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What's age got to do with it? Examining how the age of stimulus faces affects children's implicit racial bias

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WHAT'S AGE GOT TO DO WITH IT? EXAMANING HOW THE AGE OF

STIMULUS FACES AFFECTS CHILDREN'S IMPLICIT RACIAL BIAS

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ABSTRACT

What's Age Got To Do With It? Examining How the Age of Stimulus Faces Affects Children's Implicit Racial Bias

by

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Discrepant results regarding the emergence of children's implicit racial bias suggest additional research is needed to understand the developmental timeline of racial bias. Investigations using established explicit racial bias measures and the implicit association task with children demonstrate racial bias in young children (Aboud, 1988; Baron & Banjai, 2006). These findings do not corroborate the only known developmental use of the affective priming task (APT) to measure racial bias, which suggests implicit racial bias does not emerge until adolescence (Degner & Wentura, 2010). Variations in the task demands, the types of stimuli used to represent the construct of race, and child's environment may be important factors to consider when investigating these discrepancies. The current study explored how same-age faces and adult faces influenced 6.5-, 10.5-, and 14.5-year-old children's racial bias using the APT and whether cross-race interactions affected racial bias. Results indicated that children did not demonstrate significant racial bias at any age when viewing child or adult faces, though data from non-Hispanic Caucasian 6.5-year-olds suggested stronger racial bias to same-age faces. Cross-race interactions were positively correlated with 14.5 year-olds' same-age racial bias. This effect occurred because greater cross-race interactions with peers predicted

adolescents' positive associations to Caucasian same-age faces but did not predict

negative associations to African American same-age faces. The lack of significant racial

bias observed in this sample suggests that children from racially diverse areas (i.e., Las

Vegas, NV) may not have the same levels of implicit racial bias as samples collected in

previous studies.

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DEDICATION

This dissertation is dedicated to those who have provided endless emotional support for this project. My parents, Eddie and Dawn Noles, have given and taught me more than I could ever convey in words. My gratitude for the people they are and the person they taught me to be is endless. They first taught me the value of the word "Why" while patiently answering my ceaseless questions and allowing/encouraging me to question the world around me. In addition to my parents, Meredith Privott, Nicole Bies-Hernandez, Esidro Hernandez, Andrea Kayl, Kerri Schafer, Tyler Schafer, Sara Shmee Giarratana, Daniel Lodato, James Purcell, PJ Magellan, Michael Aanonsen, Regina Campbell, Josh Dimesa, and too many more to name have served as my chosen family during this 14-year academic journey. My parents and my chosen family have believed in me when I did not believe in myself, let me cry tears of frustration, made me laugh when I did not think anything was funny, and celebrated every small step along this journey. Lyricists and musician Aesop Rock summed up my feelings, "I have been over everything in my head 'till I can't think anymore. But I guess some times, when you can't breathe, there are people there to breathe for you. I am lucky enough to have those people around me."

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CHAPTER 1

INTRODUCTION

Making judgments about someone based on their skin color or ethnicity is one of

the many ways individuals process people in their social environment. Sometimes these

racial or ethnic inferences are innocuous (e.g., "Italians make great pasta."), but often

they can have dangerous and even fatal outcomes. The violent murder of James Byrd by

White supremacists (Cropper, 1998) and the debate over the killing of 17-year-old

Treyvon Martin (Alvarez, 2012), both of whom were African Americans, suggest that

racial stereotypes and prejudice are still important social and empirical topics to address.

From a developmental perspective, it is necessary to understand when and how racial bias

emerges in childhood to formulate solutions for reducing stereotyping and prejudice in

both children and adults. The current study is the first known implementation of the

affective priming task (APT) to investigate racial bias with American children aged 6.5,

10.5, and 14.5. Degner & Wentura (2010) found that implicit racial bias among German

and Dutch children was not evident until adolescence. Established developmental

literature indicates explicit racial bias, as measured by choice or preference tasks, and

implicit racial bias, as measured by reaction time, is evident by at least age 6 (Aboud,

1988; Baron & Banaji, 2006; Bar-Tal, 1996; Jackson, 2011). It is important to investigate

this discrepancy to advance the developmental understanding of how children think and

feel about race. By attempting to replicate, modify, and extend the initial findings from

Degner & Wentura (2010), it should be possible to gain greater insight into when implicit

racial bias, as measured by non-verbal tasks, emerges in development.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

In the adult literature, stereotypes are defined as an individual's set of beliefs about the characteristics of a group; stereotypes are not inherently negative or inaccurate (Judd & Park, 1993). Stereotyping is conceived as a cognitive process encompassing thoughts or beliefs about a group, whereas prejudice is defined more behaviorally or affectively. A modern and widely accepted definition of prejudice in adults is, "the holding of derogatory social attitudes or cognitive beliefs, the expression of negative affect, or the display of hostile or discriminatory behavior towards members of a group on account of their membership to that group" (Brown, 1995, p. 8). Although stereotypes may have both positive and negative cognitive components, prejudice is generally defined more affectively and in negative terms.

In the child literature, racial stereotyping and prejudice can be difficult to accurately separate (Augoustinos & Rosenware, 2001; Bigler & Liben, 2006). Asking children to assign positive and negative traits to ingroup members (i.e., people who are similar on a salient dimension) and outgroup members (i.e., people who are different on a salient dimension) is the most common way to measure stereotyping and prejudice (Doyle & Aboud, 1995; Williams, Best, & Boswell, 1975). When measuring a child's use or knowledge of stereotypes, researchers often rely on measures of preference or behavior (i.e., prejudice) via a choice or preference task (Doyle & Aboud, 1995; Williams et al., 1975). A child's affirmative response indicating they prefer an ingroup member, dislike an outgroup member, or think someone is mean, nice, or good may indicate multiple evaluations. They could be displaying their personal racial bias, or their

knowledge of racial stereotypes, or the belief that other people feel this way, or their perceptions and expectations about a person's behaviors. Some developmental researchers directly attempt to disentangle these concepts, but this task is difficult due to differences in racial bias measures and age-related differences in children's language and cognitive capacities (Augoustinos & Rosenware, 2001; Cameron, Alvarez, Ruble, & Fuligni, 2001). Because developmental researchers acknowledge stereotypes precede and co-occur with prejudice, these terms are often not treated as distinct in many publications (Bigler & Liben, 2006, 2007). In this paper, the terms may be used interchangeably when referring to previous literature.

A more inclusive term, racial bias, can be used synonymously with stereotyping and prejudice because it allows for the inclusion of both positive and negative evaluations related to perceptions of race. Racial bias will be the primary term used within this paper referring to any preferential or derogatory cognitions/attitudes/behaviors that are based on race. Because it is often difficult to determine, and widely debated, whether specific tasks are assessing affective, cognitive or behavioral components of related to race, this broader term captures the idea that an individual's responses are affected by race-related differences (Fazio & Olson, 2003; Gawronski & Bodenhausen; 2007; LeBel & Paunonen, 2011; Nosek, Hawkins, & Frazier, 2011)

Racial bias is observed in social interactions among children and adults (Augoustinos & Rosewarne, 2001; Cristol & Gimbert, 2008; Devine, 1989; Dovidio et al., 2002; Jackson, 2011; Judd & Park, 1993). Once children understand the concepts of "same" and "different," it is proposed they begin to associate these labels with people and use these labels to navigate their social world (Bigler & Liben, 2006; McArthur & Baron,

1983). Skin color is a salient cue for children to group other people into categories such as "like me" and "not like me" (Bigler & Liben, 2006). This categorization of people based on skin color is believed to initiate subsequent inferences about behaviors and attributes that may lead to stereotypes and prejudice (Bigler & Liben, 2006). Decades of research examining how and when children make sense of racial groups indicate that children, some as young as 3-years-old, demonstrate racial bias (Aboud, 1988; Bar-Tal, 1996; Clark & Clark, 1939 as cited in Hraba & Grant, 1970; Cristol & Gimbert, 2008).

Using Explicit Measures to Examine Racial Bias

It is commonly accepted that racial bias, as measured by explicit (i.e., verbal or written responses) tasks typically emerges by ages 3 to 5, with bias soundly in place by age 6 to 7, and then declines in many children after age 7 (Aboud 1988; Bar-Tal, 1996; Doyle & Aboud, 1995; Doyle, Beaudat, & Aboud, 1988; Jackson, 2011; Katz, Sohn, & Zalk, 1975; Williams, Best, & Boswell, 1975). The first established assessment of racial bias in children, the Preschool Racial Attitude Measure II, required children to decide whether adjectives like "bad", "good", or "nice" applied to a Caucasian child or an African American child (Williams et al., 1975). To circumvent the forced-choice nature of these tasks, other similar measures such as the Multi-Response Racial Attitude Scale allow children to assign traits to either child or both children (Doyle & Aboud, 1995; Doyle et al., 1988). A different measure, designed to disentangle personal beliefs from societal knowledge, asks children to indicate what most people would say about an ingroup or outgroup member, and then indicate what they personally think about an ingroup or outgroup member (Augoustinos & Rosewarne, 2001). Among these explicit tasks, there are large variations regarding what construct is assessed (i.e., societal

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knowledge about stereotypes versus personal endorsement of racial bias) and the types of stimuli used to represent race (i.e., drawings versus photographs, adults versus children).

More recent data suggest that racial prejudice does not dramatically decline with age, but instead, older children and adolescents either become more adept at not appearing prejudiced or individual differences related to children's environments create large variations in racial bias (Augoustinos & Rosewarne, 2001; Baron & Banaji, 2006; Raabe & Beelmann, 2011; Rutland, Cameron, Milne, & McGeorge, 2005). The motivation to appear non-biased in older children and adolescents indicates that more covert measures may be warranted to accurately assess bias. To progress and unify the developmental investigation of racial bias, it is imperative to continue examining the task demands and constructs being assessed by measurements of children's racial bias. Additionally, controlling for the impact of stimulus characteristics (e.g., age, gender, race typicality of faces used to represent racial groups) among tasks, the overt versus covert measurement of bias, and individual differences (e.g., amount of cross-race contact) among participants is also necessary for continued advancement in the field.

Using Implicit Measures to Examine Racial Bias

The term "implicit" is often used synonymously with automatic and unconscious to highlight the difference between more explicit, controlled, or conscious processes (Greenwald & Banaji, 1995; Payne & Gawronski, 2010). Implicit cognition is broadly defined as thoughts, attitudes, or biases that are not consciously accessible in memory or via self-report (Fazio Jackson, Dunton, & Williams, 1995; see Greenwald & Banaji, 1995 for a thorough review of the importance of implicit social cognition). When implicit cognitions are measured via association and priming tasks, these tasks are collectively

referred to as implicit tasks or measures (Degner & Wentura, 2010; Fazio et al., 1995; Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz 1998; Olson & Fazio, 2003).

