

WHAT DO YOU WANT TO BE WHEN YOU GROW UP?:  
PREDICTING GENDER DIFFERENCES IN  
ELEMENTARY-AGED CHILDREN'S  
OCCUPATIONAL INTERESTS

by

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## ABSTRACT

The purpose of this study was to determine how perceived occupational knowledge, gender stereotypes and gender socialization influence children's career interests. A sample of 185 children between the ages of 9 and 11 years of age ( $M_{\text{age}} = 9.78$  years, 48.1% girls) completed a survey that measured perceived occupational knowledge, gender stereotyped beliefs and gender socialization. As expected, children were interested in, and perceived that they knew more about own-gender dominated occupations. Results did not support a mediation model but showed a relationship between children's perceived occupational knowledge and occupational interest. Boys who experienced greater gender socialization and held more stereotypical beliefs about occupations were less interested in female-dominated occupations. Gender socialization moderated the relationship between perceived occupational knowledge and interest in own-gender occupations for both boys and girls.

## DEDICATION

This thesis is dedicated to my grandmother.

## LIST OF ABBREVIATIONS AND SYMBOLS

$\alpha$	Cronbach's index of internal consistency
$b$	Unstandardized regression coefficient
CI	Confidence Interval
$d$	Cohens $d$ : effect size used to indicate differences between two means
$df$	Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data
$M$	Mean: the sum of a set of measurements divided by the number of measurements in the set; arithmetic average
$N$	Sample size
$p$	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
$r$	Pearson product-moment correlation
$SD$	Standard deviation
$SE$	Standard Error
$t$	Computed value of $t$ test
$<$	Less than
$=$	Equal to

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## 1. INTRODUCTION

Examining patterns of employment reveals a difference in the occupations that men and women hold, despite an increasing trend for individuals to enter gender-atypical occupations. For example, it is no longer common for men to be sole breadwinners and women to be full-time caregivers, yet women are more likely than are men to be employed in service occupations, and men outnumber women in management occupations (Bureau of Labor Statistics, 2016). It is important to understand why gender segregation in the workplace persists, as it accounts for part of the gap between male and female compensation, perpetuates gender stereotypes, and potentially influences career selection that may not fully utilize a person's talents (for a review, see Peterson & Hyde, 2014). Developmental scholars posit that gender differences in occupational interest during childhood have a number of influences (Gottfredson, 1981; Stockard & McGee, 1990), such as gender socialization (Eccles, 1987), occupational knowledge (Schmitt-Wilson & Welsh, 2012) and gender stereotypes (Oswald, 2008). However, there has been little research understanding how these variables might work together to influence occupational interest. The purpose of this study was to examine children's gendered career interest within the contexts of perceived occupational knowledge, gender stereotypes and gender socialization. It was proposed that interest in same-gender dominated occupations would be related to perceived knowledge about these occupations. Furthermore, it was expected that the knowledge-interest link is due to gender-stereotypical beliefs that are socialized by parents, teachers, and peers.

## **Development of Occupational Thinking**

Children's occupational thinking develops concurrently with their self-concept (Howard & Walsh, 2011; Porfeli, Hartung, & Vondracek, 2008). Beginning around four years of age, children can distinguish occupations based on the gender composition, and gender differences in occupational interests emerge (Care, Ceans, & Brown, 2007; Porfeli et al., 2008). Indeed, there is a considerable body of research suggesting that gender is related to occupational aspirations across the lifespan. Prior studies have established that children's concepts of occupations increase with schooling, and by fifth grade, students have developed accurate understandings of broad occupational characteristics (Blackhurst, Auger & Wahl, 2003; Walls, 2000). Elementary-aged children are able to identify specific career aspirations, suggesting that important ideas about careers are developing during this time (Auger, Blackhurst, & Wahl, 2005). Gottfredson's (1981) developmental theory of circumscription and compromise delineates the importance of the elementary years for an individual's career development. According to this theory, children begin ruling out occupations that do not match their gender identity around age six. That is, they start to see occupations that do not match their gender identity as unacceptable for them. The pattern of gender differentiation in career interest extends through adolescence and adulthood (Porfeli et al., 2008). Given that career education occurs primarily during secondary schooling; and elementary-level children begin to form career interests, there is evidence to suggest a need for earlier career education (Auger et al., 2005; Harkins, 2001; Hartung et al., 2005).

## **Occupational Knowledge**

Occupational knowledge is a key variable in career development that significantly predicts career aspirations and expectations (Hartung, 2015; Schmitt-Wilson & Welsh, 2012). Moreover, children's occupational preferences have been linked to occupational areas in which

they feel knowledgeable (Rohlfing, Nota, Ferrari, Soresi, & Tracey, 2012), particularly in regard to aspirations for science, technology, engineering, and mathematics (STEM) careers (Nugent et al., 2015; Zhang & Barnett, 2015). For example, intervention research has demonstrated that providing early education to children about STEM careers increases their motivations to take STEM classes in high school (Harackiewicz, Rozek, Hulleman, & Hyde, 2012).

Prior research has demonstrated the role of gender in children's occupational knowledge (McMahon & Patton, 1997). Overall gender differences in occupational knowledge seem to relate to stereotypes and the gender-typing of occupations (Stockard & McGee, 1990). Miller and Hayward (2006) found that adolescents believe they have more knowledge for occupations congruent with their gender than for those non-congruent with their gender. That is, boys tend to think they have more knowledge of masculine occupations than do girls, even though boys and girls might be quite comparable in their actual knowledge (and vice versa). Recent work has demonstrated gender differences in perception of occupational knowledge, but not in actual occupational knowledge (Ferrari et al., 2015). This research suggests that gender stereotypes influence occupational understanding; furthermore, *perception* of occupational knowledge or amount of knowledge children think they have (Rohlfing et al., 2012), and *actual* occupational knowledge, or what children know about occupations (Watson & McMahon, 2005), may be two distinct processes in career development. Because this study's objective was to discern potential explanations for gender differences, we focused on perceived knowledge. It was hypothesized that children's perceptions that they have more knowledge about same-gender occupations than other-gender occupations would be positively related to their interest in same-gender occupations, and together this would account for gender differences in career interests. Both knowledge and interests are impacted by gender stereotypes embedded in the larger culture.

## **Gender Stereotypes**

Despite societal changes in the roles of men and women, gender stereotypes have been highly stable across the last several decades (Haines, Deaux, & Lofaro, 2016). Gender stereotypes about occupations can impact career development in a number of ways, including distorting ideas about education and discouraging people from choosing careers considered incongruous with their own gender (Eccles, 2011). Occupational interests have been correlated with gender-role stereotyping and gender-segregation, such that boys are more interested in careers they believe are held and should be held by men, compared to girls. Similarly, girls are more interested in careers they believe are held and should be held by women, compared to boys (Ginevra & Nota, 2015).

Awareness of gender-based occupational stereotypes begins between the ages of two and a half and five years old (Blakemore, 2003; Hilliard & Liben, 2010). By age six, children have developed beliefs associating boys with intelligence, which may impact their interest (Bian, Leslie & Cimpain, 2017). Likewise, the masculine stereotype for math and science can be seen in elementary-aged children (del Rio & Strasser, 2013; Liben & Bigler, 2002). These stereotypes send messages that some occupations may be more suited for boys than girls. For girls, the salience of these stereotypes can decrease a sense of belonging and influence girls' interests, self-concepts and motivations for male-dominated fields during elementary school and beyond (Cheryan, Master, & Meltzoff, 2015; Cheryan, Plaut, Davies, & Steele, 2009; Master, Cheryan, & Meltzoff, 2016; Steffens, Jelenec, & Noack, 2010).

The relation between gender stereotypes and occupational interest is not limited to younger children. For example, Barth et al. (2018) found that across ages, having less stereotypical views of who holds science, technology, engineering and math (STEM)

occupations were associated with greater interest in STEM occupations. Cultural stereotypes about male and female career lines appear to impact career interest, which remain relatively stable from early adolescence to middle adulthood (Low, Yoon, Roberts, & Rounds, 2005). Thus, gender differences in children's early occupational interests may have a lasting impact on occupational interests. Gendered occupational interests are associated with the expectation that specific occupations enable men and women to achieve other gender socialized roles.

### **Gender Segregation**

The study of career development has addressed several factors that influence children's occupation interests, including ideas about the types of people who hold different careers, stereotypes about the societal values of masculine/feminine occupations, perceptions of income potential, perceptions of work/family conflict, and perceptions of the value of these occupations to society. Social role theory (Eagly, 1987) posits that gender differences in career interest result in part from the historical gender segregation in labor. Alone, occupational gender composition is a powerful predictor of vocational preference (Weisgram, Bigler, & Liben, 2010).

