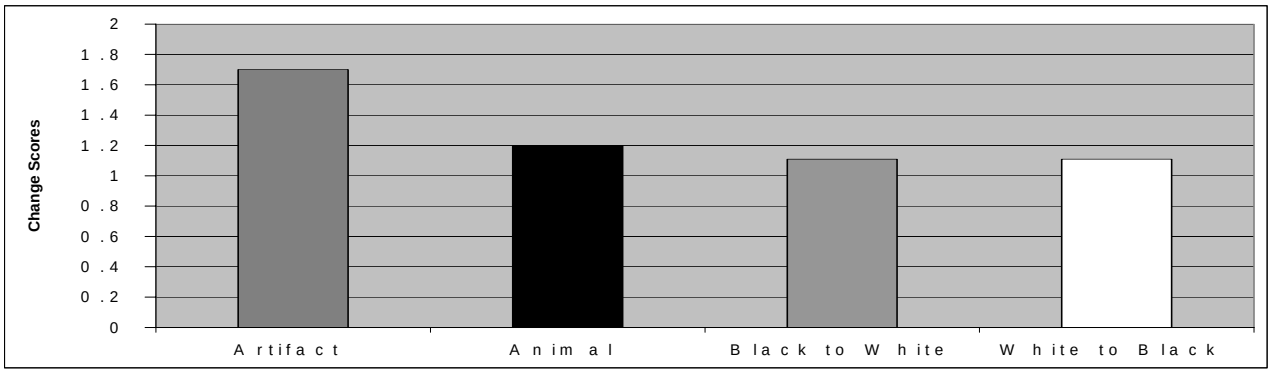
= 5.19. Eight to nine year old children did not differ significantly from 10-12 year old children, $F(1,42) = .17$, $p = .68$.

Figure 3. Main effect of age



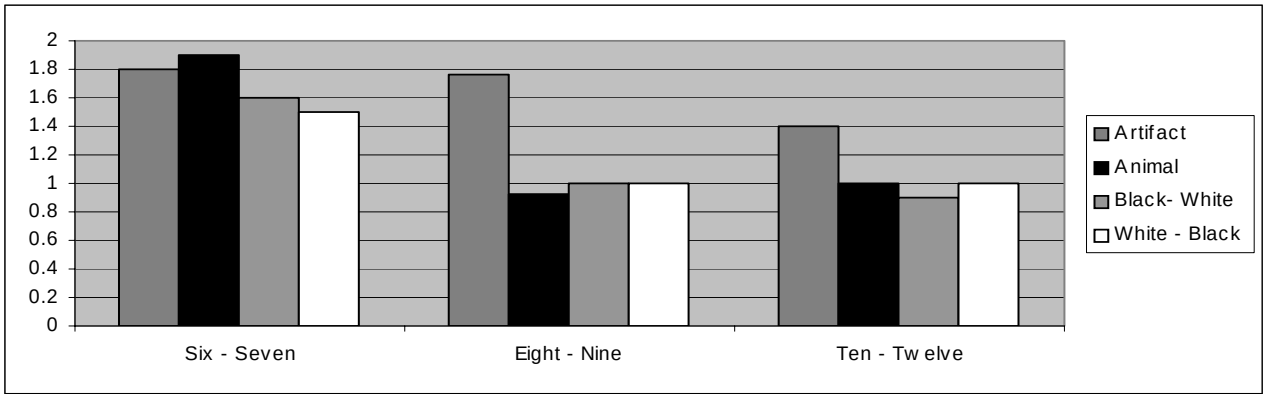
The analysis also resulted in a main effect of Story Type, $F(1,126) = 5.76$, $p < .01$. Artifact ($M = 1.69$) change scores were higher than Animal change scores ($M = 1.16$), $F(1,126) = 7.79$, $p < .01$. Artifact change scores were higher than scores for stories involving black to white transformations ($M = 1.11$) or white to black transformations ($M = 1.11$), $F(2,126) = 17.03$, $p < .01$. Stories involving animals did not differ significantly from stories involving black to white transformations or white to black transformations $F(2,126) = .82$, $p = .37$.

