

ABSTRACT

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TO 2010.

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Across time, the roles of women and men in the workforce have evolved. Crossing traditional gender barriers in occupational choice has become more commonplace, particularly for women who have seen domestic role changes interact with employment options. Data from the 1960 through 2000 decennial censuses and the 2010 American Community Survey were analyzed to determine trends in young adults' occupational choices classified according to Holland's occupational types and level of complexity, and to determine whether young adults have increasingly crossed traditional gender career barriers. The hypotheses were that while greater percentages of young women than young men (ages 18 to 29 years) would have been employed in the Artistic, Social, and Conventional categories in more recent decades, the differences in proportionate representation of young women and young men would have decreased from 1960 to 2010; that while there would have been greater

percentages of young men than young women employed in the Realistic, Investigative, and Enterprising categories, the differences in proportionate representation of young men and young women would have decreased from 1960 to 2010; and that while young men would continue to be employed in work of higher mean cognitive complexity than young women, the difference in the complexity level of work done by young men and young women would have decreased from 1960 to 2010. The data are reported as percentages of women and men employed in occupations in the six Holland categories each decade, and the mean cognitive complexity of occupations in which women and men were employed from 1960 to 2010. Trends over time were examined by plotting the percentages of women and men employed in occupations in each of the six Holland categories and the mean cognitive complexity for occupations for women and men 1960 to 2010. In order to capture the overall change from 1960 to 2010, the following were calculated: odds of men and women being employed in each Holland occupational category, the relative odds from men to women in 1960 and 2010, the relative odds for women and men from 1960 to 2010, and the change in relative odds (ratio of relative odds) from 1960 to 2010. The results indicate that in the traditionally female-dominated areas, the difference between the representation of women and men did not decrease as a result of men entering traditionally female-dominated occupations. In the traditionally male-dominated areas, the difference between the representation of men and women did not decrease with the exception of the Enterprising area. The average cognitive complexity of occupations of women did come closer to that of men in the Realistic, Investigative, and Enterprising areas over time, but were fairly consistent with that of

men in the Artistic, Social, and Conventional areas from 1960 to 2010. The information gained from this study elucidates changes in the gender composition of various types of work according to a psychological classification of occupations, aids career counselors in understanding whether the actual employment of young adults has reflected those aspirations of college students for women and men, and provides guidance as to how to shape young people's occupational aspirations in the context of employment reality.

EVOLUTION OF OCCUPATIONAL CHOICES IN YOUNG ADULTS FROM
1960 TO 2010.

By

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Dissertation submitted to the Faculty of the Graduate School of the
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Dedication

I dedicate my dissertation to my family, who supported and encouraged me through three decades of learning and growing. To my parents, Dr. Mary Leong and Dr. Peter Leung Hong, who showed me the benefits of tireless work and commitment to one's craft, and allowed me to find my own path. To my sisters, Stefanie Lindsay and Michele Allison Hong, who have walked with me, motivated me and shared in our joint pursuit of our ancestors' dreams.

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Background

People are influenced by gender norms from early childhood. Children internalize stereotypes during socialization in their home and school environments as well as in the media (Anker, 1998; L. S. Gottfredson, 1981). They are able to identify “feminine” and “masculine” occupational categories as young as 4 or 5 years of age (Hartung, Porfeli, & Vondracek, 2005). L. S. Gottfredson’s (1981) theory of circumscription and compromise describes the orientation to sex roles at 6 to 8 years of age. She viewed this as a time when children’s self-image is placed within the context of culturally-defined categories of what is appropriate for boys and girls. In a 2012 study, Schuette, Ponton, and Charlton found the occupational aspirations of middle school boys are affected by the occupations of working males in their homes, although they did not find the same effect for middle school girls. However, in middle school and high school, there are differences in how male and female students feel about certain subjects. At this age, female students report more anxiety about science and less motivation in and enjoyment of science than male students (Desy, Peterson, & Brockman, 2011). By the time they enter college, male and female students take into account different values in choosing a major and career path (Zafar, 2013). Previous studies have found that American men have historically scored higher on interest measures in Holland’s Realistic and Investigative categories than have women; while American women have historically scored higher on interests measures in Holland’s Social and Artistic categories than have men (Murray & Hall, 2001). People tend to pursue occupations that align with their vocational personality (Holland, 1973, 1985; Smart, Elton, & McLaughlin, 1986). Those individuals who pursue occupations that align with their personality tend to have greater job satisfaction (Spokane, 1985). Many studies have focused on the nature of sex differences in occupational aspiration (Harren, Kass, Tinsley, & Moreland, 1979; Farmer, Rotella, Anderson, &