Interest in implicit racial bias stems from data suggesting racial bias has become less overt with many people disavowing prejudicial attitudes when assessed via traditional explicit measures (Baron & Banaji, 2006; Devine, 1989; Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002). Implicit measures indicate that actual bias may still exist, but children and adults are either unable or unwilling to report these biases using traditional self-report surveys (Baron & Banaji, 2006; Dovidio & Gaertner, 1998; Fazio, Jackson, Dunton, & Williams, 1995; Greenwald, McGhee, & Scwartz, 1998; McConahay, 1986; Monteiro, de Franca, & Rodreigues, 2009; Rutland et al., 2005). Findings from numerous studies suggest that individuals' implicit racial bias is divergent from their expressed views on race, and that implicit measures better predict intergroup behaviors among adults, such as expression of nonverbal cues (Baron & Banaji, 2006; Devine, 1989; Dovidio et al., 2002; Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Implicit bias is often assessed using reaction time measures, which examine the speed of associations between race and positive and negative stimuli or the effect of race primes on the speed of participants' responses to subsequent positive and negative stimuli (Fazio, et al., 1995; Greenwald et al., 1998).

Seminal work by Devine (1989) suggests high and low prejudiced individuals are equally knowledgeable about negative racial stereotypes, and these stereotypes are equally accessible and automatic in both types of individuals when implicitly measured. The quantifiable difference between high and low prejudiced individuals occurs at a more

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conscious level of responding. Low prejudiced participants exert more controlled responding by attempting to negate their automatic biases as opposed to high prejudiced participants whose responses closely resemble their automatic biases. The empirical validation of automatic versus controlled processes circumvented problems with self-report data, and helped to bolster psychological interest in implicit cognition, learning, and attitudes (Baron & Banaji, 2006; Castelli, De Dea, & Nesdale, 2008; Devine, 1989; Devine et al., 2002; Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Gaertner, & Hodson, 2002). There is an ongoing debate in the adult literature regarding the exact nature and mechanisms of implicit tasks, but from a developmental perspective it is hoped that these measures may provide valuable insight into children's racial attitudes (see Cristol &Gimbert, 2008; De Houwer & Moors, 2010; De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Gawronski & Bodenhause, 2007; Fazio & Olson, 2003 for an extensive review of implicit measures).

Using Implicit Measure with Children

Though initially developed for adults, researchers have empirically validated implicit measures to assess children's racial bias (Baron & Banaji, 2006; Degner & Wentura, 2010; Dunham, Baron, & Banaji, 2008; Newheiser & Olson, 2012; Rutland, Cameron, Milne, & McGeorge, 2005; Sinclair, Dunn, & Lowery, 2005). The use of these measures helps to circumvent and reduce confounds associated with children's limited language abilities, social desirability bias, and forced-choice designs (Augoustinos & Rosewarne, 2001; Baron & Banaji, 2006; Cristol & Gimbert, 2008; Cvencek, Greenwald, & Meltzoff, 2011; Rutland et al., 2005).

The most commonly used implicit measure with adults and children is the Implicit Association Task (IAT; Baron & Banaji, 2006; Dunham, Baron, & Banaji, 2006; Greenwald et al., 1998; Rutland et al., 2005). This task requires participants to categorize photos or names by race (e.g., pressing the letter key "I" after seeing a Caucasian face/name and "E" after seeing an African American face/name). Participants also categorize positive and negative words using the same "I" or "E" keys. For each trial they see a face or name or a positive or negative word and must categorize the face, name or word as quickly as possible. Reaction time data are used to compare trials where Caucasian stimuli and positive words are categorized using one of the keys and African American stimuli and negative words are categorized using the other key to trials where the pairings are reversed. Caucasian adults and children show faster reaction times to positive adjectives and ingroup members (e.g., Caucasian faces or names with the word "love") compared to positive adjectives and outgroup members. Faster reaction times between negative adjectives and outgroup members (e.g., African American faces or names with the word "hate") indicate stronger negative associations to outgroup members (Baron & Banaji, 2006; Dunham et al., 2008; Greenwald et al., 1998; Greenwald, Nosek, & Banaji, 2003). These positive ingroup and negative outgroup associations are interpreted as indicating implicit racial bias.

Baron & Banaji (2006) published the first empirically validated IAT developed for children. Minor differences (e.g., auditory presentation of the word instead of visual presentation; presentation of child faces instead of adult faces) made this assessment slightly different from the adult version of the IAT. Data from American children suggest that implicit bias emerges by age 6 and is of equal, stable magnitude (i.e., Cohen's $d =$

.22) among 6-year-olds, 10-year-olds, and adults (Baron & Banaji, 2006). No known IAT studies have measured racial bias in children younger than 6. Additional research with both American and Japanese children confirmed that stronger positive associations to ingroup faces and stronger negative associations to outgroup faces exist in children aged 6 and 10 (Dunham et al., 2006). Explicit bias measures, collected in addition to implicit measures, indicated a reduction in bias with age, thus children's implicit bias scores did not correlate with their explicitly reported bias (Baron & Banaji, 2006; Rutland et al., 2005; Sinclair et al., 2005). Children tested with the adult version of the IAT (i.e., they saw adult faces instead of children's faces) also showed racial bias indicating a positive association to Caucasians and a negative association to African Americans by age 7 (Rutland et al., 2005; Sinclair et al., 2005). Because the authors of the adult IAT assessments with children did not report effect sizes, it makes it difficult to compare the magnitude of bias between the child and adult version of the IAT, though it is clear that bias, as measured on this task, appears by ages 6 to 7 (Baron & Banaji, 2006; Dunham et al., 2006; Rutland et al., 2005; Sinclair et al., 2005). This implicit emergence of bias on the IAT corresponds to traditional research with explicit measures indicating racial bias by age 6, though unlike explicit measures, a reduction in implicit bias does not co-occur with age on the IAT (Aboud, 1988; Jackson, 2011).

A recent publication using a different type of implicit task, the affective priming task (APT), suggests that racial bias does not emerge until approximately age 13 (Degner & Wentura, 2010). The APT is a sequential priming paradigm also known as the "bonafide pipeline" in the adult social psychology literature (Fazio et al., 1995; Nosek et al., 2011). Degner & Wentura (2010) published the first use of this task with child and

adolescent samples, which is the only known publication using this task to assess racial

bias with children. Across 4 studies conducted in Germany and Holland, they examined

Caucasian 10- to 15-year-olds' racial bias towards Turkish and Moroccan adult males;

results consistently indicated that racial bias did not emerge until ~13 years of age.

The format of APT involves a brief display of a prime, and then the participant

presses a key to categorize a subsequent positive or negative target word or picture as

good or bad (Degner & Wentura, 2010; Fazio et al., 1995). There are two phases in each

trial. In phase 1, a prime is briefly displayed (e.g., 317 ms or 30 ms using masked

presentation). The prime may either be a photograph of a face from a particular racial

group or a positive or negative picture. In phase 2, a positive or negative target picture or

word is displayed. The valence associated with the prime is expected to influence the

speed of categorizing the subsequent target. According to a response activation

framework, the prime activates an affective response (i.e., a positive or negative

emotional reaction); if the valence of the subsequent target is affectively congruent with

the initial response then it should be faster to categorize the target than if the target is

affectively incongruent (De Houwer et al., 2009; Fazio et al., 1995). For example, if a

participant is positively biased towards Caucasians and negatively biased towards African

Americans, it should be faster to identify a puppy as positive when primed with a

Caucasian face as compared to an African American face prime. In addition, it should be

faster to identify a gun as negative when primed with an African American face as

compared to a Caucasian face. A difference score compares response times during

congruent trials (i.e., Caucasian prime and positive target or African American prime and

negative target) versus incongruent trials (i.e., Caucasian prime and negative target or

African American prime and positive target) trials. Unlike the IAT, the race of the face is not categorized in this task, but instead, race is used as a prime to investigate discrepancies in the time needed to categorize positive or negative targets.

The APT is a unique way to measure bias because it does not force the participant to categorize the race of a picture or a name, nor does it ask the participant to evaluate a person as part of the task. Not requiring the categorization or evaluation of individuals within the task sets it apart from other measures of racial bias, which often require the participant to indicate the race, actions, intentions, or characteristics of others (Augoustinos & Rosewarne, 2001; Baron & Banaji, 2006; Bigler & Liben, 1993; Doyle & Aboud, 1995; Doyle et al., 1988; Williams et al., 1975). Using the APT with children may provide valuable data about when children begin to feel positively or negatively about a race without confounding this affect with knowledge about racial stereotypes. Understanding and measuring children's affect towards same- and other-race individuals should help clarify the difference between categorical or stereotypical knowledge and the presence of actual affective prejudice the child feels towards others.

Degner & Wentura (2010) ensured that children's responses could be altered via priming by using standard pictorial stimuli (i.e., positive, neutral, or negative images) trials inserted among face prime trials. In trials with positive (e.g., a flower) or negative (e.g., fire) primes, all children showed quicker responses in congruent compared to incongruent trials. The crucial evidence that racial bias does not emerge until adolescence comes from examining face prime trials. Only participants aged ~13 years and older showed differential responding in these trials (i.e., faster reaction times to positive words when seeing Caucasian faces; faster reaction times to negative words when seeing

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Turkish or Morrocan faces). This discrepancy indicates that all children's responses, aged 10-15, can be primed with standard pictorial stimuli, but only adolescents' responses are affected by the race of a face prime (Degner & Wentura, 2010).

Critically Examining Degner & Wentura's (2010) Conclusions

Though the APT is a potentially valuable way to assess racial bias, additional work is needed to investigate the discrepancies between the traditionally accepted emergence of racial bias by age 6 and Degner & Wentura's (2010) data indicating the emergence of racial bias around age 13 (Aboud, 1988; Baron & Banaji, 2006; Degner & Wentura, 2010; Doyle & Aboud, 1995; Rutland et al., 2005). These discrepancies could emerge from methodological differences between the tasks or from theoretical differences related to what the tasks are measuring.

To explain their data indicating the later developmental emergence of racial bias, Degner and Wentura (2010) propose that the IAT assesses categorical knowledge about racial groups that emerges by age 6, and the APT assesses affect towards individuals from racial groups, which does not emerge until adolescence. This contention suggests that categorical knowledge, which could also be thought of as stereotype knowledge, about racial groups may emerge earlier in development as children learn about groups in a racially biased society (Bigler & Liben, 2006). Perhaps this stereotype knowledge is also what traditional measures have captured when asking questions like, "Which child is nice? Which child is bad?" (Doyle et al., 1988). It is plausible that actual positive or negative affect towards individuals from racial groups does not emerge until adolescence and is not captured on explicit measures or the IAT. Because the APT only uses race to prime an emotional response, it is proposed to assess affect, but not necessarily

stereotype knowledge. Though affect can be altered by stereotypes (e.g., endorsing a strong negative stereotype may result in negative affect), stereotypes may not be directly correlated to personal affect (e.g., a strong negative stereotype could be actively refuted by the individual or the individual could list negative stereotypes but not endorse the stereotype; see Devine, 1989). Additional work using the APT with child and adolescent samples is needed to validate the assertion that race-related affect, viewed separately from stereotype knowledge, does not emerge until adolescence.