Figure 4. Main effect of Story Type



The ANOVA did not reveal a significant Story Type x Age interaction $F(6,126) = 1.64$, $p = .14$; however the means suggested that the youngest children did not discriminate between story types in their responses to the same extent as older children. The graph below shows the means of each Story Type change scores for each group. The lack of a significant interaction is probably due to the low number of 6-7 year old children in the sample (n = 11). Exploration of this effect was not the primary goal of the current study.

Figure 5. Story Type x Age Interaction



The primary focus of this study was to determine if children who had a better understanding of race constancy would use race as a more salient social category when making inductive inferences about others. In order to evaluate this hypothesis the relationship between the transformation and inference task needed to be determined. Younger children's data was excluded because results showed that age group was responding differently than older children. As reported, they were more likely to say that objects, animals, and people could change category membership than older participants; therefore, they were not discriminating between what could change and what could not, resulting in low variability.

A Pearson's correlation was used to determine whether there was a relationship between children's race change score (0-4) from the essentialist task and number of inferences (0-12) made for each type of social category (i.e., race sex, or age). Therefore, race change scores were separately correlated with the number of race-based inferences, sex based inferences, and age based inferences. I expected a negative correlation between race change scores and race based inferences, specifically that children who had low race change scores would be more likely to use race when making inductive inferences. The results are reported in the table below.

Table 1

Correlations Between Race Change Scores and Social Category Inferences

Attribute Type	Control	Individual	Social	Biological	Combined
			Race-Based Inferences		
Race Change Score	-0.32*	-0.18	-0.18	-0.31*	-0.33*
			Age-Base Inferences		
Race Change Score	0.29	-0.02	-0.22	-0.03	-0.02
			Sex-Based Inferences		
Race Change Score	0.03	0.18	0.41**	0.34*	0.37*

*** significant at .01*

** significant at .05*

Table 1 shows that children who had lower race change scores made more race-based inferences for biological attributes and the overall combined trials. Thus children who are more likely to essentialize race, are also more likely to use race as a means of drawing inductive inferences. This table also shows that children who had lower race change scores made fewer inferences based on sex on three types of attributes, not just social and biological $t(33) = 2.58$, $p = .01$, $t(33) = 2..07$, $p = .05$, $t(33) = 2.36$, $p = .02$.

Discussion

The results of this study provided support for several of my predictions but also yielded some unexpected results. With regard to the transformation task, I hypothesized that younger children would be more likely to accept transformations than older children. This hypothesis was confirmed. Older children were more resistant that category membership could change than were younger children. The results of this study show that a better understanding of constancy seems to occur between the ages of 7 and 8. These findings are consistent with the line of research that supported the idea that young children gradually develop an understanding of racial categories (Aboud, 1988; Glerum, 2002; Madole et al. 1999; Semaj 1980) as opposed to possessing an innate adult-like, "common-sense," theory of race as proposed by Hirschfeld, (1995, 1996).

I also hypothesized a difference in the four story types. This hypothesis was also confirmed. Artifacts were viewed as the most likely to change category membership, followed by animals, and people were viewed as the least likely to change category membership. The results from both of these hypotheses are consistent with previous findings (Glerum, 2002; Madole et al., 1999). Also, these findings offer continued support for the body of literature (Aboud, 1988; Glerum, 2002; Madole et al., 1999; Semaj, 1980) arguing that children develop a gradual understanding of racial categories. The main effect of age clearly shows a developmental shift in cognitive functioning, rather than children possessing an adult-like, "common sense" theory of race from a young age as Hirschfeld (1995, 1996) suggests. Although these findings do assist with that debate, more research is needed to explore what exactly causes this change in conceptual understanding to occur. For example, can children's understanding of category membership be attributed to nature, nurture, or an interaction of both as Piaget's

