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## Predictors of Child and Adolescent Bias and Flexibility in the Attractiveness Domain

Stephanie Verba  
sann.quinones@gmail.com

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PREDICTORS OF CHILD AND ADOLESCENT BIAS AND FLEXIBILITY IN THE  
ATTRACTIVENESS DOMAIN

By

Stephanie A. Verba-Quinones

Bachelor of Arts – Psychology  
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Stephanie A. Verba-Quinones

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Department of Psychology

Jennifer Rennels, Ph.D.  
*Examination Committee Chair*

Kathryn Hausbeck Korgan, Ph.D.  
*Graduate College Interim Dean*

Erin Hannon, Ph.D.  
*Examination Committee Member*

Rachael Robnett, Ph.D.  
*Examination Committee Member*

Joshua Baker, Ph.D.  
*Graduate College Faculty Representative*

## Abstract

Children often associate positive attributes with high attractive peers and negative attributes with low attractive peers (bias), although some think both peers have positive attributes and neither has negative attributes (flexibility). Children also believe those they think positively of will think positively of them (positive bias reciprocation/positive flexibility reciprocation) and such beliefs in reciprocation predict bias and flexibility. Given the negative effects of bias (i.e., differential attributions based on one's attractiveness) and the positive effects of flexibility, this study investigated individual differences in children and adolescent's attractiveness biases and flexibility. Specifically, the author examined whether 9-11-year-olds and 14-16-year-olds' beliefs in reciprocation mediated the associations among self-esteem, perspective-taking ability, and bias and among self-esteem, perspective-taking ability, and flexibility in the attractiveness domain. Participants ( $N=104$ ) completed measures of self-esteem and perspective-taking and a task in which they assigned positive and negative attributes and considered who would reciprocate positive evaluations to faces differing in attractiveness. Participants could choose one of the two faces (i.e., displaying bias), or both or neither of the faces (i.e., displaying flexibility). For both age groups, participants' beliefs in positive flexibility reciprocation mediated the association between self-esteem and flexibility and perspective-taking ability and flexibility, whereas these abilities were unrelated to their bias. Results suggest bias and flexibility activate two different cognitive mechanisms. Efforts to improve children and adolescent's self-esteem and perspective-taking ability might increase flexible thinking, but predictors of bias need to be further explored.

## Table of Contents

Abstract .....	iii
List of Tables .....	v
List of Figures .....	vi
Chapter 1: Introduction .....	1
Self-Esteem and Perspective-Taking in Childhood and Adolescence .....	3
Attractiveness Biases in Adolescence .....	7
Female versus Male Targets .....	8
The Current Study .....	10
Hypotheses .....	10
Chapter 2: Method .....	13
Participants .....	13
Stimuli .....	13
Measures .....	14
Procedure .....	15
Data Preparation.....	17
Chapter 3: Results .....	19
Chance Comparisons .....	19
Correlational Analyses .....	20
Participant and Target Characteristics .....	21
Differences in Self-Esteem and Perspective-Taking .....	23
Mediation Models .....	23
Chapter 4: Discussion .....	26
Limitations .....	32
Conclusion .....	33
References .....	45
Curriculum Vitae .....	55

## List of Tables

Table 1. Positive and negative traits and behaviors used in the non-forced bias task.....	33
Table 2. Comparisons of children's bias, flexibility, and beliefs in reciprocation to chance when viewing female and male targets across age groups.....	34
Table 3. Comparisons of children's bias, flexibility, and beliefs in reciprocity to chance when viewing female and male targets within age groups.....	35
Table 4. Correlations between bias and beliefs in positive bias reciprocation and between flexibility and beliefs in positive flexibility reciprocation across and within age groups.	36
Table 5. Correlations between bias and individual difference measures and flexibility and individual difference measures across and within age groups.....	37

## List of Figures

Figure 1. Hypothesized mediation among self-esteem, perspective-taking, positive bias reciprocation and bias and among self-esteem, perspective-taking, positive flexibility reciprocation and flexibility.....	38
Figure 2. Attribution task; Positive Attribute example.....	39
Figure 3. Middle childhood girls more often assigned positive attributes to attractive targets and negative attributes to unattractive targets as compared to adolescent girls and boys.....	40
Figure 4. Mediation model depicting associations between individual difference measures, positive bias reciprocation, and bias.....	41
Figure 5. Mediation model depicting associations between individual difference measures, positive flexibility reciprocation, and flexibility.....	42

## Chapter 1: Introduction

Children as young as 3 to 4 years old display attractiveness biases (Adams & Crane, 1980; Dion, 1973; Rennels & Langlois, 2014a; 2014b) and children more often assign positive attributes to attractive people and negative traits to unattractive people (e.g, Dion, Berscheid, & Walster, 1972; Rennels & Langlois, 2014a; 2014b, Rennels & Langlois, 2015). Throughout the paper, we will refer to such stereotypic responding as *bias*. There are detrimental effects of bias such that attractiveness biases can lead to differential treatment of attractive and unattractive individuals (see Langlois et al., 2000 for review). Several studies demonstrate that attractive children are treated more favorably relative to their unattractive counterparts. For example, caregivers give more attention and teachers give better grades to attractive children than unattractive children (see Langlois et al., 2000 for review).

Differential attributions and treatment based on attractiveness are evident beyond the preschool years. For example, older children aged 6 and 10 years rely more on physical attractiveness than ethnicity when designating peer preferences and attributing traits and behaviors to unfamiliar peers (Langlois & Stephan, 1977). Specifically, White, Black, and Mexican-American children rated attractive peers who were White, Black, and Mexican-American higher on positive attributes such as likeability, intelligence, and friendliness, and lower on negative attributes such as meanness. In contrast, children more often rated unattractive peers as mean (Langlois & Stephan, 1977). These findings suggest attractiveness biases may be a more salient feature than ethnicity when children are asked to make judgments about unfamiliar peers. A study comparing the effect sizes of 3- to 11-year-olds' attractiveness, gender, and race biases further implicated this idea—attractiveness biases were as strong and perhaps stronger than gender and race biases (Rennels & Langlois, 2014a). Despite the large effect sizes of

attractiveness biases as compared to gender and race biases, there are significantly fewer studies examining attractiveness biases relative to both gender and race biases in children.

Not all children show attractiveness biases, however. Some children display flexibility in their thinking with regard to biases and stereotypes (e.g., Serbin & Sprafkin, 1986; Rennels & Langlois, 2015). In a study examining gender stereotypes, the term flexibility referred to children's flexibility in their assignments of who would use a gender stereotypic item (e.g., hammer). Specifically, children's response of "both boys and girls" as compared to "only boys" is an example of flexibility in relation to gender stereotypes (Serbin & Sprafkin, 1986). The term flexibility has also been used in the attractiveness domain (e.g., Rennels & Langlois, 2014b; 2015). In addition to the option to choose either of the targets or "both" targets, Rennels and Langlois (2014b; 2015) gave children the option to choose "neither" target when assigning positive and negative attributes. Although the term flexibility is defined in a variety of ways, for the purposes of this paper, we define *flexibility* as the belief that both high and low attractive targets have positive attributes or that neither target has negative attributes (Rennels & Langlois, 2014b; 2015). Flexible thinking emerges around middle childhood (e.g., Doyle, Beaudet, & Aboud, 1988; Serbin & Sprafkin, 1986) and appears to generalize across domains, suggesting it is related to general cognitive development and in turn, cognitive abilities (Powlishta et al., 1994; Rennels & Langlois, 2014a).

In addition to bias and flexibility, 3- to 11-year-old children also display beliefs that people they think positively of will also think positively of them (beliefs in positive attribute reciprocation; Rennels & Langlois, 2015). Children directed these beliefs in reciprocation toward one peer, either the attractive or unattractive peer (i.e., *positive bias reciprocation*), or both or

neither peer (i.e., *positive flexibility reciprocation*). Individual differences in children's beliefs in positive bias reciprocation significantly predicted bias, and their beliefs in positive flexibility reciprocation significantly predicted their flexibility (Rennels & Langlois, 2015). Despite evidence that children display variations in their attractiveness bias and flexibility, there is a lack of research examining why these differences manifest. Until relatively recently, little work has examined predictors of children's bias and flexibility in the attractiveness domain (Rennels & Langlois, 2014b; Rennels & Langlois, 2015). Given the detrimental effects of bias (e.g., unwarranted differential treatment and judgments based on attractiveness), and the positive effects of flexibility (e.g., social judgments based on factors beyond attractiveness level), it is critical to ascertain what factors predict attractiveness bias and flexibility.

Children's beliefs in positive attribute reciprocation predict their bias and flexibility (Rennels & Langlois, 2015), so examining factors that predict such beliefs should shed light on how to decrease bias or increase flexibility based on attractiveness. Two constructs that might predict individual differences in beliefs in reciprocity are self-esteem and perspective-taking abilities (Rennels & Langlois, 2015). Therefore, the main goal of this research was to examine whether children (9- to 11-year-olds) and adolescents' (14- to 16-year-olds) beliefs in positive bias reciprocation and beliefs in positive flexibility reciprocation functioned as mediators that account for the links among participants' self-esteem, perspective-taking, and bias and among their self-esteem, perspective-taking, and flexibility. See Figure 1, which shows the conceptual mediation models for bias and flexibility, respectively.