Wardrop, 1998; DiDonato & Strough, 2013), potential causes for sex differences in occupational choice and aspiration (Kenkel & Gage, 1983; Selkow, 1984; Weisner & Wilson-Mitchell, 1990; Eden, 1992; Fletcher, 2012), and attempts to encourage and support young people with a desire to cross gender barriers in their fields of study and eventual occupational decision making (Jacobs, Chhin, & Bleeker, 2006; Dodson & Borders, 2006; Jackson, Wright, & Perrone-McGovern, 2010; Werhan, 2010; Toglia, 2013). Others have analyzed the relationship between occupational aspiration and occupational choice (G. D. Gottfredson, Holland & Gottfredson, 1975; Holland & Gottfredson, 1975; Baird, 2012), and the occupational choices of adults (L. S. Gottfredson, 1978b). In past studies, occupational aspirations have included jobs and careers explicitly indicated as desired or intended in high school and college-aged individuals. Oftentimes, they are the jobs and careers that students intend to have in their 30s. The terms occupation and occupational choices are often used to refer to jobs and careers in which adults are already employed, usually at the present time (current occupation or occupational choice) or at a specific time in the past (past occupation or retrospective occupational choice). From the literature, it is clear that sex differences in occupational aspirations and choices exist from childhood through adulthood. By using Census data of young adults ages 18-29, it is possible to establish how initial occupational choices in young people just entering the workforce after high school or college have changed over time as American society has evolved over the last few decades. Using Holland's theory of personalities and work environment as a framework, this study aims to determine what kinds of occupations young men and women have entered from 1960 through 2010 and what trends exist for men and women.

Holland's Theory of Personalities and Work Environments

The research questions require a classification that can organize information about both people and jobs according to kind of work done and level of training or education. Holland's occupational classification scheme was chosen to provide organization and structure to make sense of the many evolving Census occupation titles through the years. It provides a means to make sense of the kind of work done, and estimates of the level of cognitive complexity in the work and therefore the cognitive demands on workers needed for that work, with rules for classification of people and jobs into meaningful categories (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) and specifies the educational level required for those jobs. This classification scheme is based on Holland's empirically-based theory of personalities and work environments. Rather than simply being a ranking of occupations in a hierarchy of status, prestige, education, or income (Duncan, 1961; Siegel, 1971; Temme, 1975), it groups occupations according to type of work performed and environmental demands, supplemented by a hierarchy of level of cognitive complexity in the work demands.

Holland's theory of vocational interests and preference as expressions of personality and personal development assumes that people of similar personality types are drawn to similar occupations. Holland (1966) deduced this from an observation of similar personalities among those in the same profession. His theory is based on several assumptions: that we can characterize individuals' resemblance to personality types, that we can characterize the environment's resemblance to model environment types, and that the outcome of the pairing of people and environments is predictable based on what we know about personality and environment types.

The main tenets of Holland's theory of vocational personalities and work environments are that people can be described in terms of their resemblance to six personality types, that environments can be described by their resemblance to six kinds of environments, that people search for environments that match their personality types, and that people's behavior can be explained by the interaction of their personality and the environment. These personality types can be assessed qualitatively, as in expressed aspirations, and quantitatively, such as with the Vocational Preference Inventory or the Self-Directed Search (Holland, 1977; Holland, 1985; G. D. Gottfredson & Holland, 1996). The Vocational Preference Inventory describes a person by creating a profile from expressed preferences for appealing vocations from a list of occupational titles representing each of Holland's six personality types, resulting in a personality profile of the highest to lowest rankings of the six types. The Self-Directed Search assesses a person's activities, competencies, occupations, and self-ratings to determine the individual's resemblance to each of the six types. A personality pattern is the rank order of resemblance to the types, and is often described by listing the two to six types in order of the person's resemblance to them. A personality pattern provides a more comprehensive description of a person than does the specification of the single type the person most resembles, and it may be used to identify more specific occupations appropriate for an individual (G. D. Gottfredson & Holland, 1996). For instance, an individual with a Realistic personality type would generally prefer to work with that which is tangible and concrete. If the person resembles the Realistic and Artistic types, then a chef might be an appropriate occupation, as it combines tangible and creative activities. However, if the person resembles the Realistic and Investigative types, then a laboratory technician might be more appropriate as it incorporates both the concrete activities and science.

