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Emily Riewestahl

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Explaining Gender Differences in Realistic Interests with Social Cognitive Career Theory

Emily Riewestahl, Kate Cusimano & Nina Gougisha

Faculty Mentor: Dr. Wyndolyn Ludwikowski, Psychology

Lead author Emily Riewestahl is a psychology major who is pursuing dual concentrations in women's studies and sociology. She is from Grantsburg, WI. Her broad range of research interests include how race and gender impact an individual's daily life and how to efficiently and successfully improve communities abroad without interfering with their culture. The current study interested her because the model was fairly complex, taking into account the many factors that Riewestahl believes impact career choices. She has presented this research with mentor Dr. Ludwikowski at the Southeastern Psychological Association's annual meeting in Atlanta, GA. After graduating from Xavier in May 2019, Riewestahl plans to obtain a master's degree in social work.

Abstract

The purpose of the present study was to examine the extent to which gender differences in Realistic interests are explained by gender-based personality variables, occupational perceptions of sex-type and income, learning experiences, and confidence using an archival data set. The Realistic theme is described as occupations or interests that are "hands on" and practical, such as carpentry. In 2009, 427 participants from a large, Midwestern university completed measures of masculinity, femininity, learning experiences, confidence, and interests. The results of the study suggest that men receive more Realistic learning experiences, which provides them with more confidence in Realistic tasks, while also increasing their expectations of finding more men in Realistic fields. These factors likely lead to higher levels of Realistic interest and a higher likelihood of men choosing Realistic occupations. However, the gender difference shown by the significant path from gender to Realistic interest was robust and was not accounted for by the other significant paths.

Key Terms:

- Confidence
- Realistic Interest
- Social Cognitive Career Theory

Gender differences in interests may explain part of the wage gap between men and women. Women earn less money than men on average in United States, earning 83% of what men earn based on women's median annual earnings as a percentage of men's annual earnings (United States Department of Labor Bureau of Labor Statistics, 2015). This disparity highlights the need for researchers to determine the factors that contribute to the income disparities. Many researchers have examined the various factors that influence the gender wage gap, including sexism (Alksnis, Desmarais, & Curtis, 2008), discrimination (Lips, 2013), contentment or satisfaction with current pay (Davison, 2014), negotiation issues (Bowles & Babcock, 2013), and discontinuous work (Evers & Sieverding, 2014), though no single answer prevails (Blau & Kahn, 1994, 2016).

Another possible contributing factor to this earning gap is that men choose different and higher paying fields than women, so, on average, men have higher earnings. For example, 87.5% of Bachelor's degrees in engineering are earned by men (US Department of Education, 2012). According to the U.S. Census Bureau (2011), lifetime earnings in the field of architecture and engineering are \$2.5 million, which is considerably greater than the \$1.5 million lifetime earnings in the service fields. Perhaps, one reason women are still earning less money than men is that they are less likely to pursue a career in high-paying science, technology, engineering, and mathematic (STEM) occupations. Therefore, researchers may need to take a better look at the variables that impact career decision-making in order to investigate the factors that contribute to the gender wage gap. Given the utility of learning experiences, confidence, outcome expectations, and interest in explaining career decision-making within Holland's Theory of Vocational Personality Types (Holland, 1959; 1997), Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett,

1994), and Gottfredson's Theory of Circumscription and Compromise, researchers should examine the role of these variables in explaining the gender wage gap.

Literature Review

Holland's Theory

Holland's theory indicates that occupations and interests can be described by six different themes: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). Realistic describes a person who enjoys working with things, such as machines and tools. This type of person would be down-to-earth and value practical things. A person who is Investigative enjoys math and science and solving those types of problems. They consider themselves to be scholarly. When a person is Artistic, they enjoy creative activities and have strong abilities in that area. They see themselves as original and independent. A Social person enjoys helping people and providing information. They consider themselves to be helpful and friendly. An Enterprising person enjoys selling things and ideas as well as persuading people. They are often ambitious and sociable. Finally, a Conventional person likes to work in a systematic method with numbers or records. They tend to be orderly and prefer a set plan rather than something ambiguous. These six themes align themselves on a wheel, pairing up in opposites. The pairs are Realistic and Social, Investigative and Enterprising, and Artistic and Conventional (Holland, 1997)