Before accepting that affect about racial groups does not emerge until adolescence, it must first be determined if characteristics of the participants or stimuli used by Degner & Wentura (2010) could account for the observation of delayed racial bias. There are five important variables to consider when comparing the findings from the APT to the established developmental literature (Aboud, 1988; Baron & Banaji, 2006; Jackson, 2011). First, isolating the impact of the age of stimulus faces is warranted because Degner and Wentura (2010) used only adult faces, whereas many other measures use just child or child and adult stimuli to assess bias (Augoustinos & Rosewarne, 2001; Baron & Banaji, 2006; Doyle & Aboud, 2005). Second, Degner and Wentura (2010) included only male stimulus faces, so it is difficult to determine if their findings generalize to both genders. Third, the race and ethnicity of the APT outgroup stimuli consisted of immigrant, voluntary minorities (i.e., Turks and Moroccans), whereas the majority of comparable studies on racial prejudice in the United States typically use involuntary minorities such as African Americans (Baron & Banaji, 2006, Cristol & Gimbert, 2008; Jackson, 2011; Ogbu, 1992). Fourth, it is important to test children as young as 6 on the APT to truly determine whether racial bias is absent among younger

children. Fifth, Degner & Wentura's (2010) participants lived in racially homogenous areas, but research suggests cross-race contact may reduce racial bias (Levin, van Laar, & Sidanius, 2003; Raabe & Beelmann, 2011; Towles-Schwen & Fazio, 2001; White et al., 2009). The current study will address these concerns by including adult and same age male and female stimuli faces when testing 6.5-, 10.5-, and 14.5-year-old participants with the APT. The inclusion of Caucasian and African American faces will allow for better comparisons to the existing literature, and examining children's cross-race contact will help determine whether this variable impacts racial bias.

The Importance of Stimulus Faces

One important methodological difference between many previous studies and the child APT is the type of faces used within the tasks (Degner & Wentura, 2010). Photographs of children and drawings used in earlier research may elicit different responses than photographs of adult faces used in the APT (Augoustinos & Rosewarne, 2001; Baron & Banaji, 2006; Doyle & Aboud, 2005; Williams et al., 1975). For example, in Study 3 of their publication, Degner & Wentura (2010) used the same adult male faces from Study 1 and 2 and created an IAT by changing the instructions (i.e., categorizing the race of the face and categorizing the valence of target using the IAT paradigm). Their version of the IAT with adult male faces yielded stronger effect sizes ($D = .32$ and $.53$) than IAT researchers have reported ($D = .22$) when using children's male and female faces (Baron and Banaji, 2006). This difference could be the result of age of faces, gender of faces, or cultural influences on bias level towards voluntary minorities.

From a theoretical perspective, evidence from own-age bias (OAB) research suggests that children and adults are more expert at processing, recognizing, and

remembering faces from their own age group (see Rhodes & Anatasi, 2012 for an extensive meta-analytic review of this area). Children aged 5 to 11 show superior abilities in recognizing faces that are within 1-3 years of their own age (Anastasi & Rhodes, 2005; Hills, 2012; Hills & Lewis, 2011). Explanations for the OAB suggest that increased experience with same-age individuals (i.e., ingroup members) compared to other-aged individuals (i.e., outgroup members) facilitates more expert processing of these familiar/ingroup faces (He, Ebner, & Johnson, 2011; Sporer, 2001). Processing adult faces as outgroup members may elevate bias compared to same-age ingroup members.

Though children may have greater contact with same-age peers as they age, it is also possible that adult faces are more strongly represented in children's memory due to early experiences with caregivers (Macchi Cassia, 2011). This contention needs more empirical investigation, but it is possible that children's fluency in processing adult faces develops first, and subsequent experience with siblings and/or peers augments or alters their facial knowledge through experience (Macchi Cassia, 2011). By 9 months of age, infants are accurate at recognizing adult faces only, though at 3 months, infants are able to equally recognize newborn and adult faces. These findings indicate that by the end of the first year of life, an expertise for adult faces has emerged; this expertise could cause children to more strongly attach racial knowledge to adults compared to children (Macchi Cassia, Herman, Proietti, & Picozzi, 2012). The origins, manifestations, and causes of the OAB are still being debated, but it is clear that the age of stimulus faces is an important consideration when processing and recognizing faces (see Hill, 2012 and Macchi Cassia, 2011 for a review of this debate).

Due to the lack of developmental research regarding age of stimulus faces in racial bias tasks, and the mixed findings from the OAB literature, it is difficult to clearly predict how same-age or adult face stimuli will influence the assessment of racial bias. It is plausible that social interactions with peers should decrease bias towards same-age faces if age is used to group others into ingroup and outgroup members (i.e., less bias towards ingroup members). Conversely, it is possible that the social interactions among same-age peers may serve to elevate bias towards same-age faces based on tenets from the social identity theory (SIDT; Nesdale, 2008). SIDT proposes the strength of bias is based on (a) the extent that children identify with their social group, (b) whether prejudice is normative among the child's social group, and (c) the degree of competition or conflict between ingroups and outgroups (Nesdale, 2008; Nesdale, Durkin et al., 2005; Nesdale, Maass et al., 2005). If children view other-race, same-age peers as competition or sources of conflict, these experiences could serve to elevate racial bias towards peers. Competition and social status of peers may become more relevant in adolescence as children's peers become crucial to their identity (Tarrant, 2002; Tarrant, North, & Hargreaves, 2004).

The developmental intergroup theory (DIT) may also guide predictions regarding the importance of age when evaluating faces. DIT supports the idea that even young children strive to make sense of their world using racial cues (Bigler & Liben, 2006, 2007). Race is salient early in development as indicated by 3-month-old infants' differential responses to familiar and unfamiliar races (Kelly et al., 2007; Sangrigoli & de Schonen, 2004). DIT proposes the environment determines what traits (e.g., race) are culturally important to children; children then use these traits to group people as they

navigate their social world. After understanding that people can be grouped by race, children then seek to assign meaning to these groups, and classify newly encountered people by their group status. For example, if a child consistently sees Caucasians in higher status occupations, and non-Caucasians in lower status occupations, they may begin to associate race to social and occupational status. This process of extracting and inferring information about race gives rise to the early appearance of racial bias in children (Bigler & Liben, 2006). The tenets of DIT are supported empirically from numerous studies indicating the presence of racial bias in young children (Aboud, 1988; Bigler & Liben, 1993; Cristol & Gimbert, 2008; Jackson, 2011).

DIT, in conjunction with the face processing literature, can guide predictions about whether same-age or adult faces should elicit stronger racial bias (Macchi Cassia, 2011). If early experience with adult faces results in a strong representation of adults in a child's memory, then the salience of race and its association to status and characteristics may be more strongly tied to adults than to same-age peers. Perhaps young children first establish racial bias towards adults, after observing social interactions and media, and then map these beliefs and expectations onto peers (Bigler & Liben, 2006; Macchi Cassia, 2011). If this hypothesis is accurate, then younger children should evidence stronger racial bias towards adult faces compared to same-age faces. As children age, they may gain enough experience with peers that racial bias is now observed when evaluating peers and adults; it is unknown at exactly what age this would occur. Adolescents tend to rely more on same-age peers for establishing identity, thus racial bias towards same-age faces may be stronger among adolescents compared to young children

(Tarrant, 2002). No known research has investigated age differences in racial bias towards children and adults, thus the current study should provide insight into this topic.

Degner & Wentura's (2010) APT stimuli contained all male faces, but no other known racial bias tasks used only male faces (e.g., Baron & Banaji, 2006; Doyle & Aboud, 1995). Methodologically, it is important to control for any potential gender effects related to stimuli, though the concurrent assessment of both gender bias and racial bias among children has not received any known empirical investigation. One possibility regarding the effects of gender on racial bias may relate to children's early experiences with same-race female caregivers. Infants with female primary caregivers have greater expertise and preferences for familiar race female faces; this early female preference may lead to more positive associations to females compared to males as children age (Quinn, Yahr, Kuhn, Slater, & Pascalis, 2002; Quinn et al., 2008). Though infants and toddlers spend significantly more time with same-race, adult female caregivers (Rennels & Davis, 2008), it is unknown whether this early experience with females reduces later biases when evaluating new females of the same or different race.

Children and adolescents' preference for same-gender friends also indicates that it is important to include male and female faces when testing male and female participants (Martin & Fabes, 2001; Mehta & Strough, 2010). Alternatively, race may be a more salient cue than gender when processing faces. Nine- to 13-year-olds demonstrated the well-established other-race effect (i.e., better recognition and memory for familiar race faces), but this effect did not depend on the gender of the participant or the gender of the stimulus faces (Correnblum & Meisner, 2006). Taken together, data indicate that the gender and race of faces are important considerations, thus the current study will allow

for examination of these features. Importantly, it is necessary to determine whether

Degner & Wentura's (2010) findings generalize to other types of stimuli (i.e., female

faces) when evaluating their conclusions about the emergence of racial bias.

Additionally, Degner & Wentura (2010) assessed participants' outgroup bias

towards immigrant, voluntary minorities (i.e., Turks and Moroccans). Previous racial bias

research, especially on the IAT, used involuntary minorities (i.e., African Americans),

thus it is important to test the APT with stimuli that allow for more accurate comparisons

to previous studies (Aboud, 1988; Baron & Banaji, 2006; Jackson, 2011; Ogbu, 1992). In

the most comparable implicit study, American and Japanese children and adults

completed the IAT with Caucasian, Japanese, and African American faces (Dunham et

al., 2006). African American faces elicited more bias among participants in both

countries, thus suggesting that bias against African Americans may be stronger than bias

against other outgroups (Dunham et al., 2006). If stronger bias is observed towards

African Americans than other minority groups, then it may emerge earlier in

development as suggested by previous research (Baron & Banaji, 2006; Jackson, 2011).

By using younger age groups and African American faces, it will be possible to

investigate this possibility using the APT.

Age of Participants

It is necessary to assess younger children on the APT to clarify whether affective

racial bias is present before age 10. Historically, children aged 3- to 4-years-old

demonstrate some racial bias when measured explicitly (Aboud, 1988; Bar-Tal, 1996;

Clark & Clark, 1939 as cited in Hraba & Grant, 1970; Katz, 2003). This bias tends to

increase until about age 7 followed by a reduction in bias among some children (Aboud

1988; Doyle, Beaudat, & Aboud, 1988; Jackson, 2011; Katz, Sohn, & Zalk, 1975).

Implicit measures with racial bias do not suggest a curvilinear relationship, and indicate

the presence and maintenance of bias by age 6 (Baron & Banaji, 2006; Dunham et al,

2006). No known studies assess implicit racial bias in children younger than 6. Research

with implicit measures in other domains (e.g., gender and weight bias) indicates that

implicit attitudes exist and can be measured in children as young as 3-years-old

(Cvencek, Greenwald, & Meltzoff, 2011; Thomas, Smith, & Ball, 2007).

  To understand whether affect, as measured by the APT, is associated with race

early in development, 6-year-olds will be the youngest age tested in the present study to

allow comparisons to other implicit racial bias measures. In different domains (e.g.,

extracting information about social settings and math anxiety), researchers successfully

implemented the APT with 6- to 7-year-old children, so the APT should be a

developmentally appropriate tool to investigate racial bias for this age group (Lawson,

Banerjee, & Field, 2007; Rubinsten, & Tannock, 2010). Measuring race-related affect, as

well as its developmental trajectory, in young children should clarify whether and when

children's personal bias becomes distinct from their knowledge of bias.