### **Self-Esteem and Perspective-Taking in Childhood and Adolescence**

Self-esteem and perspective-taking abilities were of interest for several reasons. Middle childhood is when children start making social comparisons based on appearance, abilities, and behaviors (Butler, 1998) and perspective-taking skills emerge (Harter, 1999). During adolescence, social comparisons become prominent and, in turn, teenagers place an emphasis on being viewed as positive and desirable, demonstrating they are particularly concerned about what others think about them (Harter, 2006). Given that peer-evaluations (Guyer et al., 2014), social comparisons (Kraye & Iphofen, 2008), and perspective-taking (Choudhury, Blakemore, & Charman, 2008) emerge in middle childhood and strengthen during adolescence, investigating individual differences in self-esteem and perspective-taking abilities among children within these age groups may help explain variation in children's beliefs in reciprocity and subsequent displays of bias and flexibility.

**Self-esteem.** Self-esteem is the evaluation of the self, yet interactions with others and their judgments play a vital role in the development of one's self-esteem (Harter 1999; 2006). Self-esteem consists of four main domains: academic, social, athletic competence, and physical appearance (Harter, 1999). Feedback and how much support children receive from their peers, parents, evaluators, and other people in regard to their success in the four domains of self-esteem help shape their evaluation of self-worth (Harter, 1999). Thus, it is plausible that children's self-esteem is related to their beliefs about what others think about them (i.e., beliefs in positive attribute reciprocation) and subsequently what they think about others (i.e., biased or flexible beliefs). For example, due to the influential role that others' judgments play in children's self-esteem, children who possess higher self-esteem might believe unfamiliar targets, regardless of

their appearance, will think positively of them (i.e., positive flexibility reciprocation). Such beliefs should facilitate a reciprocal liking for both targets (i.e., positive flexibility).

Studies support a possible relation between children's beliefs in reciprocity and self-esteem, and their displays of bias or flexibility. Researchers assigned college students to one of two groups (i.e., ingroup vs. outgroup) and investigated their beliefs of ingroup and outgroup members. They found that students who had low self-esteem rated members of their own group and members of the outgroup more negatively relative to their high self-esteem counterparts (Crocker & Schwartz, 1985). Results suggest that individuals who do not think highly of themselves (i.e., low self-esteem) also do not think highly of others. Another study assessed college students' self-esteem and asked them to rate their similarity to a high or low attractive female target (Graham & Perry, 1976). Women with low self-esteem perceived themselves to be more similar to the low attractive target and women with high self-esteem perceived themselves to be more similar to the high attractive target. In contrast to high self-esteem women, low self-esteem women displayed a greater tendency to rate the high attractive targets' personality negatively (Graham & Perry, 1976). Taken together, results suggest children's self-esteem could impact children's attractiveness biases and their corresponding beliefs in positive attribute reciprocation. Specifically, children with low self-esteem may be more likely to believe that unattractive targets will think positively of them as a function of similarity and in turn assign negative attributes to attractive targets and positive attributes to unattractive targets. Additionally, children with low self-esteem may be more negative in general and in turn more likely to believe that both targets will think negatively of them as compared to children with high self-esteem.

**Perspective-taking.** The ability to take someone else's perspective is necessary to navigate daily social interactions with others. To successfully do so, one needs to understand others and their point of view. In contrast, the inability to take someone else's perspective may lead to less understanding of others and their beliefs. Perspective-taking ability emerges in childhood (Selman, 1971) and increases with age, with girls showing higher levels of perspective-taking ability (e.g., Bengtsson & Arvidsson, 2011; Selman, 1976; Smith et al., 2016; Van der Graaff et al., 2014). Research suggests girls show higher levels of perspective-taking than boys due to earlier maturation in certain brain regions, resulting in girls' more advanced cognitive abilities than boys (e.g., Smith et al., 2016; Van der Graaff et al., 2014).

Some research suggests that the ability to take someone else's perspective decreases ingroup favoritism and increases positive thoughts about an unfamiliar target. Specifically, in a number of tasks, researchers manipulated adults' perspective-taking when viewing an unfamiliar target by explicitly asking participants to "put themselves in the person's (target's) shoes." Perspective-takers described the unfamiliar target (i.e., an elderly person) with less stereotypic and more positive content and as more similar to themselves (Galinsky & Moskowitz, 2000). Additionally, Galinsky and Moskowitz (2000) used a minimal group paradigm to examine the relationship between perspective-taking and ingroup and outgroup biases. They found that perspective-takers did not rate their ingroup as more favorable than the outgroup as compared to non-perspective-takers.

There is also evidence to support a relation between adolescents' perspective-taking and feelings toward socially disadvantaged groups (Smith et al., 2016). Researchers longitudinally examined 15- to 19-year-olds' perspective-taking abilities and attitudes towards Black, gay, and

poor people using a rating thermometer (0 = *I feel very cold toward this group* to 100 = *I feel very warm toward this group*). They found that the higher adolescents' perspective-taking abilities, the warmer their feelings for three groups documented in the literature as socially disadvantaged (i.e., Black, gay, and poor people) relative to White, straight, and rich people, respectively (Smith et al., 2016). Taken together, research (e.g., Galinsky & Moskowitz, 2000; Smith et al., 2016) demonstrates perspective-taking is related to warmer, less stereotypic, and more positive feelings and evaluations for unfamiliar targets, outgroup members, and disadvantaged groups. These findings suggest that perspective-taking abilities might influence how children and adolescents assign attributes to targets who differ in attractiveness and their beliefs in reciprocity. If so, increasing perspective-taking skills might provide a pathway to decrease bias and increase flexibility by increasing positive views of low attractive individuals.

### **Attractiveness Biases in Adolescence**

Despite a general consensus that attractiveness biases are evident throughout development, studies examining attractiveness biases among adolescents are lacking. Specifically, the adolescent attractiveness literature focuses more on the importance of attractiveness for mate selection (e.g., Ha, Overbeek, & Engels, 2010) relative to the influence of attractiveness on person perception more generally. An exception to this general trend is a study that examined whether 13- to 19-year-olds attributed male and female targets' successes to their ability or to luck (Agthe et al., 2013). Results demonstrated males rated high attractive females more positively (i.e., attributed their successes to their ability) relative to unattractive females (i.e., attributed their successes to luck), but interestingly, same-aged females' ratings for attractive versus unattractive males did not significantly differ. Researchers did not directly

measure mating motives, but suggested results might be driven by such motives (Agthe et al., 2013).

Although there are minimal studies examining adolescents' attractiveness biases, it seems that adolescents are attuned to facial attractiveness during this sensitive time period and make judgements about others as a function of their attractiveness (e.g., Agthe et al., 2013).

Additionally, adolescents' views about their own appearance and their beliefs about how others view their appearance better predicts self-esteem than variables such as academic competence (Harter, 1998). Results further implicate the importance placed on appearance and how one is perceived during this developmental period. Thus, we were interested in extending previous findings by Rennels and Langlois (2014b; 2015) with 3- to 11-year-olds to adolescents.

Specifically, we examined whether adolescents displayed beliefs in positive bias reciprocation and beliefs in positive flexibility reciprocation and if such beliefs predicted their displayed bias and flexibility, respectively.

### **Female versus Male Targets**

Another question of interest was whether children would display stronger biases and beliefs in reciprocity for female targets than male targets. Research documents 3- to 11-year-olds' robust attractiveness biases, particularly for girl targets (e.g., Dion, 1973; Rennels & Langlois 2014a; 2015). Although 7- to 11-year-olds show more flexible thinking than 3- to 6-year-olds, they still show robust biases based on girls' attractiveness (Rennels & Langlois, 2014a 2015). Similarly, beliefs in positive attribute reciprocation were particularly strong for attractive girl targets such that children generally thought attractive girls would think positively of them (Rennels & Langlois, 2015). One study demonstrated that 8- to 13-year-olds held implicit gender

stereotypes such that girls were viewed as as more warm and friendly than boys (Jiang et al., 2016). Because children generally associate positive traits with attractive targets (see Langlois et al., 2000 for review), and girls are viewed as more warm than boys (Jiang et al., 2016), children might believe attractive female targets are more likely to reciprocate positive attributes compared with other targets.

Not only do children show strong biases based on girls' attractiveness, teachers do as well. For example, when teachers of 6- and 7-year-olds made classroom relevant decisions (e.g., calling on a student to answer a question), they relied more on girls' attractiveness than their body size or ethnicity. Consequently, they selected attractive girls more often than unattractive girls (Wang, Treat, & Brownell, 2008). These biases impact how children value attractiveness. When asked what it meant to be popular during adolescence, more girls than boys defined popularity as being attractive. In contrast, boys defined popularity as being funny or athletic (Closson, 2009). Additionally, when 9- to 13-year-olds nominated peers in terms of likeability and popularity, they rated unattractive girls as least popular. In contrast, attractiveness was unrelated to boys they perceived as popular and well liked (Lease, Kennedy, & Axelrod, 2002).

Physical appearance is documented as particularly important to self-worth such that girls who specifically place an emphasis on physical appearance show the lowest self-esteem (Harter, 1993). Pliner and colleagues (1990) studied boys and girls starting around 10-years-old on different variables relevant to appearance (e.g., physical appearance) and found that females were more concerned than males about the way they looked and consequently had lower self-esteem with regard to their appearance. Compared to boys, girls' lower self-esteem in relation to appearance was observed across the lifespan, up to 79-years-old (Pliner, Chaiken, & Shelly,

1990), highlighting the pervasive nature of appearance on self-esteem among females in particular. Taken together, these findings suggest attractiveness is more important when children and adolescents judge female than male targets. Thus, we predicted attractiveness bias and beliefs in positive bias reciprocation would be more robust for female than male targets, as measured by effect size.