With roots in Darley's (1938) idea of organizing typologies of occupational stereotypes, Holland's theory was influenced by earlier typologies based on physique, temperament, and personality, including Forer's (1949) inventory to assess personality from interests and activities (Holland, 1966). The six personality types utilized in Holland's theory are analogous to Guilford's (1954) six major factors of human interest: mechanical, scientific, aesthetic, social welfare, business, and clerical. These types are presumed to be a result of a complex interaction of genetic and environmental forces, including cultural and personal influences. People's resemblance to types could be assessed by interest and personality inventories, self-descriptions, choice of vocation or career path, and life history.

Holland's original descriptions of the types were reflective of the 1950s and 1960s in which they were developed. Those initial descriptions echoed the teachings of Freud (characterizing types as anal and oral), and distinguished work done by men and women by incorporating the labels of "masculine" and "feminine" in the descriptions of interests and abilities. The descriptions published in 1966 reflect the beliefs, attitude, and norms of the 1960s, although they were later changed and modernized. More recent descriptions of the types mirror American society's increasing acceptance of people of either sex in roles and with interests traditionally associated with men or women. The original descriptions of the Holland types are included below in order to depict earlier attitudes because this study is intended to focus on psychological categories that have historically been associated with gender.

The types include: Realistic, Investigative (formerly Intellectual), Artistic, Social, Enterprising, and Conventional (G. D. Gottfredson & Holland, 1996; Table 1). The six personality types are characterized by the following attributes: preferences for activities and occupations, values, perception of self, others' perception of self, and avoidances (see Table).

The Realistic type prefers “manipulation of machines, tools and things” (p. 3), values “material rewards for tangible accomplishments” (p. 3), sees self as “practical, conservative, and having manual and mechanical skills—lacking social skills” (p. 3), is seen by others as “normal, frank” (p. 3), and avoids “interaction with people” (p. 3). The Investigative type prefers “exploration, understanding and prediction or control of natural and social phenomena” (p. 3), values “development or acquisition of knowledge” (p. 3), sees self as “analytical, intelligent, skeptical and having academic talent—lacking interpersonal skills” (p. 3), is seen by others as “asocial, intellectual” (p. 3), and avoids “persuasion or sales activities” (p. 3). The Artistic type prefers “literary, musical, or artistic activities” (p. 3), values “creative expression of ideas, emotions or sentiments” (p. 3), sees self as “open to experience, innovative, intellectual—lacking clerical or office skills” (p. 3), is seen by others as “unconventional, disorderly, creative” (p. 3), and avoids “routines and conformity to established rules” (p. 3). The Artistic type tends to avoid conventional activities and values aesthetic qualities. The Social type prefers “helping, teaching, treating, counseling, or serving others through personal interaction” (p. 3), values “fostering the welfare of others, social service” (p. 3), sees self as “empathetic, patient, and having interpersonal skills—lacking mechanical ability” (p. 3), is seen by others as “nurturing, agreeable, extroverted” (p. 3), and avoids “mechanical and technical activity” (p. 3). The Enterprising type prefers “persuading, manipulating, or directing others” (p. 3), values “material accomplishment and social status” (p. 3), sees self as “having sales and persuasive ability—lacking scientific ability” (p. 3), is seen by others as “energetic, gregarious” (p. 3), and avoids “scientific, intellectual, or abstruse topics” (p. 3). The Conventional type prefers “establishing or maintaining orderly routines, application of standards” (p. 3), values “material or financial accomplishment and power in social, business or political arenas” (p. 3), sees self as “having

technical skills in business or production—lacking artistic competencies” (p. 3), is seen by others as “careful, conforming” (p. 3), and avoids “ambiguous or unstructured undertakings” (p. 3). The Artistic and Social types were originally associated with more feminine qualities, while the Realistic, Investigative, Conventional, and Enterprising types were originally associated with masculinity, although Conventional occupations, such as administrative assistants, have since become more female-dominated. The descriptions of the types were later changed to be more gender-neutral (Holland, 1985), likely a reflection of the current, more modern view of masculinity and femininity.