The Importance of Assessing Cross-Race Interactions

  Most developmental research regarding racial bias has been conducted with pre-

adolescent children (Aboud 1988; Doyle, Beaudat, & Aboud, 1988; Jackson, 2011; Katz,

Sohn, & Zalk, 1975; Raabe & Beelmann, 2011). Less research directly assesses

stereotyping and prejudice levels among adolescents. A recently published meta-analysis

examining 128 studies on racial, ethnic, and national prejudice noted the lack of a clear

age-related developmental trend after age 10 (Raabe & Beelmann, 2011). Among

adolescents and college students, the amount of social contact with outgroup members is a significant predictor of racial bias. Greater contact with outgroup members and cross-race friendships serve to weaken bias (Levin, van Laar, & Sidanius, 2003; Raabe & Beelmann, 2011; Towles-Schwen & Fazio, 2001; White et al., 2009). These findings support the intergroup contact hypothesis, which suggests that contact among individuals of different races reduces prejudice (Pettigrew & Tropp, 2006). Research with younger children also suggests that cross-race friendships reduce racial prejudice (Aboud, Mendelson, & Purdy, 2003; Rutland, Cameron, Bennett, & Ferrell, 2005). Perhaps these cross-race interactions provide experiences with outgroup members that alter the representation of race away from a "they're all the same" categorical evaluation towards a more differentiated evaluation of individual group members.

Most developmental work with implicit racial bias measures has not directly addressed the frequency of participants' cross-race interactions and friendships although these interactions appear to be important (Aboud et al., 2003; Levin et al., 2003; Raabe & Beelmann, 2011; Towles-Schwen & Fazio, 2001; White et al., 2009). Degner & Wentura (2010) reported their samples came from racially homogenous areas (i.e., population of the outgroup tested was reported to be ~4% of the total population), and noted this homogeneity limited the generalizability of their findings. Most IAT work with children either does not mention the racial composition or diversity of their sample's environment or notes that it was racially homogenous (Baron & Banaji, 2006; Dunham et al., 2006; Rutland et al., 2005; Sinclar et al., 2004). Due to the influence of cross-race interactions on reducing prejudice, this variable appears to be an important factor to assess when measuring implicit racial bias. Familiarity with other races reduces explicit negative

evaluations, so assessing for cross-race interactions may help account for variability in racial bias among participants (Zebrowitz, Bronstad, & Lee, 2007).

Data for the current study were collected in a racially diverse metropolitan area, so it included children and adolescents from racially heterogeneous environments (U.S Census Bureau, 2010). The inclusion of this variable should make it easier to determine how these interactions influence implicit racial bias.

CHAPTER 3

AIMS AND IMPLICATIONS OF THE CURRENT STUDY

Using a within subjects counterbalanced design, Caucasian children, aged 6.5, 10.5, and 14.5, will complete a version of the APT that includes Caucasian and African American same-age and adult male and female faces. By including both genders and same-age versus adult faces, I can investigate if these attributes alter the expression of affective bias in an American sample. The inclusion of a cross-race interaction measure should also elucidate if cross-race contact influences bias.

If Degner & Wentura's (2010) developmental trajectory is replicated with different stimuli and a new sample, it will provide robust support for the idea that race-related affect, as measured by the APT, does not emerge until adolescence (Degner & Wentura, 2010). This timeline would suggest that children may know about stereotypes early in development, as measured by traditional measures, but they do not feel positively or negatively about people of different races until adolescence.

If Degner and Wentura's (2010) results are not replicated, it will indicate that additional factors (e.g., stimulus characteristics, age of participants, cross-race contact) contribute to affect related to racial bias. Implicit measures tend to have lower reliability than explicit measures. This low reliability suggests that variability among participants and measurement errors should be considered and investigated (see LeBel & Paunonen, 2011 for discussion and a Monte Carlo simulation of implicit measures). Given the low reliability and the debate within the adult literature about the similarities and differences among these tasks, further investigation regarding the replicability and extension of the

APT is warranted from a methodological standpoint (Fazio & Olson, 2003; Nosek et al., 2011; Olson & Fazio, 2003).

Disentangling the multifaceted nature of racial bias is another important theoretical contribution of the APT. It is possible that explicit measures and the IAT are better suited to measure associations (i.e., stereotypes) a child has about racial groups, but these associations may not be directly correlated with their feelings (i.e., prejudice) towards members of racial groups. Though a few studies have attempted to directly address the developmental difference between stereotypes and prejudice (e.g., Augoustinos & Rosenware, 2001; Coutant, Worchel, Bar-Tal, & van Raalten, 2011), many research paradigms do not (e.g., Baron & Banaji, 2006; Doyle & Aboud, 1995; Williams et al., 1975). It is hoped that continued work with the APT, in conjunction with other measures, will elucidate the differences among these constructs in children. If stereotype knowledge precedes prejudice, as suggested by DIT (Bigler & Liben, 2006) and Degner & Wentura (2010), then methodologically differentiating these constructs is necessary to understand whether and when children transition from expressing socially taught information about race to actually feeling negatively about individuals from different racial groups (Bigler & Liben, 2006).

The current study is designed to answer the following main questions. Null hypotheses and expected outcomes are noted after each question.

Question 1: *Are there age-related differences in participants' racial bias as measured by the APT? If so, will the current study replicate Degner & Wentura's (2010) finding that only adolescents show racial bias when different race faces are used as primes?*

H_O: There are no age differences in racial bias.

H_{A1}: All children will display priming effects when shown standard non-face priming stimuli, thus demonstrating their responses are affected by prime presentation.

H_{A2}: Only 14-year-olds will display racial bias when shown Caucasian and African American faces per Degner & Wentura (2010).

H_{A3}: All age groups will display racial bias as indicated by previous research with implicit tasks (Baron & Banaji, 2006; Rutland et al., 2005).

H_{A4}: A curvilinear relationship will emerge, as indicated by previous research with explicit tasks, showing more prejudice in 6- and 14-year-olds compared to 10-year-olds (Aboud, 1988).

Question 2: *Does the age of stimulus faces influence the strength of the priming effects?*

H_O: There are no differences in priming effects based on the age of the faces presented as primes.

H_{A1}: Bias should be strongest towards adult faces compared to same-age faces if adult faces are viewed as outgroup members (He et al., 2011; Sporer, 2001) or if racial knowledge is more strongly associated with adults per DIT (Bigler & Liben, 2006).

H_{A2}: Bias should be stronger towards same-age faces compared to adult faces if peers help the child establish social status and/or create competition as suggested by Nesdale (2008). This effect should be strongest for 14-year-old participants who are establishing their personal identity.

Question 3: *Does experience with different races influence children's scores on the APT? If so, how do the number of cross-race individuals in the child's life influence racial bias?*

H_O: Experience does not influence racial bias.

H_{A1}: Children with more cross-race interactions will demonstrate less racial bias than children with less cross-race interactions.

Question 4: *Are Degner & Wentura's (2010) results replicable using both male and female stimuli?*

H_O: Stimulus gender does not influence racial bias. Results are expected to generalize to both genders.

H_{A1}: Bias towards female faces will be less than bias towards males if early experiences with familiar race female caregivers serve to weaken negative biases towards unfamiliar race females compared to unfamiliar race males (Rennels & Davis, 2008). This hypothesis is tentative, and gender effects are not expected.

CHAPTER 4

METHODS OF THE CURRENT STUDY

Participants

Children aged approximately 6.5 ($n = 32$; 16 females; range = 6.05 – 7.62; $M =$ 6.70), 10.5 ($n = 33$; 17 females; range = 9.44 – 11.09; $M = 10.49$), and 14.5 ($n = 32$; 17 females; range = 13.53 – 14.99; $M = 14.31$) years participated in the study. We recruited families with eligible children via an established database in our psychology lab, local organizations and private schools, or fliers posted on campus, within the community, and online (e.g., Facebook). Research assistants sent emails or made phone calls to schedule appointments.

Participants or their parents reported children's ethnicity as Hispanic ($n = 21$) or non-Hispanic ($n = 76$) and race as Caucasian ($n = 68$), Multiracial ($n = 27$) and Asian ($n = 2$). The ethnic and racial diversity was similar across age groups. An additional 13 children participated, but their data were not included in analyses due to inattentiveness ($n = 1$), not wanting to continue the task ($n = 3$), or having an African American parent ($n = 9$). One 14-year-old participant identified as ¼ African American, but his mother indicated he had no contact with his paternal African American family, thus his data were included in the analyses. Participants received a small gift or a chance to enter a lottery for a $20 gift card as compensation.

Materials

Children completed the APT using a laptop computer and E-Prime 2.0 software. Children entered their responses using two buttons located on a mouse. Buttons were spaced equidistant on a Kensington orbit optical trackball mouse.

Affective Priming Task

To assess children's implicit affect regarding race, children saw a prime (i.e., a face of an African American or Caucasian child or adult or a positive, neutral, or negative picture) and then classified a positive (e.g., birthday cake, candy) or negative (e.g., guns, snakes) target as good or bad.

Stimulus ratings.

To select racial priming stimuli, female and male adults used 7-point Likert scales to rate 120 kindergarten and 1st grade faces, 120 4th and 5th grade faces, 120 9th grade faces, and 120 college-age faces for emotional expression (*1 = very negative expression, 7 = very positive expression*), attractiveness (*1 = not very attractive, 7 = very attractive*), and race typicality (*1 = not very typical of Caucasians/African Americans, 7 = very typical of Caucasians/African Americans*). Adults never rated the same face for more than one attribute. There was high interrater agreement for each attribute (emotional expression $r = .97$, $n = 481$; attractiveness $r = .94$, $n = 485$; race typicality $r = .95$; $n = 473$). From these ratings, we chose 20 faces in each age group that had neutral to slightly positive emotional expressions ($M = 4.32$, $SD = .45$), and were of average attractiveness ($M = 4.01$, $SD = .30$) and high race typicality ($M = 5.51$, $SD = .53$). Emotional expression, attractiveness, and race typicality did not significantly differ among age groups or between race and gender ($ps > .05$; see Tables 1 and 2).

To select standard priming stimuli, a different group of male and female adults used a 7-point Likert scale to rate a set of 300 images collected from the Internet for valence (*1 = very negative, 7 = very positive).* There was high interrater agreement for valence ratings ($r = .98$, $n = 100$). From these ratings, we chose 47 negative images ($M =$

1.73, $SD = .32$), 9 neutral images ($M = 4.04$, $SD = .25$), and 47 positive images ($M = 5.87$,

$SD = .36$). Ratings significantly differed among image type, $F(2, 100) = 1817.08$, $p <$

.001. Bonferroni post-hoc tests confirmed that mean ratings for negative, neutral, and

positive images all significantly differed from each other, $ps < .001$. Pilot data with

children, ages 6 to 14, verified that children's ratings of positive, negative, and neutral

images agreed with adults' ratings. There was high interrater agreement among children

($r = .997$, $n = 37$).