Researchers have consistently shown that children are more interested in occupations depicted by workers of their same-sex; that is, males have greater interest in occupations traditionally held by men and females have greater interest in occupations traditionally held by women (Hayes, Bigler, & Weisgram, 2018; Liben & Bigler, 2002; Ruble, Martin, & Berenbaum, 2006; Weisgram et al., 2010). The relationship between gender composition in occupations and job preferences is circular. Occupations that are perceived as male-dominated are likely to attract men to those occupations. As more men enter a particular occupation, the job is perceived as having more masculine goal affordances (e.g., prestige, high income), and thus more attractive to men. In turn, women may be less likely to apply for these positions (Weisgram, Dinella, &

Fulcher, 2011). The gender differences in children's occupational interests parallel the adult world of work, suggesting that the gender composition of occupations may have significant intergenerational effects. Researchers have suggested that gender stereotypes may change if an occupation's demographics were to change (Koenig & Eagly, 2014). Additionally, if those who hold key roles in socializing children work to alter their perceptions about socially acceptable gender roles, this may result in a better gender balance in the workforce.

### **Gender Socialization**

Social cognitive theory (Bussey & Bandura, 1999) suggests that parents, teachers and peers can serve as sources of gender role socialization for children. Gender role socialization, or the messages an individual receives about what behaviors and roles are culturally appropriate for one's gender, is a powerful influence in career choice (Eccles, 1987; Lent, Brown & Hackett, 1994). Some scholars even suggest that gendered occupational interests result from early socialization about what occupations are considered appropriate for their gender (e.g., Antecol & Cobb-Clark, 2013; Greene & DeBacker, 2004). Indeed, Eagly (1987) hypothesized that individuals develop an understanding of gender roles through the gendered division of labor, which is facilitated by socialization processes. Three main socializing influences in children's lives are parents, teachers, and peers.

**Parental socialization.** As a primary source of socialization for young children, the messages parents send can influence their child's occupational aspirations (Ferry, Fouad, & Smith, 2000; Keller & Whiston, 2008). Parents may provide gendered information about occupations through their gender ideologies, such that children of parents who hold gender-egalitarian beliefs may have more progressive views of gender (Epstein & Ward, 2011). Similarly, parental behavior may also shape children's gendered attitudes towards occupations.

Fulcher, Sutfin and Patterson (2008) found that the extent to which parents paid and unpaid labor is divided equally is associated with children's gender-typed occupational aspiration. That is, children whose parents modeled traditional divisions of labor envisioned themselves in more gender-stereotypical occupations. Additionally, parents' occupations are related to their children's career expectations (Hung-Chang & Mei-Ju, 2014).

Parents may endorse gendered stereotypes about academic domains, such as math and science, through the way they talk to their children about the topics, as well as the attributions that are given for success (e.g., Butler, 2014; Peterson & Hyde, 2014; Tenenbaum & Leaper, 2003). Several studies have observed that parents perceive math and science as being more important and have higher performance expectations for boys than girls (Eccles, Freedman-Doan, Frome, Jacobs, & Yoon, 2000; Leaper & Brown, 2014). Parents' attitudes about academic subject areas can influence children's career aspirations as well. For instance, girls whose parents hold positive attitudes about science and math view STEM and nontraditional gender occupations as more acceptable than those who hold fewer positive attitudes about math and science (Mulvey & Irvin, 2018). Taken together, parental gender role attitudes may have a lasting influence on children's occupational aspirations (Chhin, Bleeker & Jacobs, 2008; Jodl, Michael, Malanchuk, Eccles, & Sameroff, 2001).

**Teacher socialization.** Teachers may impact the development of gender-related attitudes and ideas through their classroom practices. For example, gender segregation (e.g., lining boys and girls separately, seating boys and girls separately, etc.) makes the category of gender more salient; in turn, heightening bias and gender-stereotyped perceptions (Hilliard & Liben, 2010; Martin, Fabes, & Hanish, 2014). Additionally, Vervecken, Hannover, and Wolter (2013) found that children are sensitive to gendered cues in job descriptions and suggest that when information



sources, such as teachers, describe stereotypically masculine occupations as performed by a male (i.e., he is an engineer), it may reduce young girls' interest in these occupations.

Within the classroom, teachers can express gender biases via differential treatment of boys and girls. Teachers may perpetuate gender bias through their belief that boys have higher math ability than girls and in their attributions for success in math (Leaper & Brown, 2014). That is, attributing boys' success in math to ability, but attributing girls' success to effort. Teachers may also express gender biases by calling on boys more often than girls during math and science classes (Leaper & Brown, 2014; Tiedemann, 2000). Although some studies have found teachers try to maintain explicit gender egalitarian beliefs, there is evidence that teachers still believe that boys and girls have different learning styles and interests (Jones & Myhill, 2004; Skelton et al., 2009). Students may pick up on teachers' implicit gender biases. For example, Beilock and colleagues (2010) found that girls who had a female teacher with math anxiety were more likely to endorse gender stereotypes about math and show poor math performance than their male peers. Children may internalize and endorse the gender stereotypes and biases expressed by their teachers (see Gunderson, Ramirez, Levine, & Beilock, 2012), which in turn could influence children's academic and occupational interests.

**Peer socialization.** There has been limited investigation into the role of peer gender socialization in occupational interest. Eccles and colleagues (1993) suggest that the socialization processes in contexts, such as classrooms, influence motivational beliefs (e.g., interest and ability), which in turn influence youths' academic and occupational interests, as well as their capacities to plan for future careers within an individual's educational and occupational interests (Durik, Vida, & Eccles, 2006; Eccles, 2009; Wang, Willett, & Eccles, 2011). Indeed, peer support can influence students' motivational beliefs, and a lack of peer acceptance predicts lower

academic self-concept (Flook, Repetti, & Ullman, 2005). Social learning theory posits that peers may socialize gender norms by reinforcing adherence to gender-typed behaviors and interests (Ruble et al., 2006). Additionally, peer interactions provide children opportunities for social comparison on gender typical dimensions, which can be challenging for children who do not develop salient gender-prototypical behaviors (Harris, 1995; Maccoby, 1998). Children who violate gender norms are at risk for negative peer interactions, such as bullying (Pascoe, 2012) and peer exclusion (Heinze & Horn, 2014). Children who feel strong pressure for gender role adherence may be less likely to explore a wide range of options when deciding what interests to pursue (Bem, 1981; Bussey & Bandura, 1999). In considering these theoretical models, it seems likely that peers may play a role in gender differentiation in career interests.

### **Purpose of the Study**

Differing rates of men and women entering various fields suggest there may be self-selection bias in the workplace. If so, then there is a need to understand the factors and processes that affect this bias. Occupational knowledge, gender socialization and gender stereotyping are predictors that have been studied independently, each yielding conclusive findings of their relation to career preferences (Wahl & Blackhurst, 2000). Whereas career education typically takes place during secondary schooling, findings suggest that to address gender discrepancies in the workforce, there is a need for earlier career education (Auger et al. 2005; Harkins, 2001; Hartung et al., 2005). To address these gaps, this study sought to investigate gendered career interests within the parameters of perceived occupational knowledge, gender stereotypes, and gender socialization in children in grades 4 to 5.

Based on previous research, it was expected that children who report greater perceived knowledge of occupations dominated by their same-gender would have high levels of gender

socialization, which yields high levels of gender stereotypes and interest in same-gender-dominated occupations. The hypotheses were as follows:

1. **Children's self-perceived knowledge about same-gender occupations will be positively related to their interest in same-gender occupations.**

Prior research has established that perceived occupational knowledge is related to interest in occupations (Ferrari et al., 2015). Additionally, boys' and girls' knowledge about occupations will differ following the gender associated with the occupations, and this will correspond to differences in occupation interests.

2. **The relationship between children's perceived occupational knowledge about same-gender occupations and gendered occupational interest is sequentially mediated by gender socialization and gender-stereotypical beliefs, depicted in Figure 1.**

To investigate this hypothesis, hypothesis 2a and 2b were evaluated.