The corresponding environments are characterized by skill or competencies requirements, demands of the environment, values, and types of activities involved. The Realistic environment requires “manual and mechanical competencies, interaction with machines, tools, and objects,” (G. D. Gottfredson & Holland, 1996, p. 4) demands “conforming behavior, practical accomplishment” (p. 4), values “practical, productive and concrete values; robust, risky, adventurous styles” (p. 4), and involves “concrete, practical activity; use of machines, tools, materials” (p. 4). Realistic occupations include carpenter and truck operator. The Investigative environment requires “analytical, technical, scientific, and verbal competencies” (p. 4), demands “skepticism and persistence in problem solving, documentation of new knowledge, understanding or solution of problems” (p. 4), values “acquisition of knowledge through scholarship or investigation” (p. 4), and involves “analytical or intellectual activity aimed at trouble-shooting or creation and use of knowledge” (p. 4). Investigative occupations include psychologist and microbiologist. Artistic environments require “innovative or creative ability, emotionally expressive interaction with others” (p. 4), demand “imagination in literary, artistic or musical accomplishment” (p. 4), value “unconventional ideas or manners, aesthetic values”

Table 1

Holland Personality Types, Descriptions, and Occupation Examples

Holland Type	Prefers	Values	Sees self as	Is seen by others as	Avoids	Examples
Realistic	manipulation of machines, tools and things	material rewards for tangible accomplishments	practical, conservative, and having manual and mechanical skills—lacking social skills	normal, frank	interaction with people	Military service, carpenter, truck operator
Investigative	exploration, understanding and prediction or control of natural and social phenomena	development or acquisition of knowledge	analytical, intelligent, skeptical and having academic talent—lacking interpersonal skills	asocial, intellectual	persuasion or sales activities	Engineer, psychologist, microbiologist
Artistic	literary, musical, or artistic activities	creative expression of ideas, emotions or sentiments	open to experience, innovative, intellectual—lacking clerical or office skills	unconventional, disorderly, creative	routines and conformity to established rules	Architect, musician, interior designer
Social	helping, teaching, treating, counseling, or serving others through personal interaction	fostering the welfare of others, social service	empathetic, patient, and having interpersonal skills—lacking mechanical ability	nurturing, agreeable, extroverted	mechanical and technical activity	Teacher, counselor, clergy member
Enterprising	persuading, manipulating, or directing others	material accomplishment and social status	having sales and persuasive ability—lacking scientific ability	energetic, gregarious	scientific, intellectual, or abstruse topics	Business executive, lawyer, store manager
Conventional	establishing or maintaining orderly routines, application of standards	material or financial accomplishment and power in social, business or political arenas	having technical skills in business or production—lacking artistic competencies	careful, conforming	ambiguous or unstructured undertakings	Accountant, production editor, bookkeeper

Note. Adapted from G.D. Gottfredson and J.L. Holland, 1996, *Dictionary of Holland Occupational Codes*, 3rd Ed., p. 3.

(p. 4), and involve “creative work in music, writing, performance, sculpture, or unstructured intellectual endeavors” (p. 4). Artistic occupations include musician and interior designer. Social environments require “interpersonal competencies, skill in mentoring, treating, healing, or teaching others” (p. 4), demand “empathy, humanitarianism, sociability, friendliness” (p. 4), value “concern for the welfare of others” (p. 4), and involve “working with others in a helpful or facilitating way” (p. 4). Social occupations include counselor and clergy member. Enterprising environments require “skills in persuasion and manipulation of others” (p. 4), demand “initiative in the pursuit of financial or material accomplishment; dominance; self-confidence” (p. 4), value “acquisitive or power-oriented styles, responsibility” (p. 4), and involve “selling, leading, manipulating others to attain personal or organizational goals” (p. 4). Enterprising occupations include lawyer and retail store manager. Conventional environments require “clerical skills, skills in meeting precise standards for performance” (p. 4), demand “organizational ability, conformity, dependability” (p. 4), value “conventional outlook and concern for orderliness and routines” (p. 4), and involve “working with things, numbers, or machines to meet predictable organizational demands or specified standards” (p. 4). Conventional occupations include production editor and bookkeeper. In addition to these types, the Holland occupational codes classify occupations by complexity based on the cognitive demands of the work involved.