Standard priming stimuli.

To assess standard priming effects, 24 pictures served as primes. Eight positive

pictures (e.g., baby animal, candy), 8 neutral pictures (e.g., furniture, silverware), and 8

negative pictures (e.g., snake, spider) were included. Children saw four pictures of each

valence in the child face blocks and four different pictures of each valence in the adult

face blocks. Inclusion of these images allowed for a standard assessment of whether

participants' responses to the target stimuli were affected by the prime. Children saw an

additional 5 priming images (2 positive, 1 neutral, and 2 negative) during practice trials to

ensure they understood the task. These images differed from those used during the test

trials. Standard priming stimuli were presented in color and were 90 mm square.

Racial priming stimuli.

Same-age child faces and adult faces served as racial priming stimuli. Each child

saw 20 same-age faces (10 Caucasian, 10 African American) and 20 adult faces (10

Caucasian, 10 African American) with equal numbers of male and female faces. Research

assistants used Adobe Photoshop to standardize facial images by cropping photographs

from the neck up, sizing photographs to be approximately 90 mm square, standardizing

contrast and brightness, covering clothing cues with a gray sheet, and removing jewelry. Photographs were presented in gray scale and on gray backgrounds to control for differences in skin tone among faces from each race (Stepanove & Strube, 2012). The 6.5-year-old participants saw photographs of kindergarten and 1st graders; 10.5-year-old participants saw photographs of 4th and 5th graders, and 14.5-year-old participants saw photographs of 9th graders. Researchers excluded faces that appeared markedly older or younger than comparable age mates.

Target stimuli.

Each participant categorized a total of 64 (32 positive and 32 negative) pictures twice during test trials. The mean valence ratings of priming and target stimuli did not significantly differ (*ps* > .05). Additionally, practice trials consisted of 10 (5 positive and 5 negative) different target pictures to familiarize children to the task before beginning the experimental trials. Target stimuli were presented in color and were 90 mm square.

Cross-race interactions.

Parents and children completed a form indicating the child's interactions with friends and adults. The form asked information about the first name, gender, race, and relationship of each person noted. Research indicates most children list 3 to 5 friends (Boulton, Don, & Boulton, 2011; Pijl, Koster, Hannink, & Stratingh, 2009) and adolescents name ~7 friends (Ueno, 2009), thus the form allowed up to 10 friends to be noted.

Procedure

Children aged 7 years or older completed an assent form before participating. Parents provided informed consent and demographic information regarding their child (i.e., age, race).

Affective Priming Task

One of two Caucasian female experimenters tested all children individually in a quiet room. After seating the child at the computer, the experimenter instructed the child to press one button if the target picture was good and another button if the target picture was bad. The child was instructed to ignore the priming picture and focus on the target picture. The experimenter asked the child to respond as quickly as possible. Use of the left or right button to indicate good or bad was counterbalanced across participants. The experimenter placed the mouse centered and in front of the computer; a schematic smiling or frowning face was placed beside each button to remind children which button to use for "good" and which one to use for "bad". The experimenter asked the child to place their hands on the mouse before beginning each block of trials.

The experimenter ensured that the child understood the task by having each participant complete 10 practice trials before continuing to the experimental phase. During the first 5 practice trials, children saw targets only; no primes preceded the targets. To begin each initial practice trial, a fixation cross appeared on the screen for 317 ms followed by a blank screen for 133 ms, and then the target picture appeared until the child responded. After every completed trial, the computer provided immediate feedback (i.e., large green check to indicate a correct response or large red "X" to indicate an incorrect response). Each inter-trial interval lasted 1000 ms. The participant then

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completed 5 practice trials with the presence of a priming stimulus; the priming stimulus appeared for 317 ms. The timing and feedback of each experimental trial was identical to the final 5 practice trials, and feedback on performance was provided after each trial and at the end of each block of trials. The experimenter encouraged the child to respond quickly to the target image, but targets remained on screen until the child responded. Pilot testing with children determined that the 1750 ms response time cut-off that Degner & Wentura (2010) used was not an adequate response time for younger children. Implicit measures with children and adults often do not have a response time cut-off (Askew & Field, 2007; Baron & Banaji, 2006; Field, 2006; Fazio et al., 1995; Thomas, Smith & Ball, 2007; Wentura & Degner, 2010).

Children saw two consecutive blocks of child faces and two consecutive blocks of adult faces, counterbalanced between participants, for a total of 128 trials across the 4 blocks (32 trials within each block). Within individual blocks, randomization with constraints ensured that no more than two congruent or incongruent trials appeared sequentially, no more than two face prime trials appeared sequentially, and no more than two positive or negative target trials appeared sequentially. Within individual blocks, randomization with constraints also ensured that positive and negative targets were randomly paired with priming photographs and that each prime appeared only once. Between the first and second block for a specific age of faces, primes repeated but new targets were displayed. Between the adult and child blocks, there were new primes but the same 64 target images were randomly shown again. On the second presentation of a target, the target was paired with the opposite race (i.e., if a positive target was paired

with an African American face for the first presentation, it was paired with a Caucasian face for the second presentation).

After the APT, participants and their parents completed the cross-race interaction form. After finishing the cross-race interaction form, the experimenter thanked and debriefed the child.

Data Preparation

Reaction Time Data

Reaction times from correct trials were highly skewed with a score of 12.71 and highly kurtotic with a score of 341.17. To reduce skewness and kurtosis to acceptable levels, response latencies above 10,000 ms or below 300 ms and response latencies above or below 1.5 times the value of the upper and lower interquartile ranges for each age group were removed (Degner & Wentura, 2010; Greenwald, Nosek, & Banaji, 2003; Hoaglin, Iglewicz, & Tukey, 1986). When examining reaction times to target images, one positive image (i.e., a kitten with visible claws) had a mean reaction time that was greater than 2 standard deviations above the mean for all images. Trials using this target image were removed from all analyses. There were no other systematic differences among outliers or incorrect trials. These criteria removed 8.9% of 6.5-year-old trials, 6.8% of 10.5-year-old trials, and 7.6% of 14.5-year-old trials. Ratcliff (1993) suggested that outlier analyses of reaction time data should eliminate 5% - 15% of the data points to remove trials that are truly representative of task demands. Due to a computer error (i.e., feedback for responses was reversed so the child's correct responses were not rewarded with a green check mark), one 6-year-old had a block of trials removed from analyses.

No participant had to be removed for making more than 20% errors during the task (Olson & Fazio, 2003).

Bias Scores

Per Degner & Wentura (2010), *overall racial bias scores* were calculated by subtracting the mean RTs from congruent trials (i.e., African American primes/negative targets and Caucasian primes/positive targets) from the mean RTs of incongruent trials (i.e., African American primes/positive targets and Caucasian primes/negative targets) with positive scores indicating the presence of racial bias and negative scores indicating "reverse racial bias" (i.e., faster positive associations to African Americans and faster negative associations to Caucasians). The scores were calculated for all face stimuli combined and separately for same-age and adult faces.

The overall racial bias score reflects an assumption that children who associate positive targets with Caucasian faces (ingroup positivity) will also associate negative targets with African American faces (outgroup negativity). To examine ingroup and outgroup associations separately, we calculated separate scores for how children responded to positive and negative targets when primed with African American faces (*African American bias scores*) and when primed with Caucasian faces (*Caucasian bias scores*). African American bias was calculated by subtracting the mean RTs of incongruent trials from the mean RTs of congruent trials, so positive scores indicated faster positive associations to African Americans and negative scores indicated faster negative associations to African Americans. Caucasian bias was calculated by subtracting the mean RTs of congruent trials from the mean RTs of incongruent trials, so positive scores indicated faster positive associations to Caucasians and negative scores indicated

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faster negative associations to Caucasians. The scores were calculated for all face stimuli combined and separately for same-age and adult faces.

Reaction Time Analyses

To avoid making assumptions about congruent and incongruent trials, data were also examined by using RT as the dependent variable. For the RT analyses, participant gender, prime gender, prime age, prime race, and valence of the target image served as the independent variables.

Cross-Race Interactions

For cross-race interactions, we divided the number of other-race friends and adults by the total number of individuals listed to create a percentage of cross-race interactions. For multiracial children, any friend or adult listed was considered the same race if they belonged to any of the racial or ethnic groups the child listed in their demographic information. The relation between racial bias scores and percent of different race friend and adult interactions, percent of Caucasian friend and adult interactions, and percent of African American friend and adult interactions were examined in subsequent analyses.

CHAPTER 5

RESULTS OF THE CURRENT STUDY

Effects of Age on Reaction Times

An initial analyses of mean reaction time indicated a significant effect of age on RTs, $F(2, 11058) = 4266.31$, $p < .0001$. Bonferroni post-hoc comparisons indicated that 6.5-year-olds had significantly slower RTs ($M = 1346.47$, $SD = 470.8$, $SE = 7.84$) than 10.5-year-olds ($M = 881.88$, $SD = 251.49$, $SE = 4.09$), $p < .0001$, who had significantly slower RTs than 14.5-year-olds ($M = 668.22$, $SD = 160.47$, $SE = 2.65$), $p < .0001$. Based on this robust age effect, each age group was examined individually in all analyses.

Standard Priming Condition

To investigate the effects of standard primes, we conducted three paired samples t-tests for each age group to determine whether RTs to positive or negative targets differed based on positive, negative, or neutral primes (Table 3). At each age group, and as expected, positive primes resulted in significantly faster RTs during congruent trials compared to incongruent trials, indicating that participants were faster at categorizing positive targets than negative targets after seeing a positive prime, ps $< .05$. At each age group, and as expected, neutral primes did not significantly affect RTs when categorizing positive or negative targets, indicating that neutral primes did not prime positive or negative affect, ps $> .05$. At each age group, and unexpectedly, negative primes did not significantly affect RTs when categorizing positive or negative targets, ps $> .05$. Because participants demonstrated standard priming effects with positive and neutral primes, it suggests children's responses were affected by priming images.

The Impact of Participant Gender and Prime Gender on RT

A preliminary 2 (participant gender) x 2 (prime gender) x 2 (prime age – same-age faces and adult faces) x 2 (prime race – African American faces and Caucasian faces) x 2 (target valence – positive or negative) mixed ANOVA investigated whether participant gender or prime gender influenced RTs for each age group. No age group yielded a significant main effect for participant gender. Among 10.5-year-olds, there was a significant prime gender x participant gender interaction, $F(1, 30) = 7.47$, $p = .01$, $\eta^2 = .20$. Mean RTs indicated that male participants ($M = 902.51$, $SD = 155.39$, $SE = 40.12$) were faster than female participants ($M = 878.83$, $SD = 149.17$, $SE = 38.52$) with male face primes, $t(14) = 2.14$, $p = .05$. No other findings were significant. Because neither participant gender nor prime gender significantly impacted performance on trials related to the variables of interest, data were collapsed across participant gender and prime gender for subsequent analyses.