**2a. The relationship between children's perceived knowledge and gendered job interests will be mediated by gender socialization.**

**2b. Gender stereotyped beliefs mediate the relationship between children's perceived knowledge and gendered job interests.**

## 2. METHODOLOGY

### **Participants**

Participants included 185 nine- to eleven-year-old children (51.9% boys, 52.4% fourth graders;  $M_{age} = 9.78$  years,  $SD = 0.712$  years) recruited from five local schools and after-school programs in the U.S. Southeast. All elementary schools were Title 1 schools, with a range of 37% - 68% of students qualifying for free/reduced lunch. The ethnic makeup of the sample was 65.4% White, 23.3% African American, 2.2% Latinx/Hispanic, 0.5% Asian, 3.2% Native American, and 5.4% other. A preliminary power analysis was conducted with the alpha level set to .05, power set to .80. For an effect size of .15 to be detected, a sample of 130 participants was needed, and the actual sample size exceeded this (G\*Power; Faul, Erdfelder, Lang, & Bucher, 2007)

Data collection was approved by the university Institutional Review Board (IRB) and permitted by principals at each school. Parental permission forms were distributed to students in fourth and fifth grades. Only those children whose parents returned permission slips and whom themselves agreed to participate were included in the study. Participants and parents were informed that participation was optional, and participation could be terminated at any time during the study for any reason and without penalty. To incentivize participants to return these forms, each school received a \$5 donation per consent form returned, regardless of parental approval or disapproval of participation. The initial response rate was 61.2% of the 374 potential

students. Of the 229 parental consent forms returned, 92.3% of parents gave consent. Of the 211 parents that gave consent, 87.6% of students participated in this study. Four children declined to participate, and the rest of the students were absent on the day the survey was administered.

### **Procedure**

The research team visited classrooms and administered paper surveys to all assenting students. Students were asked to complete a survey packet comprised of numerous self-report measures. Surveys were completed in participants' classrooms. To ensure a quiet working environment, students who did not receive parental consent or did not assent themselves worked quietly on their own. Research assistants also monitored each classroom to ensure that participants stayed on task and did not share answers with one another. Research assistants were available to answer any questions from the students.

Survey items measured demographic information, gender socialization, occupational knowledge, gender stereotypes, and occupational interest. Knowledge, interest and stereotype questions were asked for four male-dominated and four female-dominated occupations. Similar to Fulcher (2011), male-dominated and female-dominated occupations were chosen from the Bureau of Labor Statistics (2016) and attempted to control for salary and education requirements. That is, there was very little difference between the combined four-male and combined four-female occupations on salary and education required (Appendix A). Participants had to have answered 75% of the items on a scale to receive a score for that scale.

## Measures

**Demographic information.** Participants were asked to report their age, grade level, teacher, gender, ethnicity, and information about the occupations held by adults in the children's homes.

**Occupational knowledge.** To measure perception of knowledge, Rohlfing et al.'s (2012) Occupational Knowledge Scale was adapted. For each occupation, children were asked "About how much do you already know about what people in this job do?" Responses were based on a 6-point scale (1 = not very much; 6 = a lot). Prior work has demonstrated excellent internal consistency estimates ( $\alpha = .94$ ; Rohlfing et al., 2012). Scores were averaged into two categories: male-dominated (internal consistency  $\alpha = .65$ ) and female-dominated (internal consistency  $\alpha = .69$ ). It is possible that alphas were not as high as has been previously reported due to the small number of items in each scale.

**Gender Stereotyping.** Similar to Liben and Bigler (2002), participants were asked "*who would like to have this job?*" and "*who normally has this job?*" to evaluate to the extent to which each job is perceived as being gender-segregated. Response options included *1 = only men, 2 = mostly men, some women, 3 = a little more men than women, 4 = both men and women, 5 = a little more women than men, 6 = mostly women, some men, or 7 = only women* (Liben & Bigler, 2002). Separate scores were averaged for male-dominated ( $\alpha = .80$ ) and female-dominated ( $\alpha = .79$ ) occupations, such that higher scores are consistent with the gender stereotype for the occupation.

**Gender Socialization.** Participants completed an adapted measure of perceived pressure to conform to gender roles (Patterson, 2012). This scale is part of a larger measure of gender identity that also includes measures of gender-typicality and gender satisfaction. The perceived

pressure scale (12 items,  $\alpha = .83$ ) measures perceived pressure to conform to traditional gender roles from parents, teachers, and peers. Participants rated how much their parents, teachers, and peers would be upset, tease, and try to stop them from engaging in gender atypical behaviors. Additionally, they rated how much these people try to get them to follow gender-typical behaviors, from really true (4) to really not true (1). Separate scales were calculated for *adults* ( $\alpha = .80$ ; 8 items) and *peers* ( $\alpha = .76$ ; 4 items) by averaging items related to adult sources and peer sources, respectively. A final score for this scale was the mean of the 12 items. Higher scores indicate greater perceived pressure.

**Occupational interest.** As a measure of occupation interest, children were asked: “*How much would you like to be a(n) (occupation)?*” Participants responded using a 5-point scale ranging from *not at all* to *very much*. Summary scores of participants’ interests in masculine and feminine occupations were computed by averaging responses to four items of each type. Higher scores indicated a greater preference for feminine or masculine occupations. This measure was adapted for the current study from the Occupations, Activities and Traits- Personal Measure (Liben & Bigler, 2002). Prior work has demonstrated good reliability for this measure, with which Cronbach’s alphas ranging between .70 and .90 (e.g., Friedman, Leaper, & Bigler, 2007; Liben & Bigler, 2002). In the current study, reliability estimates were acceptable for feminine items ( $\alpha = .67$ ), but low for masculine items ( $\alpha = .56$ ). The masculine items were reverse scored, which can reduce the internal consistency (Pedhazur & Schmelkin, 2013). Although the alpha for the masculine scale was low, is it similar to those in other studies with children who were enrolled in fourth-, fifth-, or sixth- grades (Barth et al., 2018; Spence & Hall, 1996). As a result, the four items were retained.

### 3. RESULTS

#### **General Overview**

Data analyses consisted of three phases corresponding to the primary research questions. First, to provide a foundation for the subsequent analyses related to the hypotheses, the broad associations between demographic variables and outcomes of interest, as well as gender differences were examined. Next, mediation analyses were conducted to examine how gender socialization and gender stereotypes mediate the relationship between knowledge and interest. Finally, to ascertain the relationship between occupational knowledge and interest, a moderation analyses were conducted.

#### **Preliminary Analyses**

Correlations between select demographic characteristics (age and grade) and scores on the measures administered in the current study revealed no significant associations. Thus, those demographic characteristics were not included in the following analyses. See Table 1 for mean, standard deviation, and range for all measures. Correlations among variables of interest can be found in Table 2.

#### **Hypothesis 1: Gender Differences and Relations between Knowledge and Interest**

It was predicted that children's self-perceived knowledge about same-gender occupations would be positively related to their interest in same-gender occupations. To test this hypothesis,



gender differences in the measures included in the analyses were first examined (See Table 3 for complete results). A series of independent samples *t*-tests confirmed the hypothesis, showing that the boys compared to the girls, had more interest in male-dominated occupations ( $p < .001$ ), more perceived occupational knowledge about male-dominated occupations ( $p < .001$ ), and more felt pressure to conform to gender norms ( $p < .001$ ). Compared to boys, girls had more interest in female-dominated occupations ( $p < .001$ ), more perceived occupational knowledge about female-dominated occupations ( $p < .001$ ). There were no gender differences in how stereotyped boys and girls thought male or female-dominated occupations were. Bivariate correlations revealed that perceived occupational knowledge of male-dominated occupations was positively related to interest in male-dominated occupations, for boys,  $r(92) = .39, p < .001$ , and girls,  $r(85) = .60, p < .001$ . Similarly, perceived occupational knowledge of female-dominated occupations was positively related to interest in female-dominated occupations, for boys,  $r(87) = .38, p < .001$ , and girls,  $r(85) = .49, p < .001$ . Hypothesis 1 was supported.

### **Hypotheses 2a: The Mediating Role of Gender Socialization**

Model 4 of the PROCESS macro (Hayes, 2013) was used to test the hypothesis that gender socialization mediated the link between perceived occupational knowledge and occupational interest. Each analysis utilized a bootstrapping approach and the estimated effects reported were unstandardized regression coefficients. Because there were gender differences in all three variables in this model, analyses were run separately for boys and girls, as well as for male and female-dominated jobs, resulting in four distinct mediation analyses.

**Male-dominated occupations.** For boys, the total effect of perceived knowledge on interest in male-dominated occupations was significant,  $R^2 = .14, F(1, 79) = 12.85, p < .001$ . When felt pressure was added as a mediator, the model was still significant ( $R^2 = 0.14, F(2,$

78) = 6.42,  $p < .001$ ). The pathway from knowledge to interest was still significant, but the mediation pathway of “*perceived knowledge of male-dominated occupations → felt pressure to conform to gender norms → interest in male-dominated occupations*” was not significant for boys,  $b = -.002$ ; CI = -.021 to .016. For all variables in the model, the total effect was significant,  $b = .32$ ,  $p < .001$ , see Table 4 for path coefficient statistics.