theory of cognitive development argues? Do we learn the properties of category membership simply through experience? Does something change neurologically such as the frontal lobes or limbic system, both of which play a role in our behavior and understanding of many social experiences? Piaget's theory of cognitive development contends that nature and nurture interact to produce cognitive development. In this view, nurture includes every kind of experience the child encounters and nature includes the child's maturing brain and body. Piaget's concrete operational stage coincides with our findings. In this stage, which occurs between the ages of 7 to 12, children learn to reason logically about concrete objects and events. The concept of conservation becomes more established, which is the idea that merely changing the appearance of objects does not change their key properties (Siegler, DeLoache, and Eisenberg, 2003). Although a Story Type x Age Interaction was not found, the lack of a significant effect was most likely due to the low number of younger participants. Future research should include a larger sample of younger children in order to explore whether this effect would be significant.

With regard to the inference task, I hypothesized that the specific type of attribute (i.e., individual, social, biological) would influence which social category would used for making inferences. Specifically, I predicted that age-based inferences would be applied mainly to individual preferences, sex-based inferences would be applied to biological attributes, and race-based inferences would be applied to social attributes. Only two of these hypotheses were supported. Children were most likely to make race-based inferences based on Social trials, followed by Biological trials and least likely to make race-based inferences on Individual trials. Also, children were more likely to make age-based inferences on Individual trials than either Social or Biological trials. There were no differences between the trials for sex-based inferences. This finding sheds light on the

developmental changes in the use of social categories. Although these findings are inconsistent with Madole et al. (2005) which found that the youngest children in the sample made more inferences based on sex than older children, they are consistent with the replicated study that found younger children were just as likely to use sex as a means of making inferences as older age groups. Analysis of sex-based inferences also resulted in no main effect of Attribute. This finding is also inconsistent with Madole et al. (2005), which found in both studies that sex-based inferences were applied to biological attributes.

These findings not only raise additional questions but open the door for future research. Why is it that children would make more age-based inferences for individual attributes as opposed to biological or social? Could it be that so much of children's individual behaviors is based on their age (e.g., eating habits, hobbies, and interests) it is only natural for children to make age-based inferences for individual attributes? Why is it that children would make more race-based inferences for social attributes as opposed to biological or individual? I believe society and the way race is portrayed in movies, magazines, and other media turns race into a social construct. Consequently, we use race much more when making inferences about things that are social in nature, for example the locations of where black or white people may or may not live.

The main purpose of this study was to determine if children's understanding of race constancy would influence their use of race when making inductive inferences. I hypothesized that children who had a better understanding of race constancy would also use race as a more salient factor when making inductive inferences. This hypothesis was supported. Children who essentialized race more were also more likely to use race as a means of making inductive inferences. Future research should revolve around answering

why this occurs. Is this pattern specific to race or do these findings also repeat with sex? Will one's understanding of sex constancy also influence the number of sex-based inferences that are made?

It is interesting that children who were more likely to say that a person could change his/her race were also making more inferences based on sex on all three types of attributes. In this case, children are not essentializing race or treating it in a manner consistent with "psychological essentialism." As mentioned in the introduction, natural kinds such as humans: 1) remain fixed regardless of external transformations, and 2) allow for inductive inferences to be made about characteristics of that category's members. However, if children are not viewing race as remaining fixed, they will be less likely to use race as a means of drawing inductive inferences. More research should be conducted to investigate the reasoning behind this finding. Because previous research has found that race constancy develops somewhat later than gender constancy, which occurs between the ages of 5 and 7 (Aboud, 1983; Bem, 1989; Clark, et al., 1980; Semaj, 1980), it might be possible that children who do not yet have an understanding of race constancy will use something that they do believe to be fixed and unchanging. Results from Madole et al., (2005) support this possibility. Researchers found that the youngest children in the sample (i.e., 5-7 year olds) made more inferences based on sex than older children, and as we have seen, race constancy does not develop until 7-8 years old. Future research could investigate this possibility by pairing another test of race constancy such as the sorting tasks reviewed by Aboud (1988) with the inference task used in this study. As mentioned, Semaj (1980) argues that until children are able to classify people according to their ethno-racial group, children will not be able to achieve racial constancy.