### **The Current Study**

The current study should provide insight into why some children and adolescents are more biased or more flexible than others and such knowledge could inform ways to reduce bias or increase flexibility. Other studies demonstrate that children display individual differences in bias and flexibility based on attractiveness (e.g., Rennels & Langlois, 2015), but do not provide clear answers as to why such differences may manifest. Investigating children's perspective-taking ability and self-esteem may help explain individual differences in children and adolescent's biases, flexibility, and beliefs in positive attribute reciprocation. Participants completed a non-forced choice task that assessed their assignment of positive and negative attributes to targets varying in attractiveness and their assignments of who would reciprocate positive attributes. They also completed questionnaires regarding their self-esteem and perspective-taking ability.

### **Hypotheses**

**Effect size hypotheses.** We expected adolescents would show stronger bias than children because of the importance placed on attractiveness during adolescent development (e.g., Ha, Overbeek, & Engels, 2010). We also expected participants' bias and beliefs in positive bias reciprocation, regardless of age, would be stronger for female than male targets.

**Participant and target characteristics hypotheses.** We hypothesized that bias and beliefs in positive bias reciprocation might vary as a function of participant age and target sex. Specifically, we predicted that adolescents would show more bias and beliefs in positive bias reciprocation than children. Additionally, we expected participants, regardless of age, would display more bias for female than male targets. Because flexibility increases with age (e.g., Banse et al., 2010), we also hypothesized that adolescents may display significantly higher flexibility than children.

**Self-esteem and perspective-taking hypotheses.** Based on previous research (e.g., Harter, 1993; Selman, 1976), we expected self-esteem and perspective-taking ability would vary as a function of participant sex and age. Specifically, we expected children would display higher self-esteem than adolescents and that boys would display higher self-esteem than girls. Additionally, we expected adolescents would display higher perspective-taking than children and that girls would display higher perspective-taking than boys.

**Bias mediation model hypotheses.** We hypothesized that participants' beliefs in positive bias reciprocation would mediate the relation between self-esteem and perspective-taking in predicting their bias. Specifically, that higher self-esteem and lower perspective-taking scores would predict a greater tendency to think the attractive target would think positively of them, which in turn would predict a greater tendency to assign positive attributes to attractive targets and negative attributes to unattractive targets.

**Flexibility mediation model hypotheses.** Similarly, we hypothesized that participants' beliefs in positive flexibility reciprocation would mediate the relation between self-esteem and perspective-taking in predicting their flexibility. Specifically, higher self-esteem and higher

perspective-taking scores would predict a greater tendency to think both targets would think positively of them, which in turn would predict a greater tendency to think both targets were positive and neither were negative.

## Chapter 2: Method

### Participants

Children aged 9- to 11-years-old ( $n = 52$ ; 26 females) and adolescents aged 14- to-16-years-old ( $n = 52$ ; 25 females) participated in the study. Parents reported participants' race as White (55%), Black/African American (5%), multiracial or other (31%), or did not report race (9%). Parents reported participants' ethnicity as Mexican/Mexican-American/Latino (23%), other Spanish/Hispanic/Latino (7%), multi-ethnic (3%), non-Hispanic (65%), or did not report it (2%). Research assistants recruited participants by contacting parents from an existing lab database or via social media. Participants either received a small prize for participating or were entered into an iTunes gift card drawing.

### Stimuli

**Attribution task.** Stimulus faces consisted of 16 digitized, color images of Whites (4 males and 4 females) and Latinos (4 males and 4 females) aged 18 to 21 years posed with a neutral expression and shown from the shoulders up. Research assistants used Adobe Photoshop to mask clothing cues and match image contrast and brightness. Using these images, we created eight face pairs containing two faces of the same sex and ethnicity who had similar hair color, but significantly differed in attractiveness. About 40 undergraduates rated the faces on a 5-point scale for attractiveness (1 = *not very attractive*, 5 = *very attractive*). There was high interrater agreement regarding attractiveness (*Cronbach alphas* > .90). High attractive male and female faces ( $M = 3.27$ ,  $SD = .09$ ) significantly differed in attractiveness from low attractive male and female faces ( $M = 1.35$ ,  $SD = .08$ ),  $t(14) = 45.41$ ,  $p < .001$ ). High attractive males ( $M = 3.27$ ,  $SD = .11$ ) were similar in attractiveness to high attractive females ( $M = 3.27$ ,  $SD = .09$ ),  $t(6) = .10$ ,  $p$

= .93, and low attractive males ( $M = 1.35$ ,  $SD = .06$ ) were similar in attractiveness to low attractive females ( $M = 1.36$ ,  $SD = .10$ ),  $t(6) = .12$ ,  $p = .91$ .

## Measures

**Self-esteem.** To assess self-esteem, participants completed the Piers-Harris Children's Self-Concept Scale, second edition, that was designed for children ages 7 to 18 (Piers-Harris-2: The Way I Feel About Myself, Piers & Herzberg, 2002). The scale consists of 60 items and measures overall self-concept by having children respond "yes" or "no" to questions about themselves (e.g., "I am often sad"). The scale is one of the most used for children (Butler & Gasson, 2005) and is often used with adolescents (e.g., Ekinici et al., 2016; Garton & Pratt, 1999; Goltz & Brown, 2014). The Piers-Harris-2 has sufficient reliability and validity among children of varying demographics and ethnicities (Flahive & Li, 2011; Piers & Herzberg, 2002). Cronbach's alpha obtained for this measure in the current study was satisfactory ( $\alpha = .92$ ).

**Perspective-taking.** To assess perspective-taking ability, children completed the Perspective-Taking subscale of the Interpersonal Reactivity Index (IRI: Davis, 1980), a self-report questionnaire that consists of 7 items. Items on the IRI perspective-taking subscale assess children's ability to consider a point of view other than their own (e.g., "I sometimes try to understand my friends better by imagining how things look from their perspective"). They record their responses using a 5-point Likert scale ( $1 = \text{does not describe me well}$  to  $5 = \text{describes me very well}$ ). The perspective-taking subscale has sufficient internal validity and test-retest reliability (Davis, 1980) and has been used with children and adolescents (e.g., Batanova & Loukas, 2014; Hawk et al., 2013; Lane-Garon, 1998; Vanwesenbeeck, Ponnet, & Walrave, 2017;

Smith et al., 2016; Van der Graaff et al., 2014). Cronbach's alpha obtained for this subscale in the current study was relatively low ( $\alpha = .62$ ), but similar to other work (e.g., Wachi et al., 2016).

## **Procedure**

Prior to the study, an experimenter explained the purpose and procedures to the parent and participant. The experimenter obtained informed parental consent, child/youth assent, and voluntary demographic information. Participants completed all tasks electronically on a computer via Qualtrics in a quiet room while their parents waited in a separate room. Once in the study room, the experimenter told the participants, "You are going to complete three surveys on the computer in which you will be asked questions about yourself, other people, and yourself in certain situations. There are no right or wrong answers. Please make sure to answer honestly. Do you have any questions?" Once the participants confirmed that they did not have any questions, the experimenter advanced the screen to start the study. At the beginning of each task, the experimenter read the instructions to the participants. Once the participant stated that he/she understood the task, the experimenter advanced the screen and the participant was able to respond. At the end of each task, a screen prompted the participants to let the experimenter know they had reached the end of a survey.

During the study, the experimenter sat across from the participant and remained in the room for the duration of the study in case participants had any questions. First, participants completed the Piers-Harris-2 so that their responses would not be influenced by the perspective-taking and attribution tasks that ask them to think about other people. Comparisons of computerized and standard written administration of the Piers-Harris Children's Self-Concept scale showed no differences in responding (Simola & Holden, 1992), so questions were

presented sequentially on the computer using Qualtrics. Participants read questions to themselves and completed the task on their own.

Next, children completed the non-forced-choice attribution task. Participants first completed four practice trials that consisted of images of animals instead of human faces to ensure they understand the task. Participants read statements (e.g., “Who do you think is [nice/mean]?”) and had the option to assign positive and negative traits to one of the two targets, both of the targets, or neither target. To assess participants’ beliefs in positive attribute reciprocation, participants read statements (e.g., “Who would think you are [nice]?”) and again had the options to choose one, both, or neither of the targets. We asked participants about beliefs in reciprocation for positive attributes only to prevent them from thinking negatively about themselves.

We counterbalanced the presentation of the eight face pairs, such that half of the participants saw female targets first and the other half saw male targets first. Attractive and unattractive faces were counterbalanced to appear on the right and left sides equally. Questions displayed at the top of the screen with the face pair positioned below the question. Faces were labeled “Face 1” and “Face 2”. Underneath each face pair, there were four multiple-choice options (Face 1, Face 2, both, neither).. Using one of the four possible responses, children answered six questions for each face pair: two regarding assignment of positive attributes (e.g., Who do you think is happy?; see Figure 2), two regarding assignment of negative attributes (e.g., Who do you think is unhappy?), and two regarding beliefs in positive attribute reciprocation (e.g., Who would think you are happy?). Children answered questions about different attributes for each test trial with positive and negative attributes intermixed across trials, with no more than

two trials in a row assigning the same type of attribute (e.g., no more than two positive attributes in a row). See Table 1 for a list of the 32 attributes used in this task (16 positive and 16 negative), which we chose from studies examining children and adults' attractiveness biases (e.g., Langlois & Stephan, 1977; Langlois et al., 2000; Rennels & Langlois, 2014b; 2015).