The results looked similar for girls. The total effect of perceived knowledge on interest in male-dominated occupations was significant,  $R^2 = .39$ ,  $F(1, 79) = 50.54$ ,  $p < .001$ . When felt pressure was added as a mediator, the model was still significant,  $R^2 = 0.40$ ,  $F(2, 78) = 26.42$ ,  $p < .001$ . However, the mediation pathway of “*perceived knowledge of male-dominated occupations → felt pressure to conform to gender norms → interest in male-dominated occupations*” was not significant for girls ( $b = -.014$ ; CI = -.045 to .017). For all variables in the model, the total effect was significant,  $b = .43$ ,  $p < .001$ , see Table 4 for path coefficient statistics.

**Female-dominated occupations.** For boys, the total effect of perceived knowledge on interest female-dominated occupations was significant,  $R^2 = .14$ ,  $F(1, 77) = 12.58$ ,  $p < .001$ . When felt pressure was added as a mediator, the model was still significant,  $R^2 = 0.18$ ,  $F(2, 76) = 8.59$ ,  $p < .001$ . In addition, there was a significant association between felt pressure to conform to gender norms and interest in female-dominated occupations. That is, boys who feel less pressure to conform to gender norms were more interested female-dominated occupations than boys who feel more pressure to conform to gender norms. However, the pathway of “*perceived knowledge of female-dominated occupations → felt pressure to conform to gender norms → interest in female-dominated occupations*” was not significant for boys ( $b = .003$ ;

CI = -.031 to .034). For all variables in the model, the total effect was significant,  $b = .23, p < .001$ , see Table 4 for path coefficient statistics.

For girls, the total effect of perceived knowledge on interest in female-dominated occupations was significant,  $R^2 = .26, F(1, 80) = 28.58, p < .001$ . When felt pressure was added as a mediator, the model was still significant,  $R^2 = 0.26, F(2, 79) = 14.27, p < .001$ . However, the mediation pathway of “*perceived knowledge of female-dominated occupations → felt pressure to conform to gender norms → interest in female-dominated occupations*” was not significant for girls ( $b = .003$ ; CI = -.022 to .030). For all variables in the model, the total effect was significant,  $b = .53, p < .001$ , see Table 4 for path coefficient statistics.

To summarize, these results show that perceived occupational knowledge was related to occupational interest for male and female-dominated occupations for both boys and girls. Felt pressure to conform to gender norms did not mediate the relationship between perceived occupational knowledge and occupational interest. Hypothesis 2A was not supported. See table 4 for full results.

### **Hypothesis 2B: The Mediating Role of Gender Stereotypes**

Similar to the previous set of analyses, four mediation models were tested that were distinguished by the gender of the occupation and the gender of the children.

**Male-dominated occupations.** For boys, the total effect of perceived knowledge on interest in male-dominated occupations was significant,  $R^2 = .15, F(1, 89) = 15.87, p < .001$ . When gender stereotype was added as a mediator, the model was still significant,  $R^2 = 0.16, F(2, 88) = 8.49, p < .001$ . However, the mediation pathway of “*perceived knowledge of male-dominated occupations → gender stereotypes about male-dominated occupations → interest in male-dominated occupations*” was not significant for boys ( $b = .002$ ; CI = -.016 to .028). For all

variables in the model, the total effect was significant,  $b = .33, p < .001$ . See Table 5 for path coefficient statistics.

The results were similar for girls: the total effect of perceived knowledge on interest in male-dominated occupations was significant,  $R^2 = .36, F(1, 81) = 45.70, p < .001$ . When gender stereotype was added as a mediator, the model was still significant,  $R^2 = 0.36, F(2, 80) = 22.57, p < .001$ . However, the mediation pathway of “*perceived knowledge of male-dominated occupations* → *gender stereotypes about male-dominated occupations* → *interest in male-dominated occupations*” was not significant for girls ( $b = -.003; CI = -.023$  to  $.016$ ). For all variables in the model, the total effect was significant,  $b = .42, p < .001$ . See Table 5 for path coefficient statistics.

**Female-dominated occupations.** Similar to other models in this analysis, the total effect of boy’s perceived knowledge on interest in male-dominated occupations was significant,  $R^2 = .14, F(1, 86) = 13.872, p < .001$ . When gender stereotype was added as a mediator, the model was still significant,  $R^2 = 0.16, F(2, 88) = 8.49, p < .001$ . In addition, results revealed that the extent to which boys perceive female-dominated occupations to be stereotyped does predict how interested they are in those occupations. That is, the more stereotypical boys’ perceived female-dominated occupations to be, the less interested they are on those occupations. However, the mediation pathway of “*perceived knowledge of female-dominated occupations* → *gender stereotypes about female-dominated occupations* → *interest in female-dominated occupations*” was not significant for boys ( $b < .001; CI = -.051$  to  $.049$ ). For all variables in the model, the total effect was significant,  $b = .23, p < .001$ . See Table 5 for path coefficient statistics.

For girls, the total effect of perceived knowledge on interest in female-dominated occupations was significant,  $R^2 = .23$ ,  $F(1, 82) = 24.91$ ,  $p < .001$ . When gender stereotype was added as a mediator, the model was still significant,  $R^2 = 0.24$ ,  $F(2, 81) = 13.40$ ,  $p < .001$ . However, the mediation pathway of “*perceived knowledge of female-dominated occupations* → *gender stereotypes about female-dominated occupations* → *interest in female-dominated occupations*” was not significant for girls ( $b = -.01$ ;  $CI = -.060$  to  $.017$ ). For all variables in the model, the total effect was significant,  $b = .52$ ,  $p < .001$ . See Table 5 for path coefficient statistics.

To summarize, these results show that perceived occupational knowledge is related to occupational interest for male and female-dominated occupations among boys and girls. Gender stereotypes did not mediate the relationship between perceived occupational knowledge and occupational interest. Hypothesis 2B was not supported. See Table 5 for full results.

## **Hypothesis 2: The Sequential Mediation Model**

In order to test the hypothesis as to whether gender socialization and gender stereotypes sequentially mediate the relationship between occupational knowledge and occupational interest, a series of sequential mediation analyses were performed (Model 6 as described in PROCESS) with bootstrap methods (Hayes, 2013). Each analysis utilized a bootstrapping approach and the estimated effects reported were unstandardized regression coefficients. Because there were gender differences in some variables in this model, analyses were run separately for boys and girls, as well as for male and female-dominated jobs, resulting in four mediation analyses.

The pathway of “*perceived knowledge of male-dominated occupations* → *felt pressure to conform to gender norms* → *gender stereotypes about male-dominated occupations* → *interest in male-dominated occupations*” was not significant for boys ( $CI = -.002$  to  $.015$ ) or girls ( $CI = -$

.012 to .005). It should be noted that, for boys, path a3 was significant ( $b = -.29, p < .05$ ), indicating that boys who felt more pressure to conform to gender norms hold more stereotypical views of male-dominated occupations. Additionally, for girls, a significant a3 path ( $b = .31, p \leq .01$ ) revealed that the more pressure girls' felt to conform to gender norms, the more stereotypical they viewed male-dominated occupations. Similarly, the pathway of "*perceived knowledge of female-dominated occupations* → *felt pressure to conform to gender norms* → *gender stereotypes about female-dominated occupations* → *interest in female-dominated occupations*" was not significant for boys (CI =  $-.002$  to  $.015$ ) or girls (CI =  $-.012$  to  $.007$ ). Hypothesis 2 was not supported. See Table 6 for full results.

### **Exploratory analyses**

Given the findings for Hypotheses 2A and 2B, alternative exploratory analyses were conducted to investigate whether the effect of occupational knowledge on career interest was moderated by gender socialization and gender stereotypes. Because there were gender differences in all variables included in the model, analyses were run separately for boys and girls, as well as for male and female-dominated jobs. Recent work has shown that felt pressure is distinguishable by socialization source, such that pressure from parents and peers may contribute differently to gender development among adolescence (Cook, Nielson, Martin, & Delay, 2019). As such, the moderating effect of felt pressure from adults and felt pressure from peers were analyzed separately. Each analysis utilized a bootstrapping approach, and significance was determined at 95 % bias-corrected confidence intervals. All variables were centered, and the estimated effects reported were unstandardized regression coefficients. In all models, perceived occupational knowledge was the independent variable and occupational interest was the dependent variable. Full results can be found in Tables 7 and 8.