As noted in Holland's theory, people seek environments that allow them to utilize their skills, express themselves, and take on the types of problems that they enjoy solving (Holland, 1997). When an individual's interests align with their academic and occupational environments, positive vocational outcomes occur. Both interests and confidence can be measured according to the RIASEC themes

(Armstrong & Vogel, 2009; Lent, Sheu, & Brown, 2010), allowing better theoretical integration of SCCT and Holland's themes (e.g., Thompson & Dahling, 2012). In fact, greater congruence between these two variables consistently leads to greater certainty in the choice of occupations (Tracey, 2010).

Gender-Related Personality Characteristics

Bem (1974) stated that masculinity has historically been associated with a focus on task completion, whereas femininity has been associated with expression and consideration for others. In one study (Bergner, 2015), participants were asked to assign stereotypically masculine/instrumental and feminine/expressive traits as measured by the Bem Sex Role Inventory (Bem, 1974; Spence & Helmreich, 1980) to Holland's themes. The researchers found that feminine/expressive characteristics were more commonly assigned to Social, Conventional, and Artistic themes, and masculine/instrumental characteristics were most likely to be assigned to Enterprising, Realistic, and Investigative themes (Bergner, 2015). As such, gender-based personality characteristics may relate to vocational outcomes.

Gender Differences in Interest and Confidence

Persistent gender differences emerge in both interests and confidence (Betz & Hackett, 1981; Ji, Lapan, & Tate, 2004; Su, Rounds, & Armstrong, 2009). Su, Rounds, and Armstrong's (2009) meta-analysis revealed that men tend to express interest in Realistic and Investigative activities, while women tend to express interest in Social, Artistic, and Conventional activities. Betz and Wolfe (2005) conducted a study in which high school students took a Skills Confidence Inventory, where each of the skills corresponded to a specific RIASEC type. They found that men reported more confidence in Mechanical, Outdoor/Physical, and Mathematics scales, which correspond with Realistic and Investigative types. They also found that women

were more confident in cultural sensitivity and helping, which are both Social skills. The gender differences observed in confidence and interest may ultimately impact career choice.

Social Cognitive Career Theory

Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994) stipulates that learning experiences, confidence beliefs, and outcome expectations influence interest development, which shapes individuals' goals, actions, and performance attainment. Within SCCT, outcome expectations are considered "personal beliefs about the consequences or outcomes of performing particular behaviors" (Lent et al., 1994). The perceptions that individuals hold about occupations can be considered an outcome expectation. For instance, people hold beliefs about the extent to which they will be able to interact with individuals with the same gender identity in any given occupation. Comparably, individuals might hold beliefs about the level of income they will earn in certain occupations. Lent et al. (1994) also state that confidence and outcome expectations are developed through learning experiences. Previous research using the Learning Experience Questionnaire suggests that it effectively predicts confidence beliefs (Schaub & Tokar, 2005; Williams & Subich, 2006). Researchers have found that women reported more Social learning experiences and men reported more Realistic and Investigative learning experiences (Tokar, 2007; Williams & Subich, 2006). Additionally, Williams and Subich (2006) found that reported learning experiences in a specific Holland's theme are positively correlated with self-efficacy and outcome expectations in that theme.

Gottfredson's Theory

According to Gottfredson's Theory of Circumscription and Compromise (1996), individuals progress through various stages through where they eliminate occupational alternatives as they become more self-aware.

Gottfredson described tolerable level, effort, and sex-type boundaries that create a zone of acceptable occupational alternatives. She acknowledged that individuals would be less likely to compromise their sex-type for occupational fit because incongruent sex-typing is a greater threat to self-concept than prestige or interest. Gender identity accounts for a substantial portion of our self-concept, thus entering an environment that conflicts with gender identity can be threatening to our self-concept. Therefore, according to both SCCT and Gottfredson's theory, perceptions of occupational sex-type and prestige, might shape the relation between gender and interest, although the influence of sex-type and prestige will be discussed separately throughout since they are different constructs (Tracey & Rounds 1996; Sodano & Tracey, 2008).