The Impact of Prime Age and Prime Race on RT

A 2 (prime age) x 2 (prime race) x 2 (target valence) repeated measures ANOVA investigated whether the race or age of priming faces impacted RTs to positive or negative targets. There were no significant interactions for any age group. Among 14.5-year-olds, there was a significant main effect for prime race, $F(1, 31) = 7.76$, $p = .009$, $\eta^2 = .20$. Participants had faster RTs to trials with African American face primes ($M = 674.57$, $SD = 125.70$, $SE = 17.88$) than to trials with Caucasian face primes ($M = 685.85$, $SD = 125.89$, $SE = 18.35$).

Examining Bias Scores

Overall racial bias, African American bias, and Caucasian bias scores for each age were compared to zero (i.e., zero indicated no difference between congruent and incongruent trials) using one-sample t-tests. No bias scores were significant at any age when examining same-age face trials, adult face trials, and a combined bias score that included adult and same-age faces (Table 4). The 6.5-year-olds' overall racial bias scores to same-age faces ($M = 44.61$, $SD = 139.07$, $SE = 24.58$) approached significance, indicating they were 44.61 ms faster when responding to congruent trials compared to incongruent trials, but this difference only marginally significant, $t(31) = 1.81$, $p = .079$.

Comparing Overall Racial Bias to Degner & Wentura (2010)

No age group showed significant overall racial bias towards adult male faces. The 6.5-year-olds' ($M = -24.60$, $SD = 157.37$, $SE = 27.64$), 10.5-year-olds' ($M = -16.83$, $SD = 84.41$, $SE = 14.69$), and 14.5-year-olds' adult male overall racial bias scores ($M = -10.12$, $SD = 63.26$, $SE = 11.18$) did not significantly differ from zero, ps > .05.

Examining How Cross-Race Interactions Relate to Bias

Children's cross-race interactions were similar across ages and indicated that most interactions were with same-race and Caucasian individuals (see Table 5).

To investigate how cross-race interactions impacted bias scores, we examined correlations between bias scores (i.e., overall racial bias, African American bias, and Caucasian bias for same-age, adult, and combined stimuli) and adult and friend cross-race interactions (i.e., percent of different race friends and adults, percent of African American friends and adults, percent of Caucasian friends and adults). After using a Bonferroni correction to adjust alpha for multiple comparisons (corrected $\alpha = .017$), there were

significant correlations between 14.5-year-olds' cross-race peer interactions and their overall racial bias to same-age faces, Caucasian same-age faces, and African American adult faces (Table 6).

Among 14.5-year-olds, having more different race friends was associated with more overall racial bias (i.e., faster RTs in congruent than incongruent trials) to same-age faces ($r = .523$, $p = .002$). Greater diversity in peer friendships was correlated to greater overall racial bias in trials with same-age faces. Interestingly, this effect of peer diversity was driven by significant positive associations to Caucasian same-age faces ($r = .433$, $p = .013$) but not significant negative associations to African American same-age faces ($r = -.189$, $p = .301$). Additionally, greater peer diversity was associated with more positive associations to African American adult faces ($r = .480$, $p = .005$) indicating that diversity in friendships is related to more positivity to African American adult faces. Linear regressions confirmed the significant predictive power of these relationships (Table 7). No other correlations were significant.

Examining Non-Hispanic Caucasian Children's Bias

Because 30% of the participants identified as multiracial or as a member of a minority group, this racial diversity may have affected responses on the racial bias task (Brown, Spatzier, & Tobin, 2010; Killen, Henning, Kelly, Crystal, & Ruck, 2007; Margie, Killen, Sinno, & McGlothlin, 2005) We, therefore, examined how children who identified solely as non-Hispanic Caucasians responded on the task by conducting the same analyses done with the full sample. This reduced sample consisted of 6.5 ($n = 23$), 10.5 ($n = 27$), and 14.5-year-olds ($n = 19$). These analyses produced no significant findings for the 10.5- or 14.5-year-olds.

For the 6.5-year-olds, results from the 2 (prime age) x 2 (prime race) x 2 (target valence) repeated measures ANOVA with RT as the dependent variable revealed a main effect for prime race. Non-Hispanic Caucasian children had faster RTs to African American faces ($M = 1355.57$, $SD = 247.97$, $SE = 51.71$) compared to Caucasian faces ($M = 1402.98$, $SD = 256.09$, $SE = 53.40$), regardless of age of priming faces, $F(1, 22) = 8.436$, $p = .008$, $\eta^2 = .277$. This main effect was superseded by a significant prime age x prime race x target valence interaction, $F(1, 22) = 4.62$, $p = .043$, $\eta^2 = .17$. Non-Hispanic Caucasian children were fastest in trials that contained an African American same-age face prime paired with a negative target ($M = 1293.24$, $SD = 304.20$, $SE = 63.39$) and slowest in trials that contained a Caucasian same-age face prime paired with a negative target ($M = 1452.96$, $SD = 385.16$, $SE = 80.31$), $t(22) = -3.18$, $p = .004$ (Figure 1). These differences suggest faster associations to negative stimuli when primed with African American same-age faces and slower associations to negative stimuli when primed with Caucasian same-age faces. No other differences within this interaction were significant.

When we compared non-Hispanic Caucasian 6.5-year-olds' overall racial bias scores to zero using a one-sample t-test, it revealed significant overall racial bias ($M = 64.47$, $SD = 128.99$, $SE = 26.90$) to same-age faces, $t(22) = 2.40$, $p = .025$. On average, non-Hispanic Caucasian children were 64.47 ms faster in congruent trials compared to incongruent trials indicating the presence of racial bias towards same-age faces among non-Hispanic Caucasian 6.5-year-olds. No other bias scores were significant.

Analyses examining correlations between cross-race interactions and bias scores among non-Hispanic Caucasian participants revealed no significant findings at any age.

CHAPTER 6

DISCUSSION AND IMPLICATIONS

The current study revealed some interesting age differences in children's display

of racial bias. Whereas non-Hispanic Caucasian 6.5-year-olds showed racial bias when

viewing same-age faces, 10.5-year-olds showed no significant patterns of racial bias, and

14.5-year-olds' racial bias for both same-age and adult faces was related to their cross-

race interactions. These age differences in racial bias are similar to those found in explicit

bias measures (e.g., Aboud, 1988) and topical review papers (e.g., Jackson, 2011; Raabe

& Beelman, 2011) showing greater racial bias in early childhood followed by a decrease

in racial bias in middle childhood and adolescence related to cross-race friendships.

Findings with non-Hispanic Caucasian 6.5-year-olds partially support the

hypotheses that predicted children would demonstrate racial bias based on the age of

face. Non-Hispanic Caucasian 6.5-year-olds' racial bias was driven by faster negative

associations to African American same-age faces and slower negative associations to

Caucasian same-age faces. The presence of racial bias within the non-Hispanic Caucasian

sample of 6.5-year-olds, but not within the full sample of 6.5-year-olds, supports research

indicating greater outgroup racial bias among Caucasian children compared to multiracial

or minority children (Brown et al., 2010). These findings also partially support Baron and

Banaji (2006) who found that 6-year-olds displayed implicit racial bias when measured

on the IAT, but the current study contradicts their finding that implicit racial bias is

present in older children. Baron & Banjai (2006) reported their sample was

predominately Caucasian. It is difficult to make direct conclusions about the differences

observed, but one possibility is that the diversity in the current sample resulted in less

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racial bias among older children. Though racial bias was observed in non-Hispanic Caucasian 6.5-year-olds, the lack of racial bias when examining the full sample at all three age groups does not fit with previous research using implicit measures, mainly the IAT, that suggests racial bias is observed during childhood and adolescence (Baron & Banaji, 2006; Degner & Wentura, 2010; Dunham, Baron, & Banaji, 2008; Newheiser & Olson, 2012; Rutland, Cameron, Milne, & McGeorge, 2005; Sinclair, Dunn, & Lowery, 2005). Perhaps racial bias observed via the APT is more analogous to the constructs measured by explicit tasks that ask children to verbally attribute adjectives to target stimuli (Doyle & Aboud, 1995; Doyle et al., 1988). Future research comparing the APT to explicit measures (e.g., Multi-Response Racial Attitude Scale) could clarify whether implicit affective racial bias has a similar developmental trajectory to explicit racial bias.

As a group, the 14.5-year-olds did not display significant racial bias, but higher peer diversity significantly predicted bias scores indicating that adolescents' racial bias is related to their experience with different race peers. The positive correlation between peer diversity and overall bias to same-age faces suggests that adolescents who spend more time with different race peers have greater racial bias. A closer look at the significant positive correlation between peer diversity and Caucasian bias indicates that positive Caucasian associations drove the increase in overall racial bias. In contrast, greater peer diversity significantly predicted more positive associations with African American adults. Perhaps greater peer diversity allowed adolescents to come into more contact with diverse adults, such as family members of cross-race friends. The finding that greater peer diversity was related to 14.5-year-olds' positive ingroup bias, but not negative outgroup bias, offers some support for the intergroup contact theory and meta-

analytic findings by suggesting that greater peer diversity may help neutralize negative

affect towards African Americans (Pettigrew & Tropp, 2006; Raabe & Beelmann, 2011).

Though studies support the idea that peer diversity reduces intergroup bias, peer diversity

is often measured by examining peer dyads, estimations of peer diversity, small peer

samples, or peer friendships strictly within the classroom (Aboud et al., 2003; Feddes,

Noack, Rutland, 2009; Levin et al., 2003; White et al., 2009). The current study indicates

that it may also be fruitful to ask about a larger "snapshot" of participants' friends,

including extended family, neighbors, and sport team members, to better clarify how

social relationships impact racial bias. Additionally, when examining racial bias, it may

be helpful to use measures like the APT, which are able to disentangle positive ingroup

bias from negative outgroup bias. The current data suggest that the relation between

adolescents' racial bias and peer diversity may be driven more by positive ingroup

evaluations instead of negative outgroup evaluations. The presence of stronger ingroup

positivity compared to outgroup negativity is supported by both adult and developmental

research (Brewer, 1999; Nesdale, 2008; Tajfel & Turner, 1986).

The following findings were unexpected and not predicted: male 10.5-year-olds

responded faster when primed with male faces versus female faces; 14.5-year-olds

responded faster when primed with African American than Caucasian faces. Findings

from 10.5-year-olds may be related to research suggesting males in middle childhood

become more gender stereotyped than females and that both genders start understanding

the positive cultural value placed on masculinity (Signorella, Bigler, & Liben, 1993). It

is unclear why 14.5-year-olds responded quicker when primed with African American

faces compared to Caucasian faces. Findings from the other race effect (i.e., unfamiliar

race faces are treated as more perceptually similar) suggest that though recognition is better for familiar race faces, unfamiliar race faces are more quickly categorized by race (Corenblum & Meissner, 2006; Zhao & Bentin, 2008). It is possible that 14.5 year-olds treated the African American faces as more similar and devoted less time to individually processing the faces thus speeding up their RTs to subsequent target images. These unexpected findings indicate the need to continue assessing the APT, and other implicit measures, in terms of reaction times and not just bias scores to further clarify whether the patterns can be replicated.