By determining the order of an individual's resemblance to each type (from most to least), Holland has created $6!$ or 720 personality patterns. However, for practical reasons, fewer types may be used by identifying only the top one to five of the types that describe an individual (G. D. Gottfredson & Holland, 1996). This would allow career counselors to help people identify a variety of potential careers rather than narrowing the field to the point of eliminating choice. Holland used the same six names for the kinds of environments: Realistic, Investigative, Artistic,

Social, Enterprising, and Conventional. In Holland's initial formulation, type of environment is created by the congregations of that type of people. These people then create an environment that reflects their personalities. People with similar personalities gather together because individuals tend to seek environments that allow them to express themselves in ways in which they are comfortable and successful. They have the most freedom to exercise their talents and express their attitudes among similarly minded others who have created a congruous environment. Finally, by looking at the interaction of personality type with environment type, we are able to predict people's behavior within that environment. Those personality and environment types that correspond to one another are more harmonious than those that do not. With this in mind, we can predict job-related behaviors such as choice and level of training, achievement, creativity, stability, stress, and occupational mobility (Holland, 1965). The interaction of personalities and environments can be described by a hexagonal depiction, with each vertex representing a type in the following order: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. The types that are closer around the hexagon are more similar in theoretical terms. Those that are opposite to one another are more divergent. People seek and are most comfortable in occupations that fit both their personality type and cognitive ability (G. D. Gottfredson & Holland, 1996).

Early in the development of this theory of personality and environments, it was influenced by Holland's informal observations of the predominantly male World War II soldiers whom he interviewed as an Army personnel clerk. At this time, women were not as common in the workforce, much less the military, as they are now in the twenty-first century. Those women who did work outside the home were much more limited than they are today in their potential career fields and expectations. Females did not have the social role models to follow nor widespread encouragement to pursue any career path available. They also faced institutional

barriers from those people and organizations with the power to allow them to enter the more competitive and male-dominated fields.

Literature Review: Occupational Aspirations and Choices

The following literature review describes the ages at which children learn and express gender-role stereotypes, occupational aspirations of young adult American men and women, occupational choices of American men and women, and temporal changes in sex segregation in occupations of Americans in the twentieth century. It includes relevant, empirical, peer-reviewed studies found in Academic Search Premier, EconLit, ERIC, PsycINFO, SocINDEX, and Women's Studies International that are not limited to a particular racial or cultural group of American children and adults. The goal of the review is to portray the environment in which the occupational choices of American men and women have evolved, and thus the context in which the differences in these occupational choices have developed. Multiple methods were used in the literature review in order to capture past research literature, publications from Census data, and seminal and contemporary studies in the field. Studies were identified through previous knowledge, recommendations from those in the field, and the following literature searches in an attempt to encompass the development of sex stereotypes and occupational aspirations in children, the nature of occupational aspirations and occupational choices in young adults, and the sex differences in those aspirations and choices.¹

¹ Literature searches were performed in EBSCO on November 4, 2013 in the following online databases: Academic Search Premier, Education Research Complete, ERIC, PsycINFO, Social Science Full Text, and SocINDEX with Full Text. A filter for "scholarly (peer reviewed) journals" was placed on all of the databases. Additionally, Academic Search Premier also had filters for "Language: English," "Document Type: Article," and "PDF Full Text"; Education

Research Complete had filters for “Publication Type: Academic Journal,” “Language: English,” “Document Type: Article,” and “PDF Full Text”; ERIC had no filters; PsycINFO had filters for “Publication Type: Peer Reviewed Journal,” “Age Group: Adolescence (13-17 years), Young Adulthood (18-29 years),” “Language: English,” and “Population Group: Human”; Social Sciences Full Text had filters for “Publication Type: Academic Journal,” “Document Type: Article,” and “PDF Full Text”; and SocINDEX with Full Text had filters for “Document Type: Article,” “Language: English,” and “PDF Full Text.” Different filters were used for different databases due to the availability of filters for each database.

A search for the terms “occupation choice,” “gender,” and “Holland” yielded 14 results. When limited to studies relevant to American adults ages 18 to 29, gender differences, and general occupational choice (not studies of specific occupation fields or attitudes toward occupations), no articles remained.

A broader search within the same parameters in the same databases for the terms “occupation choice” and “gender” yielded 542 results. However, no additional articles were found that met the criteria of describing gender differences in occupation choice of young adults. A large number of these studies were excluded because they contained subject populations of specific ethnic groups, nationalities other than American, specific occupational categories (ex. medicine, sciences, and education), college majors, or theories about the causes of gender disparity in certain occupational categories.

A search of the publications on the ICPSR website (<http://www.icpsr.umich.edu>) using the search term “occupation choice” led to 26 results. Limiting to studies of American adults, occupational choice, and gender differences yielded 1 article. A November 8, 2013 search in Academic Search Premier and PsycINFO of “employment trends” and “gender” and “American”

yielded 65 results. When limited to studies that did not focus on only one ethnicity, those in the United States, and those relevant to employment trends of men and women over time, 3 articles remained.