Lastly, children completed the perspective-taking scale (Davis, 1980). Each question displayed one at a time and participants responded using the 5-point Likert scale. Once the study concluded, children either chose a prize or were entered into a drawing to win a \$25 Amazon or iTunes gift card. The study typically took children 35 minutes to complete.

### **Data Preparation**

**Piers-Harris-2.** Using the scoring developed by the authors, we converted raw scores from the Piers-Harris-2 to standardized t-scores ( $M = 50$ ,  $SD = 10$ ) and percentile ranks. T-score ranges for the total scale are as follows: less than or equal to 29T = very low self-esteem; 30T-39T = low self-esteem; 40T-44T = low average self-esteem; 45T-55T = average self-esteem; 56T-59T = high average self-esteem; 60T-69T = high self-esteem; and  $\geq 70T$  = very high self-esteem.

**Bias scores.** Similar to Rennels and Langlois (2015), we calculated bias scores based on participants' tendency to assign positive attributes to attractive targets and negative attributes to unattractive targets. We first calculated positive bias by subtracting the percentage of positive attributes assigned to unattractive targets from the percentage assigned to attractive targets. Next, we calculated negative bias by subtracting the percentage of negative attributes assigned to attractive targets from the percentage assigned to unattractive targets. We then summed positive bias and negative bias for a total *bias* score. We calculated beliefs in *positive bias reciprocation*

by subtracting the percentage of positive attributes participants thought unattractive targets would assign to them from the percentage they thought attractive targets would assign to them.

**Flexibility scores.** We calculated positive flexibility by subtracting the percentage of positive attributes assigned to neither target from the percentage assigned to both targets and negative flexibility by subtracting the percentage of negative attributes assigned to both targets from the percentage assigned to neither target. We then summed positive flexibility and negative flexibility for a total *flexibility* score. We calculated beliefs in *positive flexibility reciprocation* by subtracting the percentage of positive attributes participants thought neither target would assign to them from the percentage they thought both targets would assign them.

**Perspective-taking.** Scoring followed the developers' standardized protocol (Davis, 1980). For two of the seven questions, we calculated scores using a reversed scale. Higher scores indicated higher perspective-taking ability.

## Chapter 3: Results

### Chance Comparisons

To determine whether participants displayed bias, flexibility, and beliefs in positive bias and positive flexibility reciprocation, we examined whether scores differed from chance responding (0). We conducted analyses across (see Table 2) and within (see Table 3) age groups for male and female targets separately and calculated the effect sizes to test our hypotheses that adolescents would display stronger bias than children and that participants would display stronger bias for female than male targets.

**Bias measures.** Across ages (Table 2), both bias measures significantly differed from chance for female and male targets. Regardless of target sex, participants' attractiveness biases and beliefs in positive bias reciprocation were above chance,. Despite the same direction of effects for female and male targets, effect sizes for attractiveness biases were larger for the female than male targets as predicted. Contrary to predictions, however, effect sizes for beliefs in positive bias reciprocation were the same for female and male targets.

When comparing age groups separately (Table 3), we found the predicted direction of effects within the child sample—their attractiveness biases and beliefs in positive bias reciprocation were above chance and the effect sizes for both measures were larger for female than male targets. Although adolescents' attractiveness biases were above chance for both female and male targets, their beliefs in positive bias reciprocation were above chance for male targets, but were at chance for female targets. Unexpectedly, effect sizes for children's attractiveness bias and beliefs in positive bias reciprocation were larger than adolescent participants.

**Flexibility measures.** Across and within age groups, participants' flexibility significantly differed from chance, for female targets, but was at chance for male targets. Despite not showing flexible beliefs about male targets, across and within age groups, their beliefs in positive flexibility reciprocation from both female and male targets were at above chance levels. As predicted, effect sizes for the flexibility measures were larger for the female than male targets.

### **Correlational Analyses**

We conducted correlational analyses to examine the predicted relations between our variables. Across and within age groups, we conducted Pearson correlations between participants' bias and beliefs in positive bias reciprocation and between their flexibility and beliefs in positive flexibility reciprocation (see Table 4). We then separately examined the relation between the bias measures and participants' self-esteem and perspective-taking across and within each age group and did the same for flexibility measures (see Table 5).

**Bias measures.** Across and within each age group, participants' bias and beliefs in positive bias reciprocation were positively correlated. The higher their attractiveness biases, the higher their tendency to think attractive targets would think positively of them. Across age groups, participants' beliefs in positive bias reciprocation were positively correlated with their self-esteem such that the higher their self-esteem, the higher their tendency to believe attractive targets would think positively of them. When examining the two age groups separately, however, only adolescents' beliefs in positive bias reciprocation and their perspective-taking abilities were correlated and it was a negative relation. The more they believed the attractive target would think positively of them, the lower their perspective-taking abilities. There were no other significant relations between the bias measures and self-esteem or perspective-taking.

**Flexibility measures.** Flexibility and beliefs in positive flexibility reciprocation were positively correlated across and within age groups. The higher participants' flexibility, the more often they thought both targets would think positively of them. Across age groups, both self-esteem and perspective-taking were positively related to flexibility and beliefs in positive flexibility reciprocation. When examining the age groups separately, neither children nor adolescents' self-esteem was related to their flexibility, but it was positively related to their beliefs in positive flexibility reciprocation. In contrast, positive relations between perspective-taking and flexibility measures were evident for both children and adolescents.

### **Participant and Target Characteristics**

To investigate whether participant and target characteristics affected children's bias and flexibility, we conducted two  $2 \times 2 \times 2 \times 2$  (Participant Sex [girl, boy] x Age Group [middle childhood, adolescence] x Target Sex [female, male] x Target Ethnicity [Latino, White]) MANCOVAs. Bias measures (bias and beliefs in positive bias reciprocation) were the dependent variables for one analysis, and flexibility measures (flexibility and beliefs in positive flexibility reciprocation) were the dependent variables for the other analysis. Self-esteem and perspective-taking scores were used as covariates for both analyses. For both MANCOVAs, we report the results from Pillai's trace test (Olson, 1976). To decompose interactions, we conducted univariate analyses of variance and used pairwise comparisons with Sidak adjustments to control for multiple comparisons.

**Bias measures.** Preliminary analyses produced no main effects or interactions involving target sex or target ethnicity, so we collapsed across target sex and target ethnicity. The subsequent MANCOVA produced a main effect of age group,  $F(2, 409) = 6.36, p = .002$ , partial

$\eta^2 = .03$ . The main effect was superseded by a Participant Sex x Age Group interaction,  $F(2, 409) = 5.00, p = .007$ , partial  $\eta^2 = .02$ . Univariate analyses revealed the Participant Sex x Age Group interaction was significant for bias,  $F(1, 410) = 5.8, p = .018$ , partial  $\eta^2 = .01$ . Self-esteem and perspective-taking scores were not significant covariates.

The Participant Sex x Age Group interaction for bias occurred because middle childhood girls showed stronger attractiveness biases compared to adolescent girls and adolescent boys. See Figure 3. Findings did not support our prediction that adolescents would show significantly more bias and beliefs in positive bias reciprocation than children. Additionally, findings did not support our prediction that participants would show significantly more bias for female targets than male targets. We provide further explanation for the unexpected finding in the discussion.

**Flexibility measures.** Preliminary analyses produced no main effects or interactions involving age group or target ethnicity, so we collapsed across both age group and target ethnicity. The subsequent MANCOVA produced a main effect of participant sex,  $F(2, 409) = 7.86, p < .001$ , partial  $\eta^2 = .04$ , and a main effect of target sex,  $F(3, 408) = 12.18, p < .001$ , partial  $\eta^2 = .06$ . Univariate analyses revealed that participant sex significantly predicted beliefs in positive flexibility reciprocation,  $F(1, 410) = 15.72, p < .001$ , partial  $\eta^2 = .04$ . Univariate analyses also showed target sex significantly predicted flexibility,  $F(1, 410) = 23.98, p < .001$ , partial  $\eta^2 = .06$ , and beliefs in positive flexibility reciprocation,  $F(1, 410) = 7.12, p = .008$ , partial  $\eta^2 = .02$ . Self-esteem and perspective-taking scores were significant covariates in the MANCOVA and subsequent univariate analyses.

The main effect of participant sex occurred because females ( $M = .19; SE = .02$ ) were more likely than males ( $M = .10; SE = .02$ ) to believe both targets would think positively of

them. The main effect of target sex occurred because participants more often assigned positive traits to both targets and negative traits to neither target when the targets were female ( $M = .21$ ;  $SE = .03$ ) than male ( $M = .04$ ;  $SE = .03$ ). Additionally, participants more often believed both targets would think positively of them when the targets were female ( $M = .18$ ;  $SE = .02$ ) than male ( $M = .12$ ;  $SE = .02$ ). Findings did not support our prediction that adolescents would show significantly more flexibility than children, but results are in line with previous research which we address in the discussion.