When examining the current study in relation to the DIT model of intergroup bias, the first step (i.e., how the salience of perceptible cues is established) and second step (i.e., using salient cues to categorize individuals) could be viewed as malleable in terms of the child's environmental diversity (Bigler & Liben, 2006). If children are from diverse racial backgrounds or live in cities with high diversity, then the salience of race may be different compared to Caucasian children or children from more racially homogenous areas. If, within an individual child, the salience of race is reduced at step one and two through exposure to many ethnic/racial groups, then step three (i.e., the development of stereotypes and prejudice) could demonstrate a reduction in outgroup bias. The salience of race and associations related to race could also undergo changes as children age and become more exposed to diversity within their classroom and social activities, which may explain the absence of significant bias among 10.5- and 14.5-year-olds in the current sample. Additional research is needed to confirm this possibility, but using the DIT model may provide a useful framework to understand why and how the environment influences racial bias. Further refining implicit tasks, like the APT, by

accounting for the age of stimuli faces as well as intergroup contact among diverse samples may be an important quantitative way to address factors that influence the developmental emergence of racial bias.

The current study was conducted to expand on the findings of Degner and Wentura (2010) who found that implicit racial bias as measured by the APT was not evident until adolescence. Our findings do not corroborate the idea that affective implicit bias is observed only among adolescents. Examining the adult male face trials with the full sample or only the non-Hispanic Caucasian subsample did not provide any evidence that children or adolescents have affective racial bias to adult male stimuli. It is important to note several differences between the current study and Degner and Wentura (2010). One key difference involved the removal of the 1750 ms response time cutoff in the task. Because pilot testing with younger children indicated that this cutoff increased missed trials and participants' frustration, it was removed for all age groups. The removal of this cutoff greatly increased variability in RTs, especially among younger children (see Table 4 for standard deviations). Degner and Wentura (2010) reported standard deviations for priming scores that ranged from 25 ms to 63 ms; the current study had much larger standard deviations, especially among 6-year-olds.

The current study also used novel target stimuli, which were rated by adults and piloted with children, instead of stimuli from the International Affective Picture System (IAPS). We opted to collect new images after discovering that many of the best images (i.e., the most positive or most negative images) from the IAPS contained human faces, appeared very outdated, or were too graphic to show young children. It is possible that additional testing needs to be done to ensure that images used in the current study are

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easily and quickly identified as positive or negative by a larger sample of adults and children.

To overcome both the large standard deviations in RTs as well as the reliability and speed of how children perceive the negativity or positivity of an image, it would be advisable for future researchers to employ the method used by Fazio, Jackson, Dunton, and Williams (1995). Fazio et al. (1995), who published the original version of the APT, created facilitation scores by measuring participants' RTs to targets when primed with an asterisk compared to their RTs when primed with a face. Degner & Wentura (2010) did not use facilitation scores, nor did their standard deviations suggest variability was a major concern, but future studies should equate for individual variability in RTs to positive and negative stimuli. Additionally, an assessment of the time children need to categorize stimuli valence would benefit future developmental research on the implicit nature of affective reactions.

Additionally and as previously mentioned, the diversity in the sample and the sample's environment could have impacted the presence of racial bias. US Census data from 2010 indicates that Las Vegas is 47.9% Caucasian only (and not Hispanic or Latino), thus 52.1% of the population identifies as a race or ethnicity other than Caucasian only (U.S. Census Bureau, 2010). This diversity is much different than the environment noted in Degner and Wentura's sample (2010). Their sample was drawn from cities with ~11% immigrant populations, schools with all White German teachers, and the school populations were composed of 3% to 5% minority children.

A third factor involved the race and age of faces used within the task. The current study used African American outgroup faces that were adult and same-age males and

females, whereas Degner & Wentura (2010) used Moroccan and Turkish adult male faces. Because Turkish and Moroccan faces are voluntary, immigrant minority faces and African American faces are involuntary minority faces, future research should explore children's positive and negative associations to Hispanic and Asian faces among American participants. If voluntary, immigrant populations are viewed positively regarding work ethic but viewed negatively regarding competition for economic resources (e.g., jobs) then racial bias may different compared to groups like African Americans who have been viewed negatively and historically stigmatized in the United States (Ogbu & Simmons, 1998). Age of faces also appears to be important to consider in future research because bias was observed only among non-Hispanic Caucasian 6.5-year-olds viewing same-age faces, and cross-race interactions among 14.5-year-olds had different effects on bias based on the age of the face.

Another area that may have impacted the measurement of affective bias relates to the lack of priming observed with standard negative primes. Children were not faster at identifying a negative target when primed with a negative prime; they were fastest at identifying a negative target when primed with a positive image. Based on Degner and Wentura's (2010) reported results, it is impossible to determine if their data had similar trends because they simply reported a priming score for standard primes (i.e., incongruent trial RTs minus congruent trial RTs) that significantly differed from zero. It is unclear how they handled the neutral prime trials that were included in their task. Although the priming scores for each age group in the current study suggested children had been primed, the scores were not significantly different than zero. After looking more closely at the means (Table 3), it is clear that negative primes did not conform to standard

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priming effects. It is unclear why children were not primed by negative images. One possibility relates to the priming stimuli included in the study; perhaps the negative stimuli were not quickly, reliably, and universally identified as negative. The variation in participants' verbal reactions to target stimuli during the task (e.g., "Did you know that spiders are actually good because they kill mosquitoes?" and "Snakes aren't all bad.") provides anecdotal evidence for this idea. An experiment using the APT with children measuring fear conditioning found that positive primes produced the expected priming effects, but negative primes did not yield priming scores that differed from zero (Klein et al., 2012). An experiment with adults suggested that negative primes might not produce the expected priming effects found among positive primes (Aguado, Pierna, & Saugar, 2005). Other studies that used the APT with children did not report their data in a manner that makes it possible to investigate specifically how data was affected by negative primes (Lawson et al., 2006; Rubinsten & Tannock, 2010). Taken together, these studies and the data from the current study suggest that future research should investigate how negative primes affect responses on the APT. Though negative primes did not produce the expected priming effects, the significant difference between categorizing positive and negative targets observed with positive primes and the lack of difference with neutral primes provides evidence that children's responses were affected by primes.

Implications of the Current Study

Because the development of racial bias is important to understand in terms of stereotyping, prejudice, and discrimination, the ongoing exploration of how to measure this construct is a vital empirical endeavor. Without valid and reliable measurements of bias, it is difficult to compare and contrast how age and environment relate to racial bias.

The current study indicates that age of stimulus faces, participants' race, and cross-race interactions are important constructs when examining the developmental trajectory of racial bias. As highlighted in several recent reviews on the developmental of racial bias, researchers should continue to investigate, quantify, and report individual and social factors that may impact the measurement of bias (Jackson, 2011; Raabe and Beelman, 2011). Raabe and Beelman (2011) suggest that these individual and social factors are critically important to assess but are often understudied or underreported in the field. The current study corroborates this idea by suggesting children from diverse areas have less racial bias than typically observed on implicit tasks, and adolescents' racial bias is affected by cross-race friendships.

Understanding which construct a task is measuring (e.g., affect, categorical associations, ingroup positivity, outgroup negativity), how this construct relates to age, and how stimuli used in assessments of affective bias will further both the methodological process of measuring bias and the ability of researchers to test and refine theories related to racial bias. Focusing on the task demands and which constructs are being assessed could provide a framework to understand what elements of racial bias do and do not decrease across development. The current study overlaps with explicit measurements of racial bias suggesting that racial bias decreases with age among Caucasian children. Future research could benefit from comparing the APT to explicit tasks of racial bias to better understand whether implicit affective racial bias overlaps with development of explicit racial bias. Future research could also benefit from studying racial bias in diverse cities to determine the extent to which racial bias is affected by exposure to different races.

APPENDIX I TABLES

Table 1

Mean Attribute Ratings by Race, Age, and Gender

Type of Face	Attractiveness	Emotional Expression	Race Typicality
African American			
6.5-Year-Old Male	3.97	4.59	5.62
6.5-Year-Old Female	4.13	4.46	5.23
10.5-Year-Old Male	4.02	4.17	5.78
10.5-Year-Old Female	4.02	4.48	5.78
14.5-Year-Old Male	4.10	4.14	5.83
14.5-Year-Old Female	4.05	4.19	5.29
Adult Male	4.09	4.25	5.23
Adult Female	4.02	4.38	5.57
Caucasian			
6.5-Year-Old Male	3.90	4.60	5.88
6.5-Year-Old Female	3.91	4.34	5.62
10.5-Year-Old Male	3.93	4.27	5.73
10.5-Year-Old Female	3.95	4.26	5.52
14.5-Year-Old Male	4.08	4.20	5.12
14.5-Year-Old Female	4.03	4.25	5.59
Adult Male	3.92	4.24	5.44
Adult Female	4.09	4.35	5.00

Table 2

Mean Attribute Ratings and Standard Deviations by Race and Gender

Attribute	Female	Male	Caucasian	African American
Attractiveness	4.02 (.29)	4.00 (.31)	3.98 (.30)	4.05 (.30)
Emotional Expression	4.33 (.48)	4.31 (.42)	4.31 (.36)	4.33 (.52)
Race Typicality	5.41 (.52)	5.62 (.54)	5.49 (.61)	5.54 (.45)

Table 3

Mean Reaction Times (ms) and Standard Deviations Based on Valence of Priming Image

and Valence of Target Image

Image Type	6.5-year-olds	10.5-year-olds	14.5-year-olds
Positive Prime			
Positive Target	1303.20 (272.34)*	888.58 (181.74)*	662.70 (136.23)*
Negative Target	1472.67 (317.12)*	925.51 (168.87)*	694.72 (121.95)*
Negative Prime			
Positive Target	1421.37 (326.22)	923.13 (184.05)	678.72 (113.94)
Negative Target	1505.31 (288.42)	942.64 (169.36)	688.73 (125.34)
Neutral Prime			
Positive Target	1273.38 (206.24)	898.18 (190.90)	663.53 (126.53)
Negative Target	1311.61 (271.58)	865.59 (162.40)	657.13 (98.24)

Note. * indicates the means significantly differed from each other, *p* < .05

Table 4

Mean Differences between Incongruent and Congruent Trials (i.e., Priming Scores) and

Standard Deviations Based on Race and Age of Priming Faces

Priming Score	6.5-year-olds	10.5-year-olds	14.5-year-olds
Same-Age Faces			
Overall Bias	44.61 (139.07)	-9.62 (73.53)	-1.37 (53.78)
African American Bias	-29.94 (239.94)	15.07 (125.26)	9.38 (71.72)
Caucasian Bias	59.27 (231.44)	-4.16 (101.87)	6.64 (98.66)
Adult Faces			
Overall Bias	-15.96 (107.27)	-16.10 (67.15)	-10.91 (56.11)
African American Bias	38.77 (198.12)	14.17 (121.14)	9.20 (87.35)
Caucasian Bias	6.84 (204.30)	-15.82 (101.52)	-12.63 (81.07)
All Faces			
Overall Bias	14.32 (75.78)	-12.86 (42.68)	-6.14 (35.51)
African American Bias	4.41 (183.32)	12.01 (90.53)	9.29 (56.28)
Caucasian Bias	33.06 (156.11)	-11.52 (68.99)	-2.99 (72.73)