A January 6, 2014 search for “occupation” and “sex segregation” in Academic Search Premier, EconLit, ERIC, PsycINFO, SocINDEX, and Women’s Studies International of scholarly (peer reviewed) articles yielded 181 results. When limited to studies of occupational segregation among American men and women, 6 remained.

A January 25, 2014 search for “children” ages 0-12 years and “gender stereotype development” in subject terms in Academic Search Premier, ERIC, PsycINFO, and SocINDEX of scholarly (peer reviewed) articles yielded 102 results. When limited to studies that addressed the development of social, non-academic, gender-role stereotypes, in American boys and girls, not limited to any specific race or cultural group, 3 results remained.

Given that a search for first occupation choices did not produce many results, the search for existing literature was broadened to include the application of Holland’s theory of vocational interests on occupational aspirations of students. A search of “college students,” “occupational aspiration,” “gender,” and “Holland” using the same parameters and limited to “Scholarly (peer reviewed) journals” yielded 15 results. Limiting the results to American college students’ gender-traditional occupational aspirations yielded 5 articles.

A May 11, 2014 search of “vocational aspiration,” “men,” and “women” in Academic Search Premier, Education Research Complete, ERIC, PsycARTICLES, Psychology and Behavioral Science Collection, PsycINFO, Social Science Full Text, and SocINDEX, limited to scholarly (peer reviewed) journals, yielded 191 results after duplicates were removed. After eliminating unrelated articles that did not focus on Americans of all racial groups, gender

Childhood Stereotype Development

Two 1990 studies by Martin, Wood and Little found that children learn stereotypic gender characteristics of their own sex before that of the opposite sex, and that their stereotypic judgments about toy preference based on those characteristics increase in strength with age. The first study included 56 four- to six-year old children who were told a story about a sex-unspecified child who liked either a stereotypically masculine or feminine toy. The subjects were then asked to predict the child's interest in other toys by drawing a corresponding smiley face. The gender association of 113 toys had been sex-typed in a previous study (Halverson & Martin, 1985). In this study, the masculine toys included a truck, an army tank, a train engine, cars, a motorbike, an airplane, a G.I. Joe soldier, a tool kit, and a baseball. The feminine toys included doll clothes, a purse and comb set, a sewing machine, dolls, a makeup kit, a tea set with tray, a baby doll and crib, an iron and ironing board, and a dollhouse. Both boys and girls were more likely to make a "correct" prediction that corresponded with the sex stereotype of the original toy in the story when the stereotype was of their own sex than of the opposite sex.

The second study included 76 children 6, 8, or 10 years of age who were told about a child with a stereotypic masculine or feminine characteristic from one of four categories: appearance, personality, occupation, or toys. The subject was then asked to predict the likelihood of the child having other stereotypic masculine or feminine characteristics on a smiley face Likert-type scale. Masculine traits included descriptions such as getting into fights, wearing a football shirt, being a plumber, or playing with a truck. Feminine descriptions included: crying a lot, wearing a skirt, being a nurse, or playing with a baby doll and crib. There was a significant

differences, aspirations of the high school-aged population and young adults, and all types of occupations, 13 remained.

main effect for age of the subjects in the stereotypic predictions, with older children making more extreme judgments than younger children, suggesting that older children were more able to understand and utilize sex stereotypes than younger children.

Helwig (1998) examined children's occupational stereotyping via a meta-analysis of studies from 1971 to 1995. This included fixed-response occupational choice studies of children primarily in the elementary grades and free-choice occupational aspiration studies. He found that in the 1970s, while boys endorsed more occupations, girls were more likely to endorse a parenting role. By the mid-1990s, girls identified an equal or greater number of different occupational aspirations as compared to boys. He hypothesized that this may have been due to the expansion in the types of occupations held by women during that time period. A follow-up longitudinal study of 208 children followed from second to fourth to sixth grade measured students' interests and occupational plans with a free-response format. Therefore, only the responses that could be coded as specific occupations, and not general fields of interest, such as "school" or "government," were included. In the second grade, the 94 boys named 48 different desired occupations (a 0.51 ratio of occupations to boys) and the 68 girls named 35 different desired occupations (a 0.51 ratio of occupations to girls). In the fourth grade, the ratio of occupations to boys dropped to 0.42 and the ratio of occupations to girls to 0.48, although the exact numbers were not reported. In the sixth grade, the only significant sex differences were found when the ratio of occupations to boys decreased even further to 0.37 (27 occupations/73 boys), and the ratio of occupations to girls increased to 0.50 (28 occupations/56 girls). Helwig also found significant gender differences in the selection of male-dominated and female-dominated occupations. The proportion of boys who endorsed aspirational male-dominated occupations increased from 0.82 to 0.93 between second and sixth grade. No proportions were