### **Differences in Self-Esteem and Perspective-Taking**

To investigate whether self-esteem and perspective-taking varied as a function of participant characteristics, we conducted two separate 2 x 2 (Participant Sex [girl, boy] x Age Group [middle childhood, adolescence] ANOVAs with self-esteem as the dependent variable for one analysis, and perspective-taking for the other analysis. The first ANOVA produced a main effect of participant sex,  $F(1, 100) = 6.13, p = .015$ , partial  $\eta^2 = .06$ . The main effect of participant sex occurred because males ( $M = 53.42, SE = 1.34$ ) displayed higher levels of self-esteem than females ( $M = 48.74, SE = 1.34$ ). The perspective-taking ANOVA produced no significant results. Albeit non-significant, it is worth noting that means for our other self-esteem and perspective-taking hypotheses were in the predicted directions. That is, adolescents ( $M = 49.46, SE = 1.35$ ) displayed lower self-esteem than children ( $M = 52.70, SE = 1.32$ ). Additionally, adolescents ( $M = 16.99, SE = .73$ ) displayed perspective-taking than children ( $M = 15.57, SE = .71$ ), and girls ( $M = 16.73, SE = .72$ ) displayed higher perspective-taking than boys ( $M = 15.83, SE = .72$ ).

### **Mediation Models**

To examine predictors of bias and flexibility, we used path analysis to test whether beliefs in positive bias reciprocation mediated the association between individual difference measures (i.e., self-esteem and perspective-taking) and bias. We used a separate path mediation model to test whether beliefs in positive flexibility reciprocation mediated the association between individual difference measures and flexibility. The mediation models were tested in Mplus 8 version 1.5 (Muthén & Muthén, 2017).

**Positive bias reciprocation as a mediator.** The path model for positive bias reciprocation is shown in Figure 4. The direct path from self-esteem to beliefs in positive bias reciprocation was non-significant, ( $\beta = .18, p = .06$ ). Similarly, the direct path from perspective-taking ability to beliefs in positive bias reciprocation was non-significant, ( $\beta = -.15, p = .13$ ). Thus, our hypothesized mediation model was not supported. In contrast, the direct path from beliefs in positive bias reciprocation to bias, ( $\beta = .52, p < .001$ ) was significant which is in line with previous work by Rennels and Langlois (2015) that demonstrated beliefs in positive bias reciprocation predict bias. Specifically, the greater tendency to think the attractive target think positively of them predicts their tendency to respond in a biased manner (i.e., assign positive attributes to attractive targets and negative attributes to unattractive targets. Among these participants, the model accounted for 4% of the variance in positive bias reciprocation and 27% of the variance in bias. First, we tested the hypothesized direct paths between each of the variables.

**Positive flexibility reciprocation as a mediator.** The path model for positive flexibility reciprocation is shown in Figure 5. First, we tested the hypothesized direct paths between each of the variables. All direct paths tested were significant. Specifically, the direct path from self-

esteem to positive flexibility reciprocation ( $\beta = .36, p < .001$ ) and the direct path from perspective-taking to positive flexibility reciprocation ( $\beta = .26, p = .002$ ). Thus, participants higher in self-esteem and higher in perspective-taking were displayed a greater tendency to think both targets would think positively of them and neither would think negatively of them. Further, the indirect paths from self-esteem to flexibility, ( $\beta = .18, p < .001$ ) and from perspective-taking to flexibility ( $\beta = .13, p = .006$ ), were significant. Among these participants, the model accounted for 23% of the variance in positive flexibility reciprocation and 26% of the variance in flexibility.

Results suggest positive flexibility reciprocation functioned as a mediator. In the line with predictions, positive flexibility reciprocation mediates the association between self-esteem and flexibility and perspective-taking and flexibility. That is, participants' self-esteem and perspective-taking predicts their tendency to think both targets are positive and neither are negative because of their tendency to think both targets would think positively of them.

## Chapter 4: Discussion

To our knowledge, this was the first study to examine individual differences in children and adolescents' attractiveness biases. Consistent with our predictions, participants' beliefs that both targets would think positively of them mediated the associations between self-esteem and flexibility and between perspective-taking and flexibility. Contrary to our predictions, beliefs that attractive targets would think positively of them did not mediate the associations between self-esteem and bias and between perspective-taking and bias. Our study also sought to fill a gap in the adolescent attractiveness literature, which has primarily focused on sexual attraction and mating motives. We replicated previous findings by Rennels and Langlois (2015) that children possess beliefs in reciprocation based on attractiveness and extended these findings to adolescents. Findings demonstrate that adolescents, much like children and adults, make attributions based on individuals' attractiveness. The lack of a participant sex by target sex interaction suggests that adolescents make attributions based on attractiveness that are unrelated to mating motives. Additional goals included examining how age group and target sex affected displays of bias and flexibility. As predicted, participants across age groups displayed stronger bias when viewing female than male targets as measured by effect size, but surprisingly, children displayed stronger attractiveness biases in general than adolescents. These results further demonstrate the robustness of attractiveness biases for female targets in particular and a potentially important developmental shift in bias from middle childhood to adolescence. Although the current work illuminates the persistence of attractiveness biases, results provide an encouraging pathway to increase flexible thinking based on attractiveness via self-esteem and perspective-taking.

Self-esteem and perspective-taking abilities predicted measures of flexibility, but unexpectedly did not predict bias, which might be due to the types of processing involved when displaying bias versus flexibility. Previous research suggests that bias and flexibility activate two different cognitive mechanisms (Banse et al., 2010), and the current study further supports this possibility. More specifically, flexibility appears to be a conscious process whereas bias seems to be an unconscious process. Attractiveness bias appears to be automatic and children display such bias as young as 3 years of age (Adams & Crane, 1980; Dion, 1973; Olson & Marshuetz, 2005; Rennels & Langlois, 2014a; 2014b). One study evidenced the rapid and automatic cognitive processes involved in attractiveness judgments (Olson & Marshuetz, 2005). In tasks designed to elicit unconscious face-processing, adults rated targets for attractiveness and classified positive and negative words after being primed by an attractive or unattractive target. Adults rated targets' attractiveness generally accurately even when the target was presented for only 13 ms. Participants reported that they did not see the target faces and guessed the targets' attractiveness. Additionally, participants were quicker at classifying positive words (e.g., laughter) when the words were primed by an attractive target versus an unattractive target, even when instructed to ignore the target faces (Olson & Marshuetz, 2005). These findings demonstrate both the rapid, unconscious nature of attractiveness judgments as well as positive implicit biases for attractive individuals. Similar conclusions can be drawn from a study examining how 3- to 11-year-olds classified, sorted, and labeled targets based on attractiveness. Children were less accurate at classifying, sorting, and labeling targets based on attractiveness as compared to gender and race (Rennels & Langlois, 2014b), yet still showed stronger attractiveness biases than both gender and race biases (Rennels & Langlois, 2014a). These findings suggest that children exhibit

implicit biases based on attractiveness yet do not explicitly use attractiveness to categorize targets (Rennels & Langlois, 2014a; 2014b). The bias mediation model accounted for only 4% of variance in positive bias reciprocation, suggesting self-esteem and perspective-taking were not good predictors of bias. Taken together, results suggest that attractiveness is assessed automatically and unintentionally and has a subsequent effect on biases based on attractiveness. Thus, an implicit measure of attractiveness biases could be a promising predictor of performance on tasks like the non-forced choice task used in the current study.

Unlike attractiveness biases, flexibility is related to cognitive ability (Powlishta et al., 1994). Flexible thinking also generalizes across domains, so children who display flexible beliefs about individuals who vary in attractiveness also tend to express flexible beliefs about individuals who vary in gender or race/ethnicity (Powlishta et al., 1994; Rennels & Langlois, 2014a; 2015). Relatedly, self-esteem in childhood and adolescence changes as a function of maturation and cognitive abilities. That is, children start to become more aware of what others think of them and begin to make more social comparisons and in turn their self-esteem either increases or decreases (see Eccles, 1999 for review). Moreover, changes in cognitive abilities are related to perspective-taking. Viewing the world from someone else's point of view requires the ability to understand that not everyone shares the same perspective as you (Eccles, 1999). Such abilities are evident as early as 7 years old and increase with age (e.g., Bengtsson & Arvidsson, 2011; Selman, 1976; Yeates et al., 1991). Given that flexibility, self-esteem, and perspective-taking are all related to cognitive development, the flexibility mediation model accounted for 23% of the variance in positive flexibility reciprocation and 26% of the variance in flexibility.

Future research should examine what other factors contribute to the variance of flexibility in the attractiveness domain.

Results suggest that increasing self-esteem and perspective-taking provide two avenues to increase flexible thinking based on attractiveness. Perspective-taking abilities increase with age (e.g., Bengtsson & Arvidsson, 2011; Selman, 1976; Yeates et al., 1991), and self-esteem changes from middle childhood to young adulthood (Chung et al., 2017) as a function of changes in one's social environment (see Guindon, 2010 for review). Thus, further research should examine whether methods to increase self-esteem and perspective-taking increase children's flexibility in the attractiveness domain. Efforts to increase self-esteem and perspective-taking ability could also have other positive outcomes. For example, higher self-esteem is related to better mental health, happiness, and greater life satisfaction (e.g., see Baumeister, Campbell, & Krueger, 2003 for review; Li & Bian, 2016) and perspective-taking abilities are related to developing and navigating successful relationships (Selman, 1981).