Prestige

Individuals hold personal beliefs about the amount of prestige they might acquire if they choose certain occupations. The prestige of an occupation is seen as the earning power one would obtain in this occupation (income), how much education the occupation requires to attain, or the desirability of the occupation. The importance of prestige appears to depend on an individual's gender. Women score significantly lower than men on a prestige scale that measured the degree of appreciation, status, leadership, and monetary earnings (Guntern, Korpershoek, & Van der Werf, 2016). Perhaps, women may not choose prestigious occupations because prestige is less important to them than it is to men. To complicate these findings, occupational prestige varies by Holland type, with Realistic and Conventional occupations having the lowest amount of prestige and Artistic and Investigative occupations having the highest amount of prestige (Deng, Armstrong, & Rounds, 2007). Higher annual incomes were associated with greater Investigative and Enterprising interests alongside weaker Realistic interest. Therefore,

gender differences in evaluating the importance of prestige may contribute to certain fields being dominated by one gender.

Sex-type

The Holland themes also appear to be sex-typed. Eighth grade students believed that more women worked in Social occupations, while they believed that more men worked in Realistic occupations (Ji, Lapan, & Tate, 2004). These beliefs impacted interests and confidence in these occupations: girls expressed more interest and confidence in Social occupations and boys expressed more interest and confidence in Realistic occupations, highlighting that the perceived sex-type of occupations impacts interests and confidence within Holland's model. While perceptions of sex-type and prestige are two distinct constructs (Tracey & Rounds 1996; Sodano & Tracey, 2008), they are often interrelated. Masculine occupations vary from low to high prestige, but feminine occupations tend to cluster around low to medium levels of prestige (Einarsdottir & Rounds, 2000). When women work in stereotypically masculine fields, women believed that they could pursue and succeed in those fields (Beggs & Doolittle, 1993). Furthermore, women typically picked majors that lead to stereotypically feminine occupations rather than picking stereotypically masculine majors, such as math or science (DiDonato & Strough, 2013).

Current Study

The current study investigated the complicated gender differences in Realistic interests within a SCCT model. Through Structural Equation Modeling, the extent to which gender-related personality variables, confidence, occupational perceptions of sex-type and prestige accounted for the relation between gender and Realistic interests was determined. The paths between gender and both masculinity (positive) and femininity (negative) were

expected to be significant. The paths from masculinity (positive) and femininity (negative) to learning experiences were expected to be significant because of the possibility of differential exposure to Realistic learning experiences due to gender identity. Similarly, a positive significant path from gender to learning experiences was expected. A positive significant path between Realistic learning experiences and both outcome expectations were expected because learning experiences would give individuals the opportunity to gain more accurate expectations of the sex of persons in Realistic careers and the income obtained from Realistic careers. The path from learning experiences to confidence was expected to be positively significant. Positive and significant paths between both occupational perceptions and interest were expected based on SCCT (Lent, Brown, & Hackett, 1994). A positive and significant path from confidence to Realistic interest was expected. Lastly, a positive and significant path between gender and interest was expected, because it was hypothesized that men would express more Realistic interest than women even after accounting for the other paths (Su et al., 2009; Wetzel & Hell, 2013). All of the hypotheses are summarized in Figure 1.

Method

Participants

This study used archival data. In 2009, participants were recruited from an introductory-level psychology courses at a large, Midwestern university. Participation in the study was offered in exchange for course credit. A total of 452 college students completed survey packets. The participants' ages ranged from 17 to 37 with an average of 19.46. Two hundred and sixty-eight (59.3%) identified as women and 183 (40.5%) identified as men, while one did not respond to the question. Approximately 44% of the participants were freshmen, 31.6% were sophomores, 16.6% were juniors, and only 7.5%

were seniors. There were six options for race on the demographic survey. The majority, 88.9%, of the participants were Caucasian, 1.8% were African American, 2.21% were Asian American, 1.8% were Latino American and 5.31% reported as other. For the purpose of the study, 427 participants were used due to eliminations based on non-response standards.