reported for boys who endorsed female-dominated occupations. Meanwhile, the proportion of girls who endorsed a female-dominated occupation decreased from second to sixth grade (0.56 to 0.30) and the proportion of girls who endorsed a male-dominated occupation increased from 0.19 to 0.48. No sex differences were found in response to the question of whether there were jobs that only men or only women perform. However, significant differences between grades were found, with an increasing proportion of all students responding that “no,” there were not jobs that only men perform (0.52 to 0.69 to 0.73) and there were not jobs that only women perform (0.55 to 0.71 to 0.81), and a decreasing proportion of all students responding that “yes,” there were jobs that only men perform (0.37 to 0.22 to 0.19) and there were jobs that only women perform (0.29 to 0.16 to 0.10).

Occupational Aspirations

Occupational aspirations are those jobs and careers desired and intended for their adult lives by young people, generally high school- and college-aged individuals.

Development of Aspirations in Life

A study using data from the 1973-74 assessment of career and occupational development of the National Assessment of Education Progress suggests that occupational aspirations become more gender specific and diverge from childhood through adulthood (L.S. Gottfredson, 1978b). Subjects included males and females ages thirteen-year-olds, seventeen-year-olds, and adults ages 26 to 35 years. Occupational aspirations were grouped into the following categories: professional, semi-professional, skilled, semi-skilled, and unskilled. The author suggested that males and females adjust occupational aspirations towards different sets of occupations from childhood to adulthood, and that socialization is, in part, a reason that men and women seek different jobs.

Temporal Trends in Gender and Aspiration

A study of occupational aspirations using data from the National Longitudinal Surveys of the Labor Market Experience of Young Men and Young Women (NLS) found gender differences in the cohorts born from 1942 through 1954 (Shu & Marini, 2008). The NLS defined occupational aspirations as the occupations that male respondents wanted to have at age 30, and that female respondents wanted to have at age 35 if they were to work. Occupations were coded using the 1960 U.S. Census categories. Respondents were followed over time from age 17 through age 26. Men generally reported aspirations of occupations with higher levels of prestige than did women, with greater longitudinal decline for Black men and women than White men and women. Both White and Black men reported aspirations of occupations with higher earnings potential than did White and Black women. Both White and Black men reported aspirations of occupations in which a lower percentage of women were employed than did their female counterparts. On average, men endorsed aspirations of occupations with the percentage of women employed from the mid-10%'s to the mid-20%'s, and women endorsed aspirations of occupations with the percentage of women employed from the high-50%'s to the mid-70%'s. Table 2 shows the effect of background variables, including parents' education and occupational prestige, on change in the dimensions of occupational aspiration for White and Black men and women. In general, the occupational aspirations of White men were affected the most often by parents' education and occupational prestige, while those of Black women were least affected.

Shu and Marini (1998) found that while the gender-related change in occupational aspirations occurred across social classes and racial groups from the late 1960s to the late 1970s, this change was greatest for those women whose parents were highly educated. Data were taken from the National Longitudinal Surveys of Labor Market Experience (NLS for the 1944-1954 birth cohorts, and the NLSY for the 1957-1965 birth cohorts). Occupational aspirations were

ascertained from the jobs that the participants wanted to have at age 35 when asked in 1966-1968 by the NLS survey and in 1979 for the NLSY survey. Prestige of occupations was calculated by using the prestige scores of the National Opinion Research Center reconciled to the 1970 U.S. Census's detailed occupational classification. On the NLS survey, young men aspired to occupations of slightly higher prestige than did young women. While those whose parents had completed more education (≥ 13 years) aspired to higher-prestige occupations than did those whose parents had less education (< 13 years), the gender difference was also greater among those whose parents were more highly educated. On the NLSY survey, the gender difference in prestige of occupational aspirations no longer existed because young women aspired to more

Table 2

Effects of Background Characteristics on Change in Dimensions of Occupational Aspiration by Race (t-values in parentheses)