Some efforts to increase self-esteem and induce perspective-taking abilities are present in the literature. Self-esteem interventions can target self-esteem directly (e.g., self-esteem enhancement) and indirectly (e.g., targeting areas like social skills that in turn increase self-esteem; see Guindon, 2010 for review). A meta-analysis found that studies that directly targeted self-esteem were more effective at increasing self-esteem than studies that indirectly targeted self-esteem (Haney & Durlak, 1998). One way to directly increase children and adolescents' self-esteem is to teach them to internalize positive feedback from others (Harter, 1999). Furthermore, one study that induced perspective-taking by telling participants to "put themselves into someone else's shoes" led to less stereotypic responses and more positive evaluations about unfamiliar

targets (e.g., Galinsky & Morowitz, 2000). Thus, increasing children and adolescent's awareness of other's perspectives by explicitly teaching them to put themselves into someone else's shoes should be fruitful in increasing perspective-taking abilities and in turn, flexibility.

The current study replicated previous work by Rennels and Langlois (2015) that children display bias, flexibility, and beliefs in reciprocity based on attractiveness and extended these findings to adolescents. Further, Rennels and Langlois (2015) used targets that were children and the current study used targets that were adults, demonstrating the generalizability of findings. To our surprise, results demonstrated that children displayed stronger bias than adolescents as measured by effect size and that middle childhood girls displayed significantly more bias than adolescent boys and girls. We expected that adolescents would show stronger bias as compared to children because of the greater emphasis placed on attractiveness in adolescence (e.g., mate choice) and the changes associated with puberty (e.g., attraction to the opposite sex) that occur during the adolescent years. A meta-analysis examining ethnic and racial prejudices across childhood and adolescence found that prejudice peaked around 6 years of age and started to decrease in middle to late childhood (Rabbe & Beelmann, 2011). One caveat to this finding is that the decrease occurred in studies that tested explicit prejudice only, but not when the studies tested implicit bias. These findings suggest as children move towards adolescence, they learn to respond in a more socially acceptable manner, regardless of their implicit biases (see Rabbe & Beelmann, 2011 for review). It is possible that adolescents not only respond based on what is socially desirable in domains such as race or ethnicity but in the attractiveness domain as well.

In line with predictions, effect sizes were stronger for bias when participants viewed female targets as compared to male targets, albeit effect sizes for positive bias reciprocation were

the same for female and male targets. These results support previous findings in which attractiveness was a particularly salient cue for 3- to 11-year-olds when judging female adult targets than male adult targets (Rennels & Langlois, 2015; 2014a). Attractiveness seems to be a more salient cue for female than male targets starting early in development (see Rennels & Kulhanek, 2017 for review). For example, infants and children spend significantly more time with females than males (Kayl, 2012; Rennels & Davis, 2008; Sugden, Mohamed-Ali, & Moulson, 2014) and because of this predominant experience with females, infants appear to have a better-developed female facial representation that is attractive, thus leading attractiveness to be more salient when judging females than males (Rennels, Langlois, & Marti, 2005). There are serious ramifications for such disparities in the saliency of attractiveness for females relative to males. For example, women's appearance can affect career opportunities (e.g., Banchevsky et al., 2016) and negatively impact self-esteem (Pliner, Chaiken, & Shelly, 1990). Future research should examine predictors of bias for male versus female targets and should aim to decrease bias for unattractive targets, but also aim to decrease the importance placed on attractiveness for females in particular.

It is important to note, however, that differences in bias effect sizes for female targets as compared to male targets were larger among children than adolescents. Such differences might be due to changes in face-processing. As children approach puberty and adolescence, they shift from being better able to recognize adult faces to being better able to recognize faces of peers in similar stages of puberty, suggesting children shift from displaying a caregiver bias to a peer bias (Picci & Scherf, 2016). That is, during adolescence, peers become more socially relevant than caregivers, resulting in changes in individuals' face-processing as well as social processing

(Picci & Scherf, 2016). Attractiveness may be more salient for females than males due to experience early in development (see Rennels & Kulhanek, 2017 for review), but work examining developmental differences of the saliency of attractiveness for females and males is lacking. Thus, future research should examine the saliency of attractiveness for female and male targets across development.

With regard to flexibility, participants in this study all displayed more flexibility when the targets were female than male. Moreover, similar to previous research (Rennels & Langlois, 2015), the effects sizes for participants' beliefs that both female targets would think positively of them were particularly robust. These results could be due to children's implicit associations of girls as warmer (e.g., more friendly) than boys (Jiang et al., 2016). Relatedly, previous work demonstrates a "women are wonderful" phenomenon, such that adults rated women more favorably than men and more often described women using traits such as warm and kind, whereas they described men as competitive and active (Eagly & Mladinic, 1989; 1993). Children and adolescents in our study might have also associated positive traits when viewing two women, subsequently leading to their tendency to think positively of both female targets and believe that women would reciprocate such positive beliefs toward them.

### **Limitations**

In the attribution task, we showed participants a high attractive face paired with a low attractive face. This method potentially highlighted the saliency of attractiveness differences between the two faces. Studies examining racial bias suggest that showing two paired faces that differ in only one attribute (i.e., race) may direct children to attend more to racial differences than during everyday interactions, resulting in an inflated display of bias (Dunham, 2018). Future

attractiveness bias research should consider using low saliency tasks, such as showing one face at a time and having children rate the faces using a Likert-scale to examine if there are differences between the two methodologies (i.e., displaying faces paired versus sequentially).

Another possible limitation to the study was the stimuli we used—we used White and Latino faces only. Some studies suggest ethnicity or race of the target face should not matter with regard to attractiveness biases (e.g., Langlois et al., 2000; Langlois & Stephan, 1977), so determining whether results generalize to faces from other racial groups is needed. Additionally, a study examining effect sizes found that attractiveness biases in children are perhaps stronger than race biases (Rennels & Langlois, 2014a), but examining the intersectionality of race and attractiveness on children's bias is important, similar to how researchers are examining the intersectionality of race and gender on individuals' bias (e.g., Dottolo & Stewart, 2008; Riegler-Crumb & Humphries, 2012).

## **Conclusion**

Studies examining individual differences in displays of attractiveness bias and flexibility are grossly absent throughout the relevant literature, despite the impact that attractiveness has on social perceptions and social interactions. To our knowledge, this is the first study to illuminate a potential pathway to increase flexibility in the attractiveness domain. One study suggested a similar perspective-taking pathway in the gender domain—3- to 6-year-olds with false-belief theory of mind, a form of perspective-taking, displayed more flexible thinking with regard to gender stereotypes than those without false-belief theory of mind (Mulvey, Rizzo, & Killen, 2016). Because flexibility is domain general (e.g., Powlishta et al., 1994; Rennels & Langlois, 2014a), such efforts might not only increase flexibility in the attractiveness domain, but could

generalize to other domains, such as race. Thus, further research that examines efforts to increase self-esteem and perspective-taking in domains such as race and gender are warranted and encouraged.

Table 1. Positive and negative traits and behaviors used in the non-forced bias task.

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<i>Positive traits</i>	<i>Negative traits</i>
Nice	Mean
Happy	Unhappy
Successful	Unsuccessful
Friendly	Unfriendly
Smart	Not smart
Respectful	Disrespectful
Popular	Unpopular
Good/well-behaved	Bad/doesn't listen to others
Healthy	Unhealthy
Clean	Messy
Ambitious/works hard	Lazy
Wonderful	Boring
Helpful	Naughty
Strong	Weak
Trustworthy	Can't be trusted
Shares	Selfish

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Table 2. Comparisons of children's bias, flexibility, and beliefs in reciprocation to chance when viewing female and male targets across age groups.

Target sex and measure	Mean (SE)	<i>t</i> -Test result	Cohen's <i>d</i>
<i>Bias</i>			
Female targets	.23 (.02)	$t(207) = 11.14, p < .001$	1.55
Male targets	.19 (.02)	$t(207) = 8.54, p < .001$	1.19
<i>Positive bias reciprocation</i>			
Female targets	.05 (.01)	$t(207) = 4.16, p < .001$	.58
Male targets	.05 (.01)	$t(207) = 4.18, p < .001$	.58
<i>Flexibility</i>			
Female targets	.21 (.02)	$t(207) = 8.71, p < .001$	1.21
Male targets	.04 (.03)	$t(207) = 1.71, p = .089$	.24
<i>Positive flexibility reciprocation</i>			
Female targets	.17 (.02)	$t(207) = 10.66, p < .001$	1.48
Male targets	.12 (.02)	$t(207) = 6.35, p < .001$	.88

Table 3. Comparisons of children's bias, flexibility, and beliefs in reciprocity to chance when viewing female and male targets within age groups.