Measures

RIASEC interests and confidence

Participants responded to the 48 Set A activity-based items from the Alternate Forms Public Domain (AFPD) RIASEC marker scales (Armstrong, Allison, & Rounds, 2008): Participants rated how much they would like to perform each work activity, such as "Installing flooring in houses," using a 5-point Likert response format, ranging from 1 (*Strongly Dislike*) to 5 (*Strongly Like*). Following the procedures outlined in Armstrong and Vogel (2009), participants completed the 48 Set B activity-based items, rating their confidence in their abilities to perform each work-related activity on a 5-point Likert response format, ranging from 1 (*Very Low Confidence*) to 5 (*Very High Confidence*). Convergent validity between the activity-based scales and the 1994 edition of the Strong Interest Inventory ranged from .56 to .72 with a mean of .64 (Armstrong et al., 2008). Additionally, correlations between the interest and confidence scales resembled commercial RIASEC interest and confidence scales with a range between .60 and .72 with a mean of .70. Internal consistency estimates for both sets of activity-based scales tend to range from .79 to .94 (Armstrong et al., 2008). Although data was collected on all RIASEC scales, we only used the Realistic items from the measures for occupation perceptions, learning experiences, confidence, and interest. Table 1 provides means, standard deviations, and reliabilities for all scales.

Occupational perceptions

The occupation-based scales from the AFPD (Armstrong et al., 2008) were used to measure participants' ratings of the income and sex-type of occupations for each of Holland's RIASEC themes. Each RIASEC scale consists of eight items. Internal consistency reliabilities for the AFPD occupational scales range from .78 to .88, and convergent validity between the 8-item occupation-based scales and the brief activity-based scales ranged from .73 to .86 with a mean of .78 (Armstrong et al., 2008). Participants responded to the 48 AFPD Set A occupation items in the Perceptions of Occupational Income scale, rating how much income a person would make in each job, in comparison to other jobs, using a 5-point Likert-type response format, ranging from 1 (*Lower Income than Most Other Jobs*) to 5 (*Higher Income than Most Other Jobs*). Participants also responded to the 48 AFPD Set B occupation items in the Perceptions of Sex Ratio at Work scale, rating the relative number of men and women employed in the occupation, using a 5-point Likert-type response format, ranging from 1 (*Mostly Men Employed in this Job*) to 5 (*Mostly Women Employed in this Job*).

Gender

The Bem Sex-Role Inventory (BSRI; Bem, 1974) was used to study the gender identity (masculinity and femininity) of the participants. The BSRI is made up of sixty personality traits. Twenty items were judged to be masculine or desirable for men, twenty items were judged to be feminine or desirable for women, and twenty items were judged to be gender neutral. Participants were provided with a questionnaire that presented personality traits in one-word terms, and they were asked to rate themselves on a 5-point Likert scale. These items are then scored by section (masculine and feminine) by finding the mean value of each section for each participant. An example of a personality trait listed on the BSRI is

“aggressive,” which is categorized as a masculine item. The internal reliability (assessment of the consistency of results across items within the inventory) for the BSRI is high with coefficient alphas (a measure of internal consistency reliability) of .83 for the Femininity scale and .86 for the Masculinity scale, which indicated that the items making up each scale have high internal reliability (Choi, Fuqua, & Newman, 2007). Bem (1974) studied convergent validity by comparing participant's scores with those on the California Psychological Inventory (CPI) and the Guilford-Zimmerman Temperament Survey, which have both been used in previous research to examine sex-roles of individuals. The BSRI was found to correlate with the CPI but not with the Guilford-Zimmerman Temperament Survey.

Learning experiences

The Learning Experience Questionnaire (LEQ; Schaub, 2004) was used to measure the learning experiences of the participants. The LEQ contains 120 questions, which include four types of learning experiences across each of the RIASEC types. Participants were asked to rate their experiences using a 6-point Likert scale, which ranged from 1 (*Strongly Disagree*) to 6 (*Strongly Agree*). Past studies indicate that the LEQ has good internal consistency with alphas ranging from .73 to .89 (Schaub, 2004).