To summarize, the evidence presented here showed that children who were more likely to view race in way consistent with “psychological essentialism” were also more likely to use race as a means of making inductive inferences. Therefore, as children began to develop an understanding of race constancy, they tend to use race as a means of assuming things about others. Since we know this shift in thinking takes place, for most, between the ages of seven and eight, educators can use this information to develop awareness programs accordingly. The research presented here shows that awareness programs are needed at a much earlier grade level than high school or college. If such programs can be implemented, perhaps children will change the assumptions they make and consequently the prejudices that evolve from them.

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Appendix A

Informed Consent and Child Assent Documents

Informed Consent Form

Dear Parent/Guardian:

We would like to ask for your help in a study of children's understanding of categories. Dr. Kelly Madole and Casey Dawson of Western Kentucky University are conducting this study in cooperation with your child's after school program The purpose of our study is to better understand how children think about and categorize the people in their world. We will coordinate each session in cooperation with the director of each after school program to ensure that your child does not miss any important learning or social activities. Your child will receive a small token for participating.

If you decide to take part, your child will participate individually in two 15-20 minute sessions that are conducted over two days during their after-school program. During the initial session, your child will be read (or read depending on preference) eight brief stories describing animals, objects, and people who experience some type of change in their physical appearance. After each story is read, your child will then decide whether the object, animal, or person has really changed. During the second session, your child will be read simple, brief sentences about people. He or she will be asked to respond to some questions based on their beliefs about the kinds of things these people like to do, or how they behave. In particular we are interested in children's beliefs about the kinds of characteristics members of different categories share.

We emphasize that your child's participation is entirely voluntary. If you or your child decides not to participate, there will be no negative consequences for you or your child in any way. Your child has the right to refuse to answer any question and may withdraw from the study at any time. All information will be kept strictly confidential. Your child's name will only appear on the consent forms The results may be part of a published manuscript in which all results would be reported in terms of group averages, and no children will ever be identified by name.

The procedures in this study have been reviewed and approved by the Western Kentucky University Committee for the Protection for Human Research Participants. Furthermore, the University has filed a form called "Assurance of Compliance with DHHD regulations for the Protection of Human Subjects" with the Department of Health and Human Services.

Specific questions about this study may be directed to Dr. Kelly Madole, Research Director for this project at (270) 745-6475. We will be happy to answer any questions of concerns that you may have regarding this study. Please leave a message if no one is there.

We hope that you will allow your child to participate in our study and help us explore this area of development. We promise that it will be a pleasant experience for them and not interfere in any way with their academic or social activities. If you agree to participate, please fill in the
required information below. Regardless of your decision to allow your child to participate, upon returning this letter to the after school director your child will receive a small token of our appreciation for you and your child's time. Thank you for your help.

Sincerely,

Kelly Madole, Ph.D.
Research Director

Casey Dawson
Graduate Student

Western Kentucky University

Parental Consent Form

Child's name:_____

Date of Birth:_____

School:_____

_____ No. I do not give my permission for my child to participate in this study.

_____Yes. I have read the information provided about this study, and give my consent for my child to participate in this study conducted by Dr. Kelly Madole and Casey Dawson of Western Kentucky University. I understand that the anonymity and security of data will be maintained. I also understand that I may withdraw my child from the study at any time without penalty.

Parent/Guardian
signature:_____

Date:_____

Child/Minor Assent Form

I,_____ understand that my parents have said that it is okay for me to take part in a project about what kinds of things can change and what kinds of things go together with Kelly Madole and Casey Dawson.

I am taking part because I want to. Also, I have been told that I can stop any time I want to and nothing will happen to me if I want to stop.