Age group	Target sex and measure	Mean (SE)	<i>t</i> -Test result	Cohen's <i>d</i>
<i>Children</i>				
	Female targets			
	Bias	.30 (.03)	$t(105) = 9.64, p < .001$	1.88
	Positive bias reciprocation	.08 (.02)	$t(105) = 4.85, p < .001$	.95
	Flexibility	.18 (.03)	$t(105) = 6.18, p < .001$	1.21
	Positive flexibility reciprocation	.14 (.02)	$t(105) = 6.23, p < .001$	1.22
	Male targets			
	Bias	.23 (.04)	$t(105) = 6.55, p < .001$	1.28
	Positive bias reciprocation	.06 (.02)	$t(105) = 3.45, p = .001$	.67
	Flexibility	.04 (.03)	$t(105) = .137, p = .174$	.27
	Positive flexibility reciprocation	.12 (.02)	$t(105) = 4.67, p < .001$	.91
<i>Adolescents</i>				
	Female targets			
	Bias	.16 (.03)	$t(105) = 6.24, p < .001$	1.22
	Positive bias reciprocation	.01 (.01)	$t(101) = .695, p = .489$	.14
	Flexibility	.24 (.04)	$t(101) = 6.23, p < .001$	1.24
	Positive flexibility reciprocation	.21 (.02)	$t(101) = 8.97, p < .001$	1.79
	Male targets			
	Bias	.16 (.03)	$t(101) = 5.54, p < .001$	1.11
	Positive bias reciprocation	.04 (.02)	$t(101) = 2.40, p = .018$	.48
	Flexibility	.05 (.04)	$t(101) = 1.10, p = .275$	.22
	Positive flexibility reciprocation	.12 (.03)	$t(101) = 4.29, p < .001$	.85

Table 4. Correlations between bias and beliefs in positive bias reciprocation and between flexibility and beliefs in positive flexibility reciprocation across and within age groups.

Bias	Positive bias reciprocation
<i>Across age groups</i>	.403**
<i>Children</i>	.483**
<i>Adolescents</i>	.244*

Flexibility	Positive flexibility reciprocation
<i>Across age groups</i>	.467**
<i>Children</i>	.544**
<i>Adolescents</i>	.411**

\*\* $p < .01$

Table 5. Correlations between bias and individual difference measures and flexibility and individual difference measures across and within age groups.

Measure	Self-Esteem	Perspective-Taking
<i>Bias</i>		
Across age groups	.020	-.006
Children	-.014	.116
Adolescents	.004	-.094
<i>Positive bias reciprocation</i>		
Across age groups	.102*	-.077
Children	.060	.014
Adolescents	.110	-.138*
<i>Flexibility</i>		
Across age groups	.106*	.174**
Children	.105	.149*
Adolescents	.124	.185**
<i>Positive flexibility reciprocation</i>		
Across age groups	.320**	.255**
Children	.290**	.251**
Adolescents	.386**	.248**

\*\* $p < .01$ ; \* $p < .05$

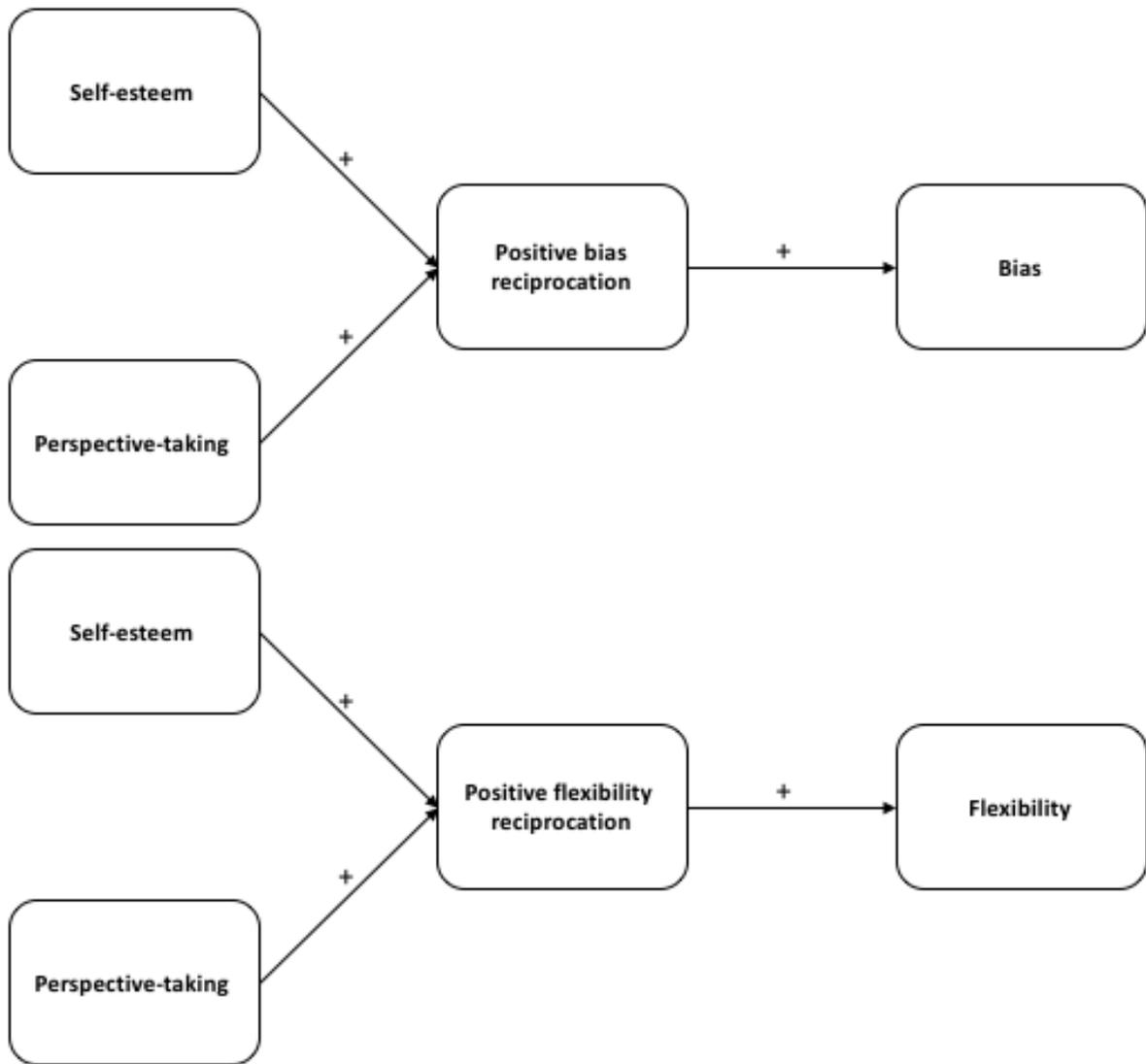


Figure 1. Hypothesized mediation among self-esteem, perspective-taking, positive bias reciprocation and bias and among self-esteem, perspective-taking, positive flexibility reciprocation and flexibility.

Who do you think is popular?



Face 1



Face 2

- Face 1
- Face 2

- Both Face 1 and Face 2
- Neither Face 1 or Face 2



Figure 2. Attribution task; Positive Attribute example.

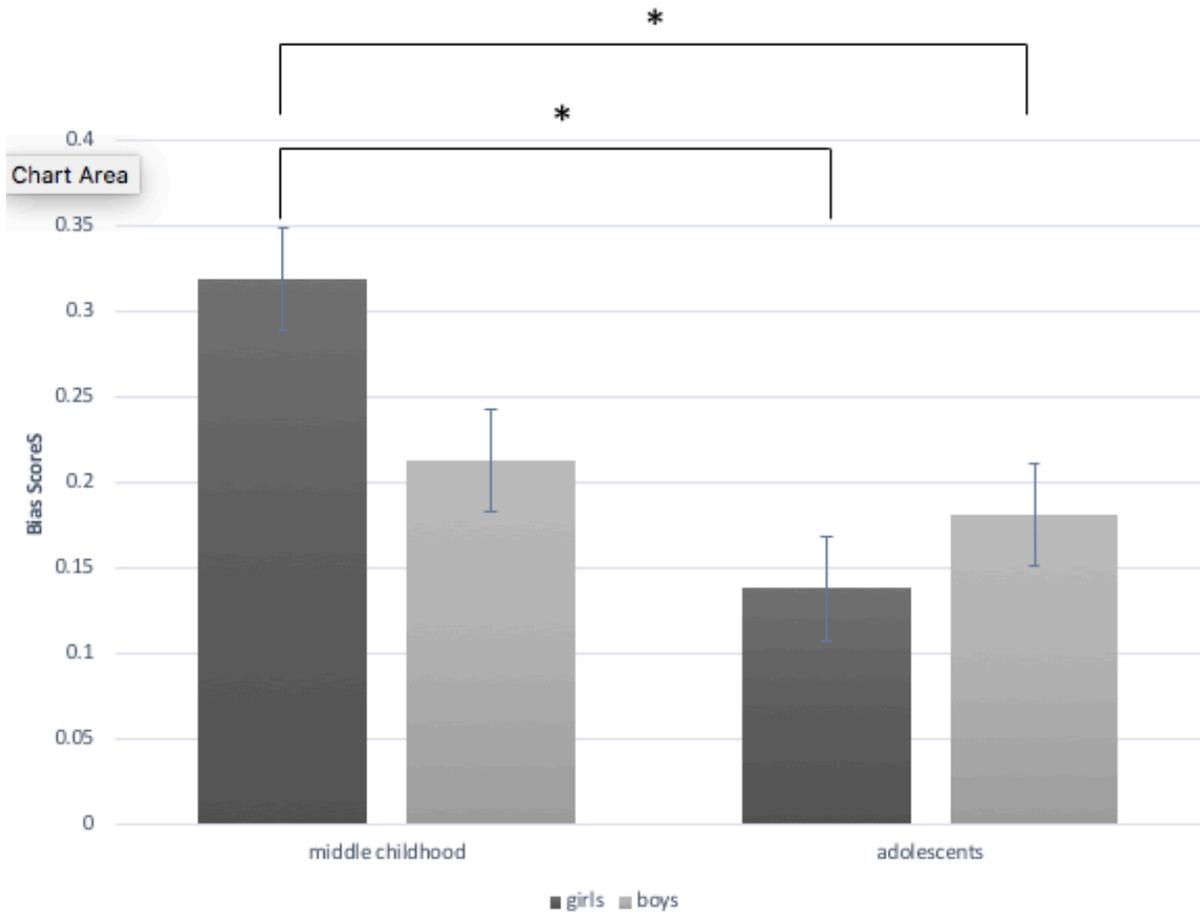


Figure 3. Middle childhood girls more often assigned positive attributes to attractive targets and negative attributes to unattractive targets as compared to adolescent girls and boys.