Demographics

Participants were provided with a questionnaire that asked their ethnic-racial identity, gender, age, classification, and major of study.

Procedure

Undergraduates enrolled in introductory psychology courses voluntarily participated in the study from a list of studies on an online database. Individuals who signed the informed consent form completed a demographic sheet. Students were then given a packet to complete

during the next week, which they returned to the lab within one week's time. Upon returning the packet, students were debriefed and they received two credits for their psychology courses.

Results and Discussion

Description of Analyses

Structural Equation Modeling (SEM) is a quantitative method of analysis similar to correlation and multiple regression (Weston & Gore, 2006). SEM is unique in that it can analyze more complex relations between constructs. The measurement model fit determines how well the parcels, groups of items, load onto (i.e., measure) the individual constructs to establish a sense of reliability of the estimation of the constructs. The structural model fit determines how well the individual constructs relate to each other. In order to ensure that SEM fits the data, specific indicators of model fit must be met. The suggested cut off values for good fit are as follows: .06 for Root Mean Square Error of Approximation (RMSEA), .08 for Root Mean Squared Residual (SRMR), and .95 for the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI; Hu & Bentler, 1999). MPlus (Version 6.11; Muthén & Muthén, 2010) was used to conduct the SEM. This program allows several paths to be analyzed as a whole, much like a more complex regression analysis, rather than each path independently as one could do on other statistical programs. Furthermore, this analysis allows the researcher to analyze several different pathways at once to determine how the variables influence each other. This analysis allows for determining whether there is a significant path between two concepts due to various factors within that relation or an unknown factor not included in the model.

Preliminary Analyses

The measurement model fit was adequate, $X^2(168) = 394.16$, $p < .0001$, based on

four criteria of fit: RMSEA = .06, SRMR = .05, CFI = .95, TLI = .94. The structural model fit was good, $X^2(196) = 532.05$, $p < .0001$, RMSEA = .06, SRMR = .08, CFI = .93, TLI = .91, which met the requirements for good fit. Once the requirements are met, that indicates that our paths fit the data. Once that fit has been shown, it is safe to proceed to interpret the data being provided by the program as results useable in this paper.

Primary Analyses and Discussion

In Structural Equation Modeling, the term "significant path" essentially means that the first variable is correlated with the second variable. The paths between gender and masculinity ($\beta = .38$, $SE = .05$, at the $p < .0001$ level) and gender and femininity ($\beta = -.44$, $SE = .09$, at the $p < .0001$ level) were significant (see Figure 2). These expected results indicated that men had higher levels of masculinity, and women had higher levels of femininity. This is supported by Bem's study (1974, p. 160) in which she found that "males score significantly higher than females on the Masculinity scale, and females scored significantly higher than males on the Femininity scale."

The paths between gender and learning experiences ($B = .26$, $SE = .10$, at a level of $p = .012$) and masculinity and learning experiences ($\beta = .32$, $SE = .07$, at a level of $p < .0001$) were significant. However, the path between femininity and learning experiences was not significant ($\beta = .04$, $SE = .10$ at the $p = .702$ level). These results indicate that gender influences whether a person is provided with Realistic learning experiences. According to the data collected, men reported a higher number of Realistic learning experience, suggesting that possessing more masculine traits leads to an increase in Realistic learning experiences. This result was supported by the study conducted by Williams and Subich (2006), which found that there were gender differences in Realistic

learning experiences in which men reported more learning experiences in Realistic areas than women.

There was a significant path between learning experiences and confidence ($\beta = .69$, $SE = .05$, at the level of $p < .0001$). A significant path between learning experiences and confidence means that when a person has more Realistic learning experiences, they are likely to also experience an increase in their Realistic confidence. This result is supported by Social Cognitive Career Theory, which states that learning experiences is one of the major predictors of confidence (Lent et al., 1994).