_____

Signature

Appendix B

Inference Pictures

Young White Male

Young Black Male

Older White Male

Older Black Male

Young White Females

Young Black Females

Older White Female

Older Black Female

Appendix C

Inference Sentences

1). These kids go to bed early. These people go to be late. Does this person go to bed early or late? (Age control)

2). These kids have dark skinned mommies and daddies. These kids have light skinned mommies and daddies. Does this kids have dark or light skinned mommies and daddies? (Race control)

3). These people go to pink bathrooms at school. These kids go to blue bathrooms at school. Does this person go to the pink or blue bathrooms at school? (Sex control)

4). These kids favorite books are about dowers. These kids favorite books are about lapidaries. Is this kid's favorite book about dowers or lapidaries? (Individual)

5). These people have an inflective body. These kids have a jiving body. Does this kid have an inflective or jiving body? (Biological)

6). These kids favorite food are udons. These peoples favorite are patinas. Is this person's favorite food udons or patinas? (Individual)

7). These peoples families all talk puritanical. These peoples families all talk alliterative. Does this person's family all talk puritanical or alliterative? (Social)

8). These kids have a finicky scalp. These people have a nascent scalp. Does this person have a finicky or nascent scalp? (Biological)

9). These peoples families all have precepts in their homes. These kid's families all have marimbas in their homes. Does this kid's family have precepts or marimbas in their homes? (Social)

10). These people like to learn about riboflavins. These people like to learn about quagmires. Does this person like to learn about riboflavins or quagmires? (Individual)

11). These people all have germinal cells. These kids all have renal cells. Does this kid have germinal or renal cells? (Biological)

12). These people like to play fighting games. These people like to play with dolls. Does this person like to play with fighting games or dolls? (Sex Control)

13). These people all have endogamous DNA. These kids all have virulent DNA. Does this kid have endogamous or virulent DNA? (Biological)

14). The kid's daddies all work at yeddos. These people's daddies all work at nikkos. Does this person's dad work at yeddos or nikkos? (Social)

15). These people like to drink swindlers. These kids like to drink tillets. Does this kid like to drink swindlers or tillets? (Individual)

16). These people have parents who are abrogative. These kids have parents who are gimbaled. Does this kid have parents who are abrogative or gimbaled? (Social)

17). These kids all have totemic blood. These kids all have saccadic blood. Does this kid have totemic or saccadic blood? (Biological)

18). These people drive cars. These kids ride bikes. Does this kid drive cars or ride bikes? (Age Control)

19). These people live on a street where everyone is consorted. These people live on a street where everyone is equatorial. Does this person live on a street where everyone is consorted or equatorial? (Social)

20). These people like to watch movies about halmas. These kids like to watch movies about sagos. Does this kid like to watch movies about halmas or sagos? (Individual)

21). These kids live on a street where all the houses are burnished. These people live on a street where all the houses are hermetic.Does this person live on a street where all the houses are burnished or hermetic? (Social)

22) These kids like to warble in their free time. These people like to forbade in their free time. Does this person like to warble or forbade in their free time? (Individual)

23). These kids have reportorial muscles. These kids have arigato muscles. Does this kid have reportorial or arigato muscles? (Biological)

24). These kid's skin burns easily. These peoples' skin does not burn easily. Does this person's skin burn easily or not burn easily? (Race Control)

Appendix D

Order of Trials

Trial type: R v A = race versus age
R v S = race versus sex
S v A = sex versus age

Types of picture: OWF = old white female
OWM = old white male
YWF = young white female
YWM = young black female
OBF = old black female
OBM = old black male
YBF = young black female
YBM = young black male

Trial#	**Trial Type**	**Target**	**Comparison 1**	**Comparison 2**
1	R v A	OWF	YWF	OBF
2	R v S	YBF	YBM	YWF
3	S v A	OBM	YBF	YBM
4	R v S	YBM	YBF	YWM
5	R v A	YWM	OWM	YBM
6	S v A	OBF	YBF	OBM
7	R v S	OBM	OBF	OWM
8	S v A	OWM	YWM	OWF
9	S v A	YBM	OBM	YBF
10	R v S	OWF	OWM	OBF
11	R v A	YBM	OBM	YWM
12	R v S	OBF	OBM	OWF
13	S v A	YWF	OWF	YWM
14	R v A	OBM	YBM	OWM
15	S v A	YBF	OBF	YBM
16	R v A	YWF	OWF	YBF
17	R v S	YWM	YWF	YBM
18	S v A	YWM	OWM	YWF
19	R v S	OWM	OWF	OBM
20	R v A	YBF	OBF	YWF
21	S v A	OWF	YWF	OWM
22	R v A	OWM	YWM	OBM
23	R v S	YWF	YWM	YBF
24	R v A	OBF	OWF	YBF