Felt pressure from *peers* moderated the relationship between boys' perceived male-dominated occupational knowledge and interest in male-dominated occupations ( $b = -.27, p \leq .05$ ). Simple slopes analyses for the effects of perceived occupational knowledge on interest were significant at low ( $< 1$  SD below the mean;  $b = .61, p < .001$ ), but not high ( $> 1$  SD above the mean;  $b = .11, p > .05$ ) levels of gender socialization from peers, as perceived by boys. When evaluating the effect of perceived occupational knowledge on interest in male-dominated occupations at different levels of peer gender socialization, the analyses indicated that as perceived occupational knowledge increased, so did occupational interest, among boys who experience low amounts of gender socialization from peers. That is, the effect of occupational knowledge on interest in male-dominated occupations was weaker for boys who feel more pressure to conform to gender norms from peers (figure 2). No other moderations were significant for boys.

For girls, there was a significant interaction between perceived occupational knowledge of female-dominated occupations and perceived pressure from *adults* in predicting interest in female-dominated occupations ( $b = -.31, p < .05$ ). Simple slopes analyses for perceived occupational knowledge were significant at low ( $< 1$  SD below the mean;  $b = .72, p < .001$ ), and high ( $> 1$  SD above the mean;  $b = .31, p = .04$ ) levels of gender socialization from adults, as perceived by girls. The analyses indicated that the effect of perceived occupational knowledge on female-dominated occupational interest for girls was stronger for those who experienced the least amount of gender socialization from adults, compared to those who experienced a great deal of gender socialization from adults. No other moderations were significant for girls.

Finally, given the lack of support for socialization and stereotypes as mediators, an additional set of analyses examined the additive effects of these variables in predicting interest.

A hierarchical regression model was used to examine if the effects of perceived occupational knowledge, gender socialization and gender stereotyping on occupational interests are different for boys and girls (Tables 9 and 10). In each model, gender was entered in the first step. In the second step, perceived occupational knowledge, gender socialization and gender stereotyping were entered. To test for moderation, the interaction terms between gender and the primary variables were entered.

In the first step of the model predicting interest in female-dominated occupations, gender was significant predictor,  $F(1, 158) = 64.50, p < .001, R^2 = .29$ , consistent with previous analyses. Results indicated a significant increase in variance explained from the first block to the second block,  $\Delta R^2 = .14, \Delta F(3, 155) = 13.13, p < .001$ . In the final step, the addition of the interaction terms also resulted in a significant increase in variance explained,  $\Delta R^2 = .05, p < .05, \Delta F(3, 152) = 5.85, p < 0.001$ . See Table 9 for full results. These findings confirm that gender moderates the effects of perceived occupational knowledge, gender socialization and gender stereotyping on children's interest in female-dominated occupations. Simple slopes analyses revealed that the effect of perceived knowledge on interest in female-dominated occupations was stronger for girls ( $b = .61, p < .001$ ) than boys ( $b = .23, p < .001$ ). Simple slopes analyses also revealed that the effect of gender socialization on interest in female-dominated occupations was marginally significant for boys ( $b = -.31, p = .07$ ), but not girls ( $b = .09, p > .10$ ). Finally, simple slopes analyses indicated that the effect of gender stereotypes on interest in female-dominated occupations was significant for boys ( $b = -.34, p < .001$ ), but not girls ( $b = .11, p > .05$ ).

The first step of the model predicting interest in male-dominated occupations was significant,  $F(1, 158) = 22.71, p < 0.001, R^2 = .12$ , indicating that gender was a significant



predictor, consistent with previous analyses. Results from the multiple regression analysis indicated a significant  $\Delta R^2$  from the first block to the second block,  $\Delta R^2 = .19$ ,  $\Delta F(3, 155) = 15.17$ ,  $p < .001$ . Knowledge was the only significant predictor in the second step. There was not a significant  $\Delta R^2$  from the second block to the third block;  $\Delta R^2 = .01$ ,  $\Delta F(3, 152) = 1.10$ ,  $p > .05$ . See Table 10 for full results. This model confirms the results from the mediation analyses: gender and perceived occupational knowledge are strong predictors of interest in male-dominated occupations. However, gender socialization and stereotyping do not appear to have an impact on interest in male-dominated occupations.

#### 4. DISCUSSION

Developmental scholars posit that gender socialization (Eccles, 1987), occupational knowledge (Schmitt-Wilson & Welsh, 2012) and gender stereotypes (Oswald, 2008) contribute to gender differences in children's occupational interest. However, there has been little research on understanding how occupational interest is affected when these variables are considered together. The current study investigated the mediating and moderating effects of how gender stereotypes and gender socialization impact the relationship between perceived occupational knowledge and occupational interests among fourth and fifth graders. Although perceived knowledge was associated with interest in all of the models tested, the hypothesis that the relationship between children's perceived occupational knowledge about same-gender occupations and gendered occupational interest is sequentially mediated by gender socialization and gender-stereotypical beliefs was not confirmed. However, for boys, gender socialization and gender stereotypes were significant predictors of lower interest in female-dominated occupations. Additionally, gender socialization moderated the relationship between perceived occupational knowledge and interest in male-dominated occupations for boys. For girls, gender socialization moderated the relationship between perceived occupational knowledge and interest in female-dominated occupations. Each of these findings is discussed below.

##### **Relations between Perceived Occupational Knowledge and Interest**

Importantly, the gender differences observed in this sample confirmed the gender trends found in previous research (Ginevra & Nota, 2015). As hypothesized, results indicated that boys

rated their self-perceived knowledge and interest in male-dominated occupations higher than girls do. Similarly, girls rated their self-perceived knowledge and interest in female-dominated occupations higher than boys did. This finding is consistent with prior work that has shown that youth are more interested in gender-typical occupations (Coyle & Liben, 2018, Teig & Susskind, 2008), and know more about occupations dominated by their own gender (Ferrari et al., 2015). Further, the finding that boys reported more felt pressure to conform to gender norms than girls replicates prior work (Egan & Perry, 2001; Smith & Leaper, 2006).

Prior work with fourth and fifth-grade Italian children has shown that children report that they know more about occupations dominated by their own gender (Ferrari et al., 2015). The study expands upon this work and shows that perceived occupational knowledge predicts children's interest in gender-dominated occupations. That is, for both male- and female-dominated occupations, the results confirm that perceived occupational knowledge was associated with occupational interests among girls and boys. However, these results slightly differ from a study among high schoolers in the United Kingdom that found that the relationship between perceived occupational knowledge and occupational interest was only significant for girls (Miller & Hayward, 2006). Future work should investigate potential developmental differences between elementary and high school boys perceived occupational knowledge and occupational interests and their association. Although the observed relationship between perceived occupational knowledge and occupational interest is not surprising, few studies have examined this relationship among younger children or children residing in the United States (Miller & Hayward, 2006).

## **Gender Socialization**

Contrary to expectations, gender socialization and gender stereotyping did not sequentially mediate the relationship between perceived occupational knowledge and occupational interest. However, both socialization and stereotyping served as independent predictors of boys' interest in female-dominated occupations. That is, the more pressure boys felt to conform to gender norms and the more they viewed occupations as female-stereotyped, the less interested they were in female-dominated occupations. This finding is similar to other work that has highlighted boys' emphasis on avoiding feminine-typed behaviors and characteristics (Halim & Ruble, 2010; Powlishta, 2002), rather than enacting masculine-typed behaviors and characteristics. Felt pressure for gender conformity has been researched with regard to psychological adjustment among U.S. adolescents (e.g., Carver, Younger, & Perry, 2003; Corby, Hodges, & Perry, 2007; Egan & Perry, 2001), educational parameters (Leaper, Farkas & Brown, 2012; Vantieghem & Houtte, 2015), but not occupational interests. This study expands upon the current literature and demonstrates that felt pressure to conform to gender norms is related to occupational interests in children under some circumstances.

After discovering that gender socialization and gender stereotypes did not serve as mediators, a set of exploratory analyses investigated whether the two hypothesized mediating variables actually moderated the association between perceived occupational knowledge and occupational interest. For boys, the degree to which they felt pressure to conform to gender norms from peers affected the strength of the relationship between perceived occupational knowledge and interest in male-dominated occupations. Specifically, the results show that as perceived occupational knowledge increased, so did occupational interest among boys who experience low amounts of

gender socialization from peers. A similar effect emerged for girls: High parental socialization dampens the effect of perceived knowledge on interest in female-dominated occupations.