The pathways between learning experiences and both of the occupational expectations (Sex-Type: $\beta = -.16$, $SE = .09$, at the level of $p = .078$; Income: $\beta = .15$, $SE = .10$, at the level of $p = .132$) were not significant. This result means that having Realistic learning experiences does not affect the perception of the gender ratio in Realistic occupations. This is in conflict with SCCT, which states that occupational perceptions are developed through learning experiences (Lent et al., 1994). One possible explanation is that in this technological age, we have access to all kinds of career information. An individual can easily access basic job information, such as average earnings. One explanation for the lack of significance between learning experiences and occupational perception of sex-type is that the idea that Realistic careers are dominated by men is so strong that learning experiences have no effect on people's perceptions.

The path between confidence and occupation perception of income was not significant ($\beta = .09$, $SE = .10$, at the $p = .354$ level); however, the path between confidence and perception of sex-type was significant ($\beta = .26$, $SE = .08$, at the $p < .001$ level). One possible explanation is that career income is

much easier to access through a simple career search, whereas sex-type information requires inside knowledge or experiences in the field. When searching on career databases, such as onetonline.org, there is a whole section on wages and employment, but there is no information about gender-ratio in that career.

Confidence ($\beta = .50$, $SE = .06$, at a level of $p < .0001$) and occupational perception of sex-type ($\beta = .10$, $SE = .05$, at a level of $p = .035$) had significant paths with Realistic interest. This is fully supported by SCCT, which states that confidence and occupational perceptions affect interest (Lent et al., 1994). However, the relationship between occupational perception of income and Realistic interest is not significant ($\beta = .05$, $SE = .05$, at a level of $p = .310$). The lack of a significant path between confidence and occupational perception of income is most likely due to the fact that Realistic occupations tend to have lower salaries than most of the other RIASEC types (Deng, Armstrong, & Rounds, 2007).

The direct path between gender and Realistic interest was significant ($\beta = .29$, $SE = .05$, at the $p < .0001$ level). This result would suggest that gender has an effect on the development of a Realistic interest and ultimately the choice to pursue a Realistic occupation. This path occurs even after accounting for the other factors within this analysis, such as Realistic learning experiences, confidence, and occupational perceptions. Therefore, this result indicates that there is still a major influence from gender that determines whether a person develops Realistic interests. This effect could be due to major social conditioning to encourage women to pursue "helping careers," which leads them to Social interests, rather than encouraging them to pursue Realistic careers. The alternate could be said for men as well.

Limitations and Future Directions

One limitation of this study is the age of the data since the perceptions listed in this study may have changed since the collection of this data. However, the gender wage gap does still exist, so perhaps future researchers could re-test this model with more modern data. Another limitation is the demographic characteristics of the participants in the study. The study was limited to college students in a Midwestern college. Therefore, it would be difficult to generalize the results to other populations. Future researchers could attempt to collect data from a larger population, one that includes populations other than college students and more racially diverse participants. Finally, a limitation is that the concept of masculinity and femininity has changed over the years, which may impact the relevance of the personality questionnaires that were used. A future study could use more modern personality questionnaires to determine masculinity and femininity. For example, the Traditional Masculinity-Femininity scale (Katchel, Steffens & Neidlich, 2016) could be used instead of the BSRI. Future studies need to expand upon the reasons behind the gender difference as this study has explored numerous paths and yet a significant and robust result still exists.

Conclusion

The results of this study suggest that there is a gender gap present in Realistic occupations, and that gap needs to be eliminated. The results indicate that exposure to Realistic learning experiences varies by gender. Also, confidence in Realistic tasks are the greatest contributor to Realistic interest. Therefore, the study may imply that women are less likely to develop confidence in Realistic tasks or occupational perceptions of sex-type as a result of their lack of exposure to Realistic learning experiences. If women were given more Realistic

learning experiences there may be an increase in women in Realistic occupations, which would help close the gender wage gap as Realistic occupations tend to have a higher salary than Social occupations. However, there is clearly another factor or factors that are still in play that have not been identified, as gender still has a significant direct impact upon Realistic interest even after accounting for the other pathways.

Table 1. Means, standard deviations, and internal consistencies.