Appendix E

Transformation Stories and Stimulus pictures

When this animal was born, it did things that horses usually do. Here is a picture of the animal when it grew up. One day the animal got sick, so the vet gave it some medicine. But the medicine was too strong, and it began to get black and white stripes and behaved like a zebra. The animal could not be changed to be the way it was before. Here is a picture of the animal now. If this could happen in real life, would this animal still be a horse, or would it now be a zebra?

When this animal was born, it did things that tigers usually do. Here is a picture of the animal when it grew up. One day the animal got sick, so the vet gave it some medicine. But the medicine was too strong, and the animal lost its stripes, grew hair around its neck, and behaved like a lion. The animal could not be changed to be the way it was before. Here is a picture of the animal now. If this could happen in real life, would this animal still be a tiger, or would it now be a lion?

When this thing was made, it was used to give off light when camping. This is a picture of this thing when it was made. Then some people took it. They took some pieces off of it, made some other changes, and filled it with seeds. None of what they did to it could be changed back again. After they did all this, they used it to feed birds. Here is a picture of this thing now. If this could happen in real life, would this thing still be a lantern, or would it now be a birdfeeder?

When this thing was made, it was used to carry water. This is a picture of this thing when it was made. Then some people took it. They took some pieces off of it, made some other changes, and filled it with soil. None of what they did to it could be changed back again. After they did all this, they used it to plant flowers. Here is a picture of this thing now. If this could happen in real life, would this object still be a bucket, or would it now be a flower pot?

When Sally was little, she looked like most white people. Her parents were white. Here is a picture of Sally when she grew up. After growing up, she realized she wanted to be different. One day Sally went to a doctor, who changed the way Sally looks. Her skin was made to be darker and her face and hair were also changed. None of what the doctor did could be changed back. Here is a picture of Sally now. If this could happen in real life, would she still be a white person, or would she now be a black person?

When Bruce was little, he looked like most white people. His parents were white. Here is a picture of Bruce when he grew up. After growing up, he realized he wanted to be different. One day Bruce went to a doctor, who changed the way Bruce looks. His skin was made to be darker and his face and hair were also changed. None of what the doctor did could be changed back. Here is a picture of Bruce now. If this could happen in real life, would he still be a white person, or would he now be black person?

When Sharon was little, she looked like most black people. Her parents were black. Here is a picture of Sharon when she grew up. After growing up, she realized she wanted to be different. One day Sharon went to a doctor, who changed the way Sharon looks. Her skin was made to be lighter and her face and hair were also changed. None of what the doctor did could be changed back. Here is a picture of Sharon now. If this could happen in real life, would she still be a black person, or would she now be a white person?

When Billy was little, he looked like most black people. His parents were black. Here is a picture of Billy when he grew up. After growing up, he realized he wanted to be different. One day Billy went to a doctor, who changed the way Billy looks. His skin was made to be lighter and his face and hair were also changed. None of what the doctor did could be changed back. Here is a picture of Billy now. If this could happen in real life, would he still be a black person, or would he now be a white person?

Appendix F

Order of Stories

Arranged Order	**Order drawn at random**
1). Control Object	1). Bucket to Flower pot transformation
2). Test	2). Male White to Black transformation
3). Control Animal	3). Tiger to Lion transformation
4). Test	4). Female Black to White transformation
5). Control Object	5). Lantern to Birdfeeder transformation
6). Test	6). Male Black to White transformation
7). Control Animal	7). Horse to Zebra transformation
8). Test	8). Female White to Black transformation