Contrary to what would have been expected, children who report having a great deal of occupational knowledge were interested in own gender-dominated occupations when they felt less pressure to conform to gender norms. Pressure for gender conformity is related to negative outcomes among youth, such as low self-esteem, low academic motivations, and more internalizing symptoms, especially among those who feel less gender-typical (Perry, Pauletti & Cooper, 2019). The combination of high levels of gender conformity pressure and low levels of own-gender similarity may lead to children feeling less knowledgeable or less confident in exploring or questioning gender-stereotypical domains. Indeed, some work has shown that, among girls, gender conformity pressure predicts lower academic motivation in English, a subject that is socially valued for female students (Leaper et al., 2012). Additionally, future work should consider how other facets of gender identity, such as gender-typicality, impact the relationship between perceived occupational knowledge were interested in own gender-dominated occupations (Patterson, 2012). The finding that different socialization sources influenced the relationship between occupational knowledge and interest in own-gender dominated occupations for boys and girls is puzzling and in need of further exploration.

Concurrently, children in middle childhood emphasize conforming to gender norms (Egan & Perry, 2001) while expressing less rigidity in their gendered attitudes in some domains than younger children (Martin, Ruble, & Szkrybalo, 2002; Ruble et al. 2006). Given that boys face harsher social sanctions for violating gender norms compared to girls (Egan & Perry, 2001; Pauletti et al., 2017), it is possible that boys are more attuned to external messages about what is *not* acceptable for them than messages about that is acceptable. Conversely, work has shown

that during childhood, girls experience pressure to act more feminine from their parents in particular (Carr, 2007). Perhaps girls are more sensitive to messages about positive prescriptive stereotypes (desirable behaviors), rather than messages about negative proscriptive stereotypes (behaviors that one should avoid). The way in which felt pressure was measured in this study may have captured pressure to *avoid* other gender, rather than pressure to *conform to* same-gender, normative behaviors. Replication of this paradoxical effect is needed to ensure confidence in this conclusion.

### **Gender Stereotypes**

It is important to consider further why gender stereotypes only directly influenced boys' disinterest in female-dominated occupations. The occupations examined are gender-segregated in the workforce, and represented as so in the media (Singh, Chayko, Inamdar, & Floegel, 2020). While children did demonstrate mean level gender differences in their interests, occupational gender stereotypes were not strongly related to their interest. It is possible that these results differ in part due to the lack of status associated with the male-dominated occupations in this study. Compared to men, women are concentrated in occupations characterized by a high level of low-wages, low-skill requirements, and low promotion opportunities (Blau & Kahn, 2017). Male-dominated occupations that are commonly assessed in research, such as doctors and pilots, are also associated with a high level of status and prestige. Indeed, children are interested in occupations associated with high status (Teig & Susskind, 2008), a characteristic of some male-dominated occupations. Perhaps the lack of status associated with the occupations in this study influenced the direct relationship between gender stereotypes and interest in male-dominated occupations for both boys and girls.

One of the biggest questions for future studies posed by these results is the pattern of relationships among the primary variables for girls. It is unclear as to why gender socialization and stereotyping did not appear to be related to perceived knowledge or occupational interest for girls. Work with older cohorts show that girls exhibit gender-typical occupational interests during childhood, but less stereotypical egalitarian occupational interests emerge during adolescence (Helwig, 2008; Sandberg, Ehrhardt, Ince, & Meyer-Bahlburg, 1991). Although girls were interested in female-dominated occupations more than boys, their lower felt gender conformity pressure may be a precursor to their egalitarian occupational interests in adolescence. As described earlier, girls have more flexibility than boys in their adherence to gender norms (Egan & Perry, 2001; Pauletti et al., 2017). Some evidence even suggests that girls are encouraged to engage with masculine-typed domains. For example, a study with nine and ten-year-olds showed that girls who prefer male-typical activities are well-liked by their peers (Braun & Davidson, 2017). If masculine traits and activities are more socially valued than feminine traits and activities (Teig & Susskind, 2008), it would make sense that gender socialization and stereotypes do not directly impact girls' occupational interests. However, it is possible that these variables do impact constructs related to occupational interests, such as their self-efficacy or motivation associated with male and female-dominated occupations. Indeed, prior work has shown that gender stereotypes (Brown, 2019) and gender socialization (Leaper et al., 2012) negatively impact girls' academic self-efficacy.

### **Limitations and Conclusions**

There are important limitations in this study. First, the current study design does not allow for causal inferences and thus only provides an initial step in understanding the pathways between perceived occupational knowledge, gender socialization, and gender stereotyping, and

gender differentiation of occupation interest. Second, it is possible that social desirability could have affected responses. For example, participants may have responded that occupations are appropriate for “both men and women” even though this response does not reflect their actual attitudes. Mediation and moderation effects may be small in effect size (Marsh et al., 2013; Zhao et al., 2010) and thus it is possible that there was not enough power to detect small effects when the mediation models were examined separately for boys and girls.

It is advantageous for future researchers to utilize multiple sources of data to understand the relationships among perceived occupational knowledge gender stereotyping, gender socialization and occupational interest fully. Though the use of self-reports was intentional, this study did not capture important social factors that may influence the association among variables. For example, it is likely that the gender norms at the level of friend group, family, and within a school have a differential impact on children’s perceptions of gender stereotypes.

The occupations presented were selected carefully to avoid a confounding status influence. However, it is possible that there were aspects of the occupations that children found unattractive. Indeed, the internal consistency of the individual scales was low. It is likely that these occupations may not have reflected the breadth of potential occupations that children are currently interested in. Additionally, the directional link between socialization and gender stereotypes holds for masculine jobs for both boys and girls, but in opposite directions. This finding that was absent from female-dominated occupations. It is possible that the pattern of relationships among the variables would be made clearer in an experiment where the characteristics of novel occupations were manipulated. Additionally, although prior work has demonstrated the utility of global, general, self-report measures of perceived knowledge (Rohlfing et al., 2012), the perceived occupational knowledge measure used in this study is broad



and does not capture specific knowledge aspects. Given that there was not a strong relationship between occupational knowledge and gender socialization or stereotyping, future work should investigate if knowledge about specific occupational characteristics (e.g., goal affordances) are related to gender socialization and stereotyping. Despite these limitations, the study findings have important implications. The finding that children's perceived occupational knowledge is related to occupational gender composition by fourth grade suggests that interventions aimed at promoting children's occupational knowledge in gender non-typical occupations should be implemented at an earlier age. The gender differences highlighted point to the need for strategies to increase the perceived job knowledge and interest in gender non-typical occupations. To offset inferences that children make as a result of exposure to occupational segregation, it may be efficacious for career guidance counselors to directly address occupational gender imbalances in conversations with children (Bigler & Liben, 2006). While it is difficult to address the gender composition of occupations at the societal level, children may benefit from examples of individuals in gender non-traditional occupations.

The results from this study represent theoretical contributions in the areas of gender and occupational interests. In this study, gender and perceived occupational knowledge were strong predictors of occupational interest. This finding lends support for gender development theories (Bem, 1981; Martin & Halverson, 1981) that suggest that children organize gendered information from their environment into schemas about what it means to be a girl or boy, which motivates their behaviors and may drive gender-typed personal preferences (Liben & Bigler, 2002; Ruble, Martin, & Berenbaum, 2006). The gender differences observed in perceived occupational knowledge and occupational interest expand upon social role theory (Eagly, 1987), which posits that gender differences in career interest result in part from the historical gender

segregation in labor. Importantly, this study may have detected an overlooked and understudied construct in research focused on gender differences in career interests, perceived occupation knowledge. It will be important to consider how perceived knowledge is associated with constructs from models that are often used to predict gender differences in academic outcomes and career interests, such as expectancy-value theory (Eccles, 2011) and social cognitive career theory (Lent et al., 1994). For example, future research might form connections between perceived knowledge and self-competence or self-efficacy.

To better understand the reasons underlying reasons for gender differences in children's perceived occupational knowledge and occupational interest, this study examined the role of gender stereotypes and gender socialization. This study confirms gender differences in career interests and knowledge and adds more questions than it answers about factors that might determine these gender differences. It does appear that boys and girls are equally cognizant of gender segregation in the workforce, but perhaps do not feel the same pressure to conform to these norms. The information gained from this study may be beneficial to understand further the interplay between perceived occupational knowledge, gender socialization, and gender stereotypes as they relate to children's occupational interests.

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APPENDIX: TABLES

Table 1

*Descriptive Statistics for Measures Included in Analyses*

<b>Measure</b>	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
<i>Perceived Occupational Knowledge</i>					
Male-dominated occupations	185	2.56	1.20	1.00	6.00
Female-dominated occupations	185	3.38	1.30	1.00	6.00
<i>Occupational Interest</i>					
Male-dominated occupations	184	2.00	0.98	1.00	6.00
Female-dominated occupations	185	2.26	1.13	1.00	5.50
<i>Gender Stereotyping</i>					
Male-dominated occupations	185	5.33	0.78	2.18	7.00
Female-dominated occupations	185	5.36	0.78	2.75	7.00
<i>Gender Socialization</i>					
Total felt pressure	178	2.20	0.68	1.00	3.92

*Note.* Higher scores indicate greater perceived occupational knowledge, interest, stereotypes and felt pressure. A 6-point scale was used for perceived occupational knowledge and interest. Gender stereotyping was on a 7-point scale. Felt pressure was on a 4-point scale.