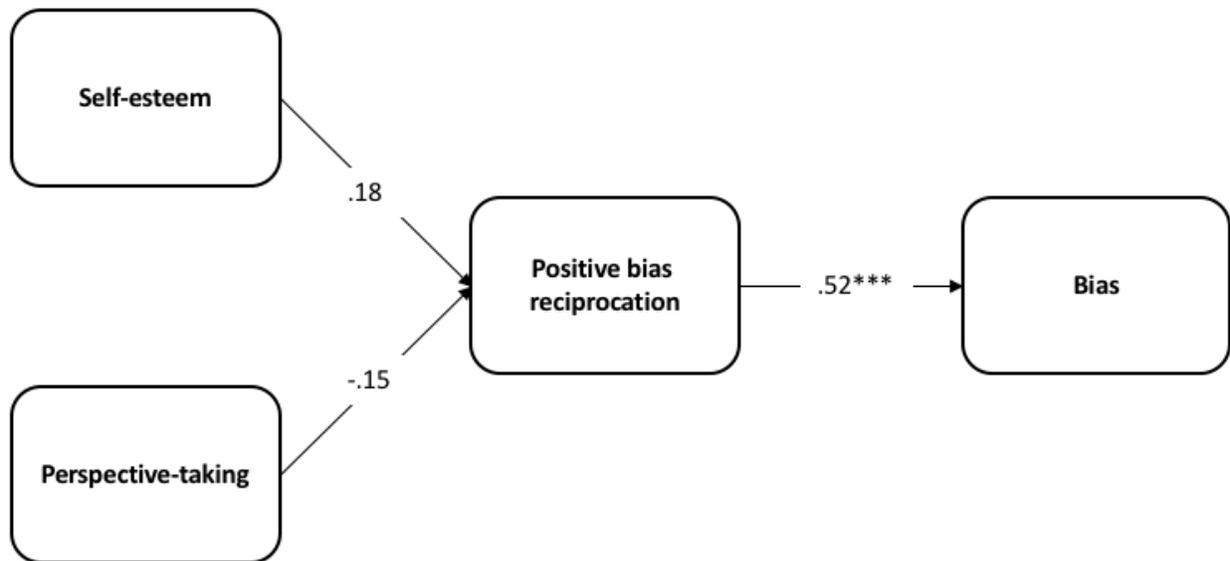


Figure 4. Mediation model depicting associations between individual difference measures, positive bias reciprocation, and bias.  $**p < .01$ ;  $***p < .001$ .

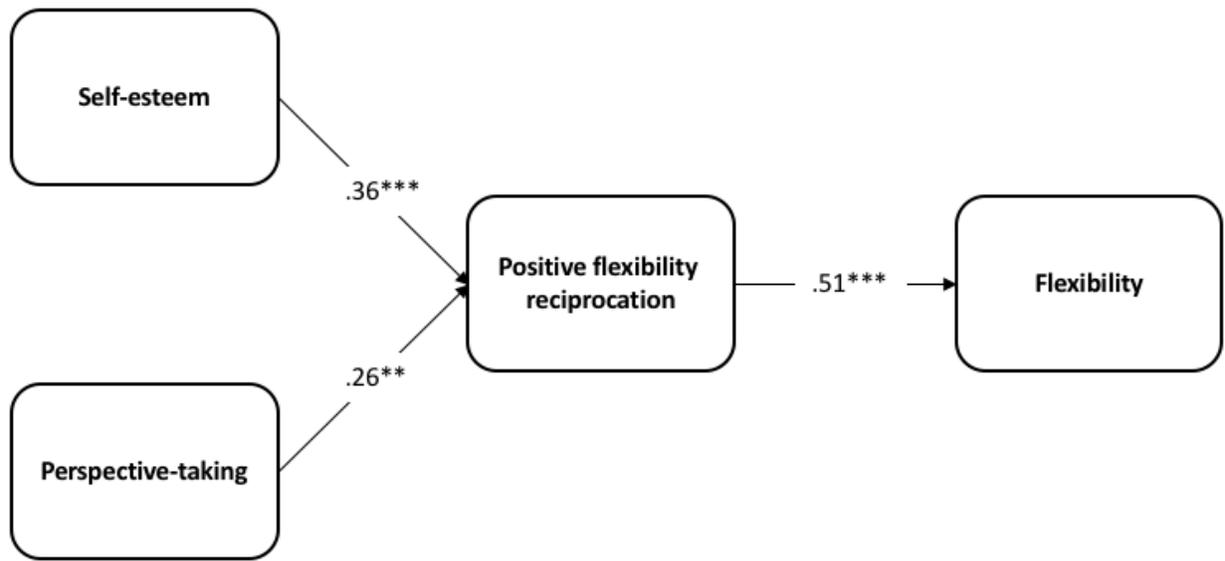


Figure 5. Mediation model depicting associations between individual difference measures, positive flexibility reciprocation, and flexibility.  $**p < .01$ ;  $***p < .001$ .

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## CURRICULUM VITAE

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**Stephanie A. Verba**

sann.quinones@gmail.com

4505 S. Maryland Parkway

Las Vegas, NV 89154

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### EDUCATION

University of Nevada, Las Vegas

Anticipated: 2019

Ph.D Experimental Psychology

Developmental Emphasis

University of Nevada, Las Vegas

2018

M.A Experimental Psychology

Developmental Emphasis

University of Nevada, Las Vegas

2013

B.A. Psychology (Cum Laude)

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### RESEARCH EXPERIENCE

University of Nevada, Las Vegas

August 2014 - Present

Faculty Advisor: Dr. Jennifer Rennels, Ph.D

*Graduate Research Assistant*

Baby Child Rebel Lab

January 2013 - August 2014

University of Nevada, Las Vegas

Faculty Advisor: Dr. Jennifer Rennels, Ph.D

Direct Supervisor: Dr. Veronica Glover, Ph.D

*Research Assistant*

Math Cognition Lab

January - December 2013

University of Nevada, Las Vegas

Faculty Advisor: Dr. Mark Ashcraft, Ph.D

*Research Assistant*

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## **PUBLICATIONS**

Rennels, J.L., & **Verba, S.A.** (2017). Commentary on Maestriperi et al.: Attentional and affective biases for attractive females emerge early in development. *Behavioral and Brain Sciences*, 40, 35. doi:10.1017/S0140525X16000613

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## **MANUSCRIPTS SUBMITTED OR IN PREPARATION**

Rennels, J.L., & **Verba, S.A.** (under review). How Female Facial Expertise Affects Children's Categorical Responding to Adult Faces. Submitted to *Journal of Experimental Child Psychology*

**Verba, S.A.**, & Rennels, J.L. (in preparation). Individual Differences Predict Bias Flexibility in Childhood and Adolescence.

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## CONFERENCE PRESENTATIONS

**Verba, S. A., & Rennels, J. (2018).** *Individual Differences in Children's Displayed Attractiveness Biases*. Poster presented at the 2018 Society for Personality and Social Psychology Convention in Atlanta, Georgia.

**Verba, S. A., & Rennels, J. (2016).** *How Predominant Female Experience Influences Children's Categorization and Typicality Judgments*. Poster presented at the biennial meeting of the Society of Research of Human Development in Denver, Colorado.

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## TEACHING EXPERIENCE

Instructor

History of Psychology (PSY 308)

Fall 2018 - present

University of Nevada, Las Vegas

Instructor

Introduction to Psychology (PSY 101)

Fall 2017 - present

University of Nevada, Las Vegas

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## AWARDS AND GRANTS

Summer Doctoral Research Fellowship

2018

University of Nevada, Las Vegas

Graduate & Professional Student

2018

Association Travel Grant at UNLV

College of Liberal Arts Ph.D

2017

Student Summer Research Award at UNLV

UNLV Graduate College Faculty	2014 - 2017
Doctoral Graduate Research Assistant Award at UNLV	
First place recipient in the Graduate & Professional Student Association Research Forum at UNLV	2016
Graduate & Professional Student Association Travel Grant at UNLV	2015
College of Liberal Arts Ph.D Student Summer Faculty Research Award at UNLV	2015
Cum Laude, University of Nevada Las Vegas	2013
Dean's Honors List, University of Nevada Las Vegas	2012 - 2013
Dean's Honors List, College of Southern Nevada	2010 - 2012

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## **SERVICE**

Housing Liaison of the Experimental Student Committee, UNLV	2016 - 2018
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Graduate Student Representative for Psi Chi Graduate Panel, UNLV	2016
UNLV Outreach to Undergraduate Mentoring Program	2015 - present
Vice President of the Experimental Student Committee, UNLV	2015
Undergraduate Mentor	2014 - present

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### **Professional Memberships**

American Psychological Association (APA)  
Society for Personality and Social Psychology (SPSP)  
Association for Psychological Science (APS)  
Society for Research in Child Development (SRCD)