Note. Positive overall bias scores indicated positive association to Caucasians and negative associations to African Americans and vice versa; positive African American bias scores indicate positive affect to African American and vice versa; positive Caucasian bias scores indicate positive affect o Caucasians and vice versa

Table 5

Percentages and Standard Deviations of Cross-Race Interactions

Type of Interaction	6.5-year-olds	10.5-year-olds	14.5-year-olds
Same Race			
Child	75.73 (17.25)	75.69 (18.93)	76.48 (14.24)
Adult	83.25 (15.77)	89.71 (14.59)	89.29 (12.93)
African American			
Child	3.97 (7.89)	4.58 (6.36)	5.83 (6.46)
Adult	2.70 (5.01)	2.61 (5.73)	2.80 (5.26)
Caucasian			
Child	65.97 (17.25)	67.89 (26.33)	56.93 (26.26)
Adult	75.50 (23.82)	85.53 (19.94)	74.37 (25.03)

Table 6

Correlations Between Bias Scores and Different-Race Interactions

Bias Scores	Different-Race Friends	Different-Race Adults
6.5-Year-Olds		
Overall Racial Bias to Same-Age Faces	.13	-.00
African American Bias to Same-Age Faces	-.20	-.09
Caucasian Bias to Same-Age Faces	-.05	-.10
Overall Racial Bias to Adult Faces	-.01	-.31
African American Bias to Adult Faces	-.15	.06
Caucasian Bias to Adult Faces	-.15	-.27
10.5-Year-Olds		
Overall Racial Bias to Same-Age Faces	.26	-.02
African American Bias to Same-Age Faces	-.26	.03
Caucasian Bias to Same-Age Faces	.06	.00
Overall Racial Bias to Adult Faces	.21	.00
African American Bias to Adult Faces	.13	-.03
Caucasian Bias to Adult Faces	-.10	-.03
14.5-Year-Olds		
Overall Racial Bias to Same-Age Faces	.52*	.10
African American Bias to Same-Age Faces	-.19	-.25
Caucasian Bias to Same-Age Faces	.43*	-.17
Overall Racial Bias to Adult Faces	-.42	.28
African American Bias to Adult Faces	.48*	-.14
Caucasian Bias to Adult Faces	-.07	.23

Note. * $p < .05$

Table 7

Linear Regression Analyses Examining Whether Different-Race Friends Predicted Bias

in 14.5-Year-Old Participants

	Percent of Different-Race Friends				
Variable	R	R^2	β	*F*	*p*
Overall Bias to Same-Age Faces	.533	.273	197.34	11.27	.002
Bias to Caucasian Same-Age Faces	.433	.187	299.74	6.91	.013
Bias to African American Adult Faces	.480	.230	294.13	8.96	.005
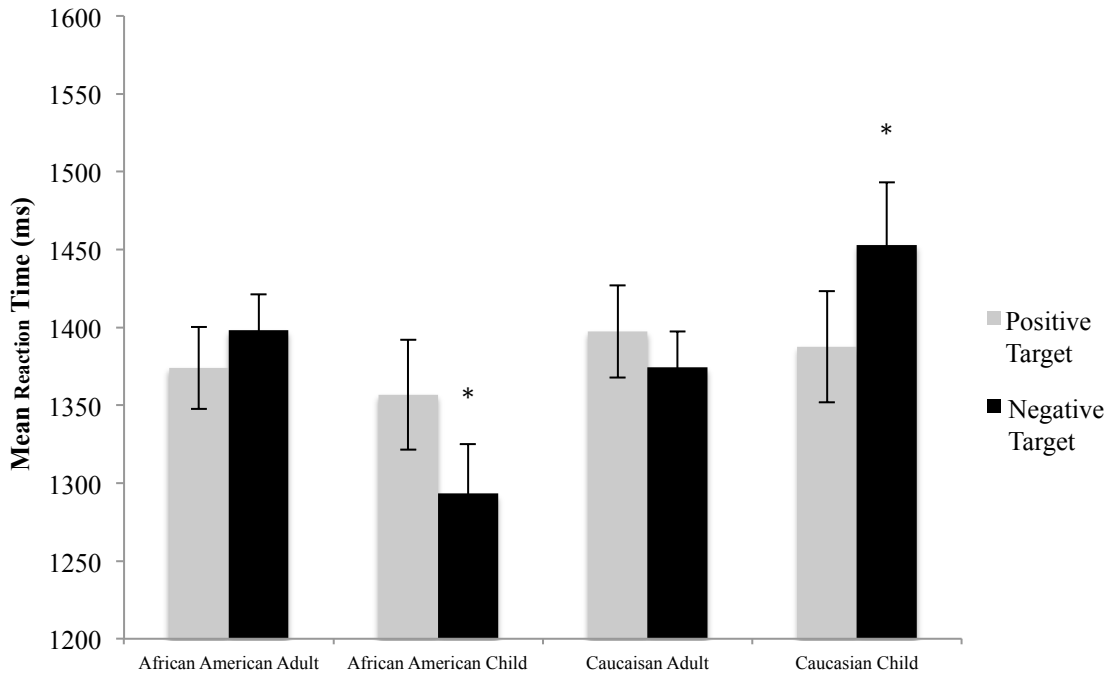
Figure 1. Mean RTs for non-Hispanic Caucasian 6.5-year-olds based on the age and race of the priming image and valence of the target image. * indicates that means for these two types of stimuli significantly differed, $p < .05$

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CURRICULUM VITAE

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EDUCATION

Ph.D. in Experimental Psychology
University of Nevada, Las Vegas
May 2014

Master of Arts in Psychology
University of North Carolina Wilmington
July 2007

Bachelor of Arts in Psychology
University of North Carolina Wilmington
May 2004

DISSERTATION AND THESIS

Noles, E. (2014). What's age got to do with it? Examining how the age of
stimulus faces affects children's implicit racial bias
Advisor: Dr. Jennifer Rennels
Noles, E. (2007). Terror management theory and racist attributions: Mortality
saliency and bias level among Black Americans
Advisor: Dr. James Johnson

PROFESSIONAL EXPERIENCE

Instructor
University of Nevada, Las Vegas: Fall 2010 – present
Research Methods
Introduction to Psychology
Nevada State College: Fall 2010 – present
Lifespan Human Development (traditional, hybrid, and online)
Introduction to Psychology (traditional and online)
University of North Carolina Wilmington: Fall 2007 – Summer 2008
Lifespan Human Development
Human Sexual Behavior

Graduate Research Assistant
University of Nevada, Las Vegas: Fall 2008 – present
Design experiments using E-Prime, Qualtrics, Final Cut Pro, Adobe
Photoshop, QuickTime, Flash, and Habit X software
Interview, hire, train, and supervise research assistants
Create and edit facial stimuli for infant and child experiments
Schedule, run, and code infant looking time data
Data compilation and analysis

Edit and grade student research papers
Assist students with creating research posters
Prepare manuscripts for publication

Graduate Research Assistant
University of North Carolina Wilmington: Fall 2004 – Summer 2008
Created databases to rescore adolescents' performance
on the Iowa Gambling Task (IGT)
Administered the IGT to 8th graders
Assessed violence intervention and prevention programs through the
Safe Schools/Healthy Students grant initiative
Assisted in writing individual program evaluations as well as editing the
annual federal grant progress report
Administered and assessed the Youth Risk Behavior Survey
Investigated the factors responsible for health disparities among African-
Americans, specifically cancer morbidity and mortality rates
Data collection, entry, and evaluation in conjunction with New Hanover
Regional Medical Center

Grant Evaluator
DREAMS in Wilmington, NC: Fall 2006 – Summer 2007
Data entry and evaluation for the NC Governors Crime Commission grant
Assisted DREAMS, an art outreach program for at-risk students, in
developing appropriate measures of program assessment
Writing mid-year and year-end grant report

PUBLICATIONS
Ferguson, T., Berlin, J., Noles, E., Johnson, J., Reed, W., & Spicer, C. (2005).
Variation in the application of the 'Promiscuous Female' stereotype and
the nature of the application domain: Influences on sexual harassment
judgments after exposure to the Jerry Springer Show. *Sex Roles, 52,*
477-487.

PROJECTS IN PROGRESS
Noles, E., & Rennels, J. L. What's age got to do with it: Examining how
the age of stimulus faces affects implicit bias in children and adults
Noles, E., & Rennels, J. L. Investigating the effects of experimenter
race on the affective priming task
Glover, V., Noles, E., & Rennels, J. L. Determining the similarities and
differences among multiple measures of children's implicit racial bias
Rennels, J. R., Noles, E., & Kayl, A. J. The influence of dynamic cues
and sex-stereotypicality on infants' intermodal knowledge of females and
males

PRESENTATIONS
Noles, E., & Rennels, J. L. (2014, February). *What's age got to do with it?*
Examining how the age of stimulus faces affects children's implicit racial
bias. Poster presented at the annual meeting of the Society for
Personality and Social Psychology, Austin, TX.

Noles, E., Kayl, A. J., & Rennels, J. L. (2012, June). *Dynamic presentation does not augment infants' intermodal knowledge of males.* Poster presented at the International Conference for Infant Studies in Minneapolis, MN.

Noles, E., (2011, April). *Terror management theory.* Talk given to Psi Chi at UNLV, Las Vegas, NV. Noles, E., (2011, April). *Understanding the importance of survival and death on memory: An assessment of adaptive memory and terror management.* Talk given to the Psychology Department at UNLV, Las Vegas, NV.

SERVICE

2008 – 2014	Undergraduate Mentor – Extensively mentored numerous undergraduate students from diverse background in the areas of scientific writing, creating and presenting research posters, and applying to graduate school; wrote letters of recommendation for students for applications and awards
Fall 2013	Community Outreach – Collected clothing donations and volunteered with an organization to feed and clothe homeless residents in Las Vegas
Fall 2013	Community Outreach – Presented information to middle school students about careers in science and psychology
Spring 2013	Research Reviewer – Reviewed student research proposals for the APS RISE Award
Spring 2013	Program Evaluation – Compiled social and developmental psychology questions for inclusion in departmental assessments of student learning
Spring 2013	Community Liaison – Assisted with developing and narrating a dinner for Las Vegas Science Festival donors and sponsors
Spring 2012	Psychology Representative to the Graduate and Professional Student Association
2011 – 2012	Cohort Representative to the Experimental Student Committee
2009 – 2011	Vice President of the Experimental Student Committee
2009 – 2010	Community Outreach – Presented information about applying to college and financial aid services to underserved families in Las Vegas

AWARDS

Fall 2012	Nominated by the department chair for UNLV's Outstanding Graduate Student Teaching Award
Fall 2012	Graduate and Professional Student Association Research Grant
Summer 2012	Graduate and Professional Student Association Travel Grant

PROFESSIONAL AND HONORARY MEMBERSHIPS

Association for Psychological Science
American Psychological Association (Division 7)
Society for Personality and Social Psychology
Society for the Teaching of Psychology
Psi Chi
Phi Kappa Phi