Table 2

*Bivariate Correlations between Measures Included in Analyses*

Measure	1	2	3	4	5	6	7
1. Knowledge: Male dominated occupations	-	.603***	.051	.337**	.116	.090	.181
2. Interest: Male dominated occupations	.392***	-	-.015	.071	.020	.040	-.006
3. Stereotypes: Male dominated occupations	-.006	-.113	-	.079	.007	.226*	.238*
4. Knowledge: Female-dominated occupations	.531***	.143	-.086	-	.490***	-.107	.030
5. Interest: Female-dominated occupations	.135	.353***	-.371**	.375**	-	.070	.061
6. Stereotypes: Female-dominated occupations	.081	.007	.633***	-.001	-.351***	-	.187
7. Socialization: Felt pressure to conform to gender norms (Total)	.076	-.010	-.242*	-.030	-.226*	-.081	-

*Note.* Numbers represent the Pearson product moment correlation coefficients between designated scales. Below the main diagonal

are results for boys, above are the results for girls. \*  $p \leq .05$  \*\*\*  $p \leq .001$

Table 3

*Gender Differences in Primary Variables*

<b>Measure</b>	Boys	Girls	<i>t</i>	<i>d</i>
<i>Perceived Occupational Knowledge</i>				
Knowledge: Male dominated occupations	2.87 (1.17)	2.15 (1.01)	4.37***	0.65
Knowledge: Female-dominated occupations	3.06 (1.33)	3.87 (0.98)	-4.56***	0.69
<i>Occupational Interest</i>				
Interest: Male dominated occupations	2.31 (1.00)	1.68 (0.73)	4.80***	0.71
Interest: Female-dominated occupations	1.69 (0.83)	2.91 (1.04)	-8.47***	1.29
<i>Gender Stereotyping</i>				
Stereotypes: Male dominated occupations	5.39 (0.78)	5.25 (0.79)	1.22	-
Stereotypes: Female-dominated occupations	5.30 (0.83)	5.34 (0.64)	-0.29	-
<i>Gender Socialization</i>				
Felt pressure to conform to gender norms	2.49 (0.63)	1.92 (0.63)	5.75***	0.90

Note. \*\*\*  $p \leq .001$  *M(SD)*

Table 4

*Mediation Analyses with Socialization as the Mediator*

Model Tested		<i>a1</i>	<i>b1</i>	<i>c'</i>	<i>Indirect effect</i>		
					<i>Effect</i>	<i>LLCI</i>	<i>ULCI</i>
Male Knowledge → Socialization → Male Interest							
	<i>Boys</i>	0.04(0.06)	-0.06(0.16)	0.32(0.09)***	-0.0026(0.01)	-0.1972	0.8437
	<i>Girls</i>	0.10(0.06)	-0.13(0.10)	0.43(0.06)***	-0.01(0.01)	-0.0426	0.0096
Female Knowledge → Socialization → Female Interest							
	<i>Boys</i>	-0.01(0.05)	-0.27(0.14)*	0.23(0.06)***	0.003(0.01)	-0.0310	0.0345
	<i>Girls</i>	0.01(0.07)	0.07(0.15)	0.53(0.09)***	0.001(0.01)	-0.0228	0.0304

*Note.* Note. *a1* = direct effect of perceived occupational knowledge on gender socialization; *b1* = direct effect of gender socialization on occupational interest. *c'* = direct effect (perceived knowledge affects interest when accounting for mediating variable). LL = low limit, CI = confidence interval, UL = upper limit \*\*  $p \leq .01$  \*\*\*  $p \leq .001$ . Unstandardized regression coefficients are presented. Standard error in parenthesis.

Table 5

*Mediation analyses with stereotype as the mediator*

Model Tested		<i>a2</i>	<i>b2</i>	<i>c'</i>	<i>Indirect effect</i>		
					<i>Effect</i>	<i>LLCI</i>	<i>ULCI</i>
Male Knowledge → Stereotype → Male Interest							
	<i>Boys</i>	-0.03(0.06)	-0.18(0.13)	0.34(0.07)***	0.008(0.01)	-0.0122	0.0533
	<i>Girls</i>	0.03(0.08)	-0.008(0.08)	0.42(0.06)***	<-0.001(0.009)	-0.0230	0.0158
Female Knowledge → Stereotype → Female Interest							
	<i>Boys</i>	-0.04(0.06)	-0.37(0.08)***	0.16(0.05)**	0.01(0.02)	-0.0340	0.0712
	<i>Girls</i>	-0.07(0.07)	0.19(0.15)	0.53(0.10)***	-0.01(0.02)	-0.0607	0.0165

*Note.* *a2* = direct effect of perceived occupational knowledge on gender stereotypes; *b2* = direct effect of stereotypes on occupational interest; *c'* = direct effect (perceived knowledge affects interest when accounting for mediating variable). LL = low limit, CI = confidence interval, UL = upper limit \*\*  $p \leq .01$  \*\*\*  $p \leq .001$  Unstandardized regression coefficients are presented. Standard error in parenthesis.

Table 6

*Testing the pathways of the multiple mediation model.*

Model Tested	<i>a1</i>	<i>a2</i>	<i>a3</i>	<i>b1</i>	<i>b2</i>	<i>c'</i>	<i>Indirect effect</i>		
							<i>Effect</i>	<i>LLCI</i>	<i>ULCI</i>
Male Knowledge→ Socialization → Stereotypes→ Male Interest									
<i>Boys</i>	0.04(0.06)	-0.02(0.07)	-0.29(0.13)*	-0.10(0.17)	-0.20(0.13)	0.31(0.09)***	0.002 (0.01)	-0.0301	0.0453
<i>Girls</i>	0.10(0.06)	-0.04(0.07)	0.31(0.12)*	-0.15(0.10)	-0.04(0.09)	0.44(0.06)***	-0.01 (0.01)	-0.0493	0.0225
Female Knowledge→ Socialization → Stereotypes→ Female Interest									
<i>Boys</i>	-0.01(0.05)	-0.007(0.07)	-0.10(0.15)	-0.31(0.12)**	-0.36(0.09)***	0.22(0.06)***	0.006(0.03)	-0.0538	0.0669
<i>Girls</i>	0.001(0.07)	-0.06(0.07)	0.18(0.11)	0.05(0.16)	0.12(0.16)	0.55(0.10)***	-0.008 (0.02)	-0.0541	0.0347

*Note.* Note. *a1* = direct effect of perceived occupational knowledge on gender socialization; *b1* = direct effect of gender socialization on occupational interest. *a2* = direct effect of perceived occupational knowledge on gender stereotypes; *a3*= direct effect of gender socialization on gender stereotypes; *b2*= direct effect of stereotypes on occupational interest; *c'* = direct effect (perceived knowledge affects interest when accounting for mediating variable). LL = low limit, CI = confidence interval, UL = upper limit \*\*  $p \leq .01$  \*\*\*  $p \leq .001$ . Unstandardized regression coefficients are presented. Standard error in parenthesis.

Table 7

<i>Interest in Female Occupations</i>				
	Boys		Girls	
Model tested	B(SE)	<i>p</i>	B(SE)	<i>p</i>
Model A				
<i>Occupational Knowledge</i>	0.23(.05)	<0.001	0.56(0.11)	< 0.001
<i>Gender Stereotypes</i>	-0.34(.09)	<0.001	0.22(0.16)	0.17
<i>Know X Stereotypes</i>	-0.02(.07)	0.81	-0.13(0.20)	0.52
Model B				
<i>Occupational Knowledge</i>	0.22(.06)	<0.001	0.51(0.09)	<0.001
<i>Felt pressure- adults</i>	-0.24(0.12)	0.04	0.08(0.14)	0.57
<i>Know X Adult pressure</i>	-0.05(0.09)	0.59	-0.31(0.15)	0.04
Model C				
<i>Occupational Knowledge</i>	0.23(0.06)	<0.001	0.54(0.10)	<0.001
<i>Felt pressure-peers</i>	-0.10(0.10)	0.30	0.006(0.11)	0.95
<i>Know X Peer pressure</i>	-0.07(0.07)	0.32	0.04(0.10)	0.68