Scale	<i>M</i>	<i>SD</i>	Cronbach's Alpha
Masculinity	72.02	9.47	0.85
Femininity	71.29	8.91	0.81
Learning Experiences	66.14	8.22	0.70
Income Perceptions	26.66	3.64	0.67
Sex-Type Perceptions	13.40	4.67	0.90
Confidence	22.12	7.32	0.91
Interests	16.86	6.74	0.91

Figure 1. Hypothesized directionality of the pathways.

+ indicates hypothesized positive pathway. – indicates hypothesized negative pathway.

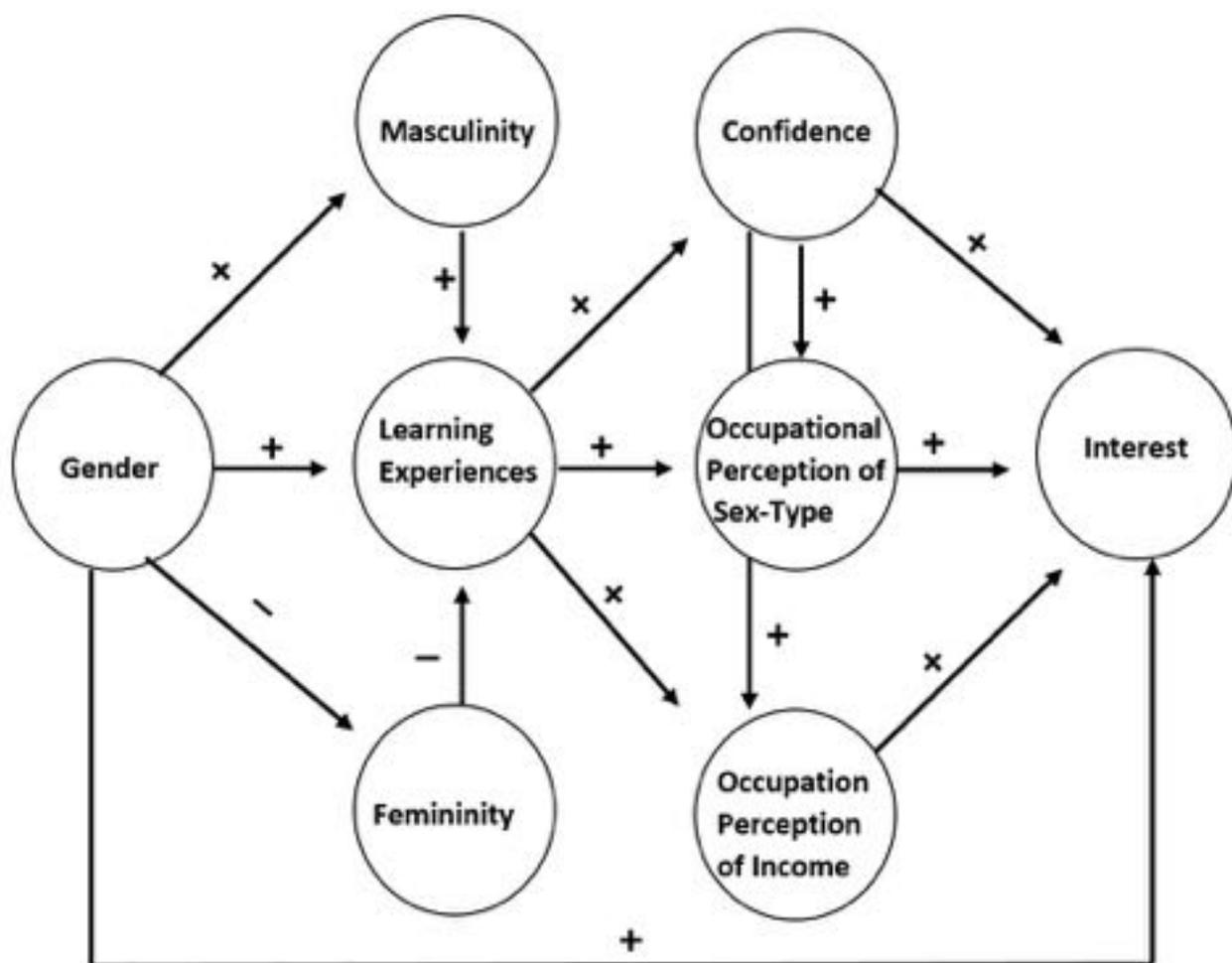
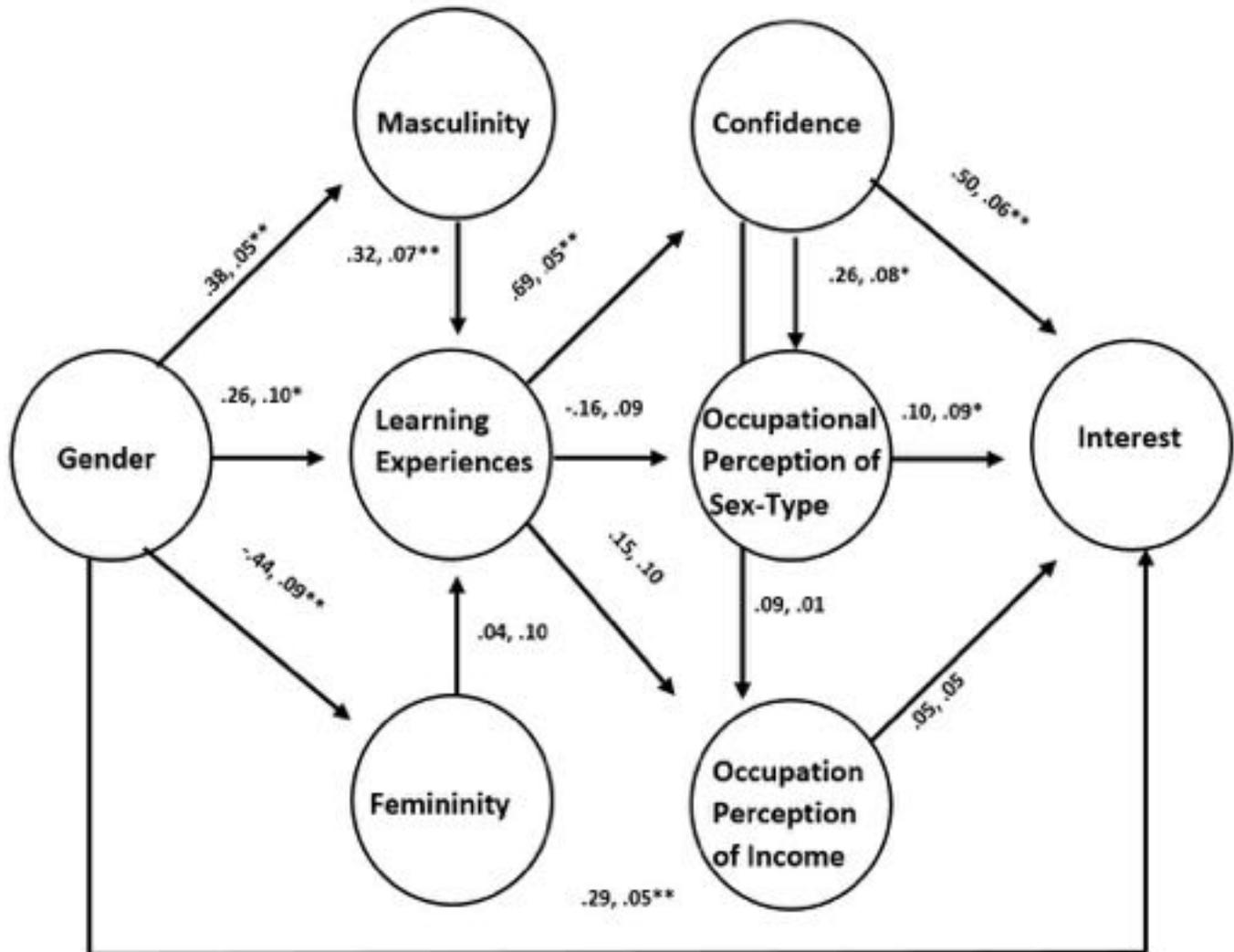


Figure 2. Structural Equation Modeling Results in which: * $p < .05$, ** $p < .01$.



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