Table 8

<i>Interest in Male Occupations</i>				
	Boys		Girls	
Model tested	B(SE)	<i>p</i>	B(SE)	<i>p</i>
Model A				
<i>Occupational Knowledge</i>	0.32 (0.08)	<0.001	0.42 (0.06)	<0.001
<i>Gender Stereotypes</i>	-0.14 (0.12)	0.25	0.005 (0.08)	0.95
<i>Know X Stereotypes</i>	-0.13 (0.12)	0.24	0.07 (0.07)	0.29
Model B				
<i>Occupational Knowledge</i>	0.33 (0.09)	<0.001	0.44 (0.06)	<0.001
<i>Felt Pressure- adults</i>	-0.09 (0.15)	0.53	-0.12 (0.10)	0.18
<i>Know X Adult pressure</i>	-0.17 (0.17)	0.30	-0.02 (0.09)	0.80
Model C				
<i>Occupational Knowledge</i>	0.36 (0.09)	<0.001	0.44 (0.06)	<0.001
<i>Felt Pressure-peers</i>	-0.09 (0.12)	0.43	-0.06 (0.07)	0.43
<i>Know X Peer pressure</i>	-0.29 (0.11)	0.01	-<0.001 (0.08)	0.99

Table 9

*Hierarchical linear regression model predicting interest in female-dominated occupations*

	<b>Step 1</b>	<b>Step 2</b>	<b>Step 3</b>
Model Information	$R^2 = 0.29^{***}$	$\Delta R^2 = 0.14^{***}$	$\Delta R^2 = 0.06^{***}$
<b>Predictor</b>	<b>Beta</b>	<b>Beta</b>	<b>Beta</b>
Gender	0.54 <sup>***</sup>	0.40 <sup>***</sup>	0.36 <sup>***</sup>
Felt Pressure		-0.05	-0.20*
Knowledge		0.37 <sup>***</sup>	0.25 <sup>***</sup>
Gender Stereotype		-0.12 <sup>m</sup>	-0.24 <sup>***</sup>
Pressure x Gender			0.16 <sup>m</sup>
Stereotype x Gender			0.21 <sup>**</sup>
Knowledge x Gender			0.20 <sup>**</sup>

*Note.* Participant Gender was coded dichotomously (0= boy, 1= girl). \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ , <sup>m</sup> $p < .10$  For the full model,  $F(7, 152) = 21.06, p < .001, R^2 = 0.49$ .

Table 10

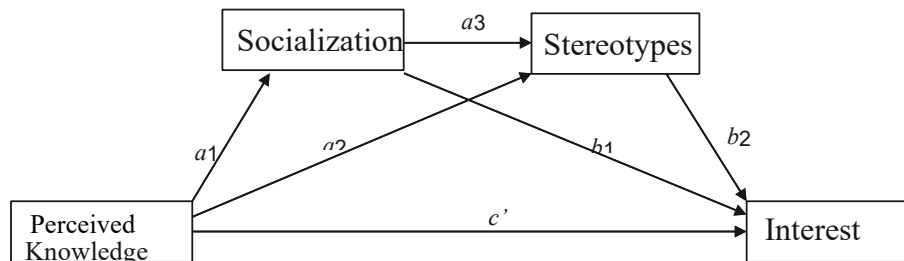
*Hierarchical linear regression model predicting interest in male-dominated occupations*

	<b>Step 1</b>	<b>Step 2</b>	<b>Step 3</b>
Model Information	$R^2 = 0.12^{***}$	$\Delta R^2 = 0.14^{***}$	$\Delta R^2 = 0.14$
<b>Predictor</b>	<b>Beta</b>	<b>Beta</b>	<b>Beta</b>
Gender	-0.35 <sup>***</sup>	-0.25 <sup>***</sup>	-0.26 <sup>***</sup>
Felt Pressure		-0.06	-0.07
Knowledge		0.46 <sup>***</sup>	0.39 <sup>***</sup>
Gender Stereotype		-0.07	-0.16 <sup>m</sup>
Pressure x Gender			-0.02
Stereotype x Gender			0.10
Knowledge x Gender			0.15

*Note.* Participant Gender was coded dichotomously (0= boy, 1= girl). \*  $p \leq .05$ , \*\*  $p \leq .01$ , \*\*\*  $p \leq .001$ , <sup>m</sup> $p < .10$ . For the full model,  $F(7, 152) = 11.12$ ,  $p < .001$ ,  $R^2 = 0.40$ .

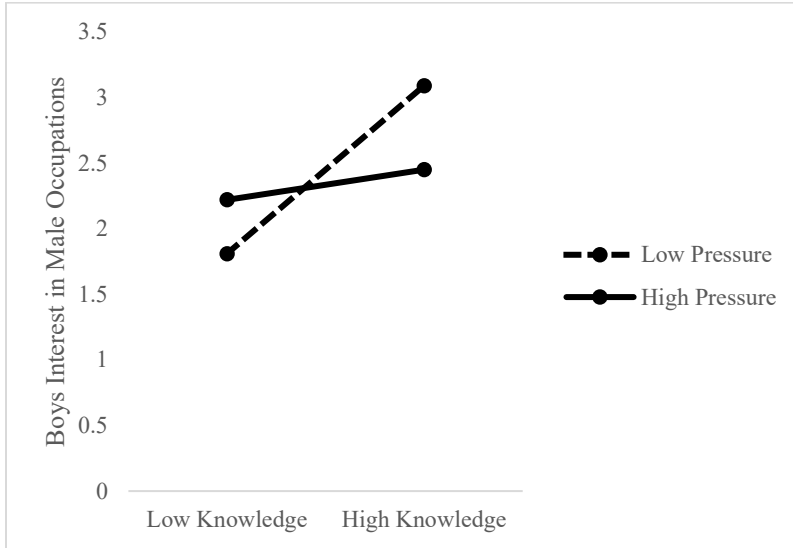
APPENDIX: FIGURES

Figure 1.



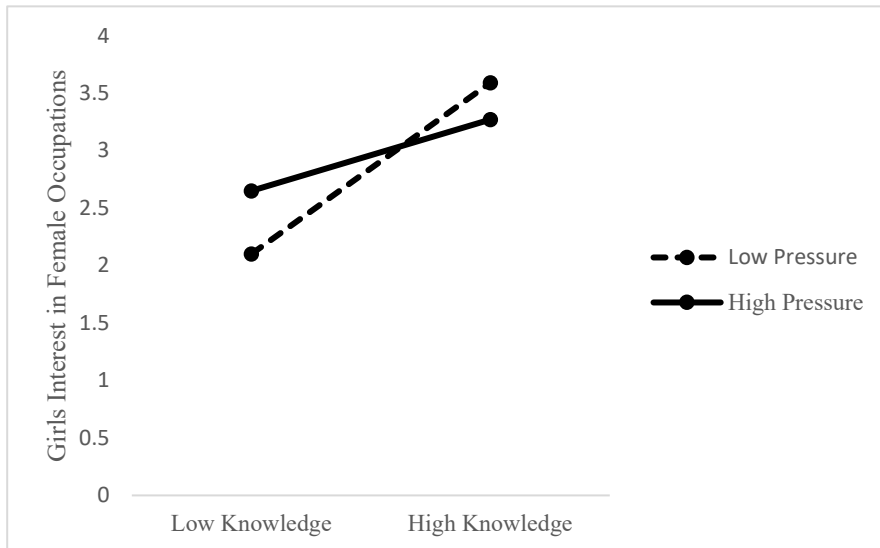
*Note.* a1 = direct effect of perceived occupational knowledge on gender socialization; a2 = direct effect of perceived occupational knowledge on gender stereotypes; a3= direct effect of socialization on stereotypes; b1= direct effect of socialization on interest; b2= direct effect of stereotypes on interest; c' = direct effect (perceived knowledge affects interest after accounting for mediating variable).

Figure 2.



Gender socialization moderates the association between boys' perceived occupational knowledge and interest in male-dominated occupations.

Figure 3.



Gender socialization moderates the association between girls' perceived occupational knowledge and interest in female-dominated occupations.

## APPENDIX: EXAMPLES OF OCCUPATIONS

### Female-Dominated Occupations

Elementary school teacher

Librarian

Nurse

Hair stylist

### Male-Dominated Occupations

Construction worker

Fire fighter

Engineer

Computer programmer

## APPENDIX: IRB APPROVAL



July 2, 2019

Stephanie Masters  
Institute for Social Science Research  
College of Arts and Sciences  
Box 870216

Re: IRB # 19-OR-166, "Interest in Careers"

Dear Ms. Masters:

The University of Alabama Institutional Review Board has granted approval for your proposed research. Your application has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

*(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.*

The approval for your application will lapse on July 1, 2020. If your research will continue beyond this date, please submit the continuing review to the IRB as required by University policy before the lapse. Please note, any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Please use reproductions of the IRB approved consent and assent forms.