Background variable	Prestige				Median education				Earning potential				Sex type			
	Men		Women		Men		Women		Men		Women		Men		Women	
	White (W)	Black (B)	W	B	W	B	W	B	W	B	W	B	W	B	W	B
Father's education	5.77*** (6.21)	4.89*** (3.23)	3.47*** (3.62)	.85 (.65)	.10*** (5.81)	1.10*** (4.68)	.05*** (3.27)	.02 (1.05)	.95*** (3.77)	.56† (1.75)	.89** (4.57)	.31 (1.19)	.28* (2.21)	.24 (1.12)	-.71 ** (-3.05)	-.14 (-.53)
Father's occupational prestige	.04* (1.98)	.00 (.07)	.03 (1.36)	.02 (.45)	.00 (.46)	.00 (.00)	.00* (2.54)	.00 (-.65)	.01* (2.38)	.01 (1.28)	.01** (2.66)	.02* (2.14)	.00 (.29)	.00 (.46)	-.01* (- 2.06)	-.01 (-1.27)
Mother's education	.86† (1.70)	2.91 (1.52)	.66*** (5.59)	22.65† (1.73)	.04* (2.20)	.03 (1.18)	.11*** (5.71)	.05* (1.98)	.49† (1.65)	.69† (1.69)	.53* (2.21)	.27 (.90)	.31* (2.06)	.18 (.64)	.01 (.03)	-.19 (-.60)
Mother's educational prestige	.11*** (5.21)	.11* (5.21)	.08*** (3.22)	.07† (1.79)	.00*** (4.94)	.02* (2.10)	.00* (3.69)	.00*** (3.69)	.02** (2.96)	.01 (.48)	.01* (2.36)	.03* (3.09)	.00 (.29)	.00 (.80)	.00 (- 1.53)	-.02* (-2.47)
	N = 27,705		11,137	6,764	1,159											

* $P < .05$ (two-tailed test)

** $P < .01$ (two-tailed test)

*** $P < .001$ (two-tailed test)

† $P < .05$ (one-tailed test)

Note. X. Shu and M. Marini, 2008, *Research in Social Stratification and Mobility*, 26, p. 43.

prestigious occupations. Earning potential and sex type of the aspirational occupations were obtained from census data for the labor force ages 16 years and older in 1970. While the earning potential of occupations aspired to by young women was lower than that of occupations aspired to by young men on both surveys, there was an increase in the earning potential of aspired occupations of young women on the NLSY as compared to the NLS. In terms of sex type of occupations, the percentage of women in the occupations aspired to by young women declined from the NLS survey (mean percentage of White women in the aspired to occupations: 72.2%, mean percentage of Black women in the aspired to occupations: 75.7%) to the NLSY survey (White women: 58.7%, Black women: 62.8%). An index of dissimilarity was used to determine the extent to which young women and men aspired to different occupations from the late 1960s to the late 1970s. The extent to which young women and men aspired to different occupations declined between the late 1960s and the late 1970s, more so for White women and men (NLS: 72.08, NLSY: 65.14) than for Black women and men (NLS: 70.50, NLSY: 67.71). That is, women and men aspired to more similar occupations over the course of the decade. These findings suggest that during the 1960s, young women's occupational aspirations became more prestigious with greater earning potential, less gender-traditional, and more similar to those of their male counterparts.

Gerstein, Lichtman and Barokas (1988) found a shift in occupational plans of high school students during the 1970s. Data on occupational plans from the National Longitudinal Study of the High School Class of 1972 and the 1980 High School and Beyond Study was coded into the 993 occupational codes in the Census, which were

then grouped into 11 National Center for Education Statistics categories: Professional 2 (attorney, college professor, dentist, physician, scientist, etc.), Professional 1 (accountant, architect, artist, engineer, nurse, social worker, etc.), Technical, Teacher, Manager or Proprietor, Craftsman or Operator, Clerical or Sales, Service, Farmer or Laborer, Military, and Housewife. There was an increase from 1972 to 1980 in the plans to enter professional 1 and managerial occupations, and decreases in plans to become teachers or enter the clerical/sales occupations. For women, plans to enter the professional occupations increased the most during that time (+15%), and the largest decreases were in the clerical/sales (-12%) and teacher (-10%) occupations. For men, the largest increase was in manager/proprietor occupations (+6%), and the largest decrease was in the craftsman/operator occupations (-8%). Male-dominated occupations were considered to be craftsman/operator, farmer/laborer, manager/proprietor, military, and technical. Female-dominant occupations were considered to be clerical/sales, housewife, and service. Professional occupations were classified as neither male- nor female-dominant. The male-dominated domain in which the percentage of female students increased the most was manager/proprietor (+7%). While these numbers do suggest a shift in occupational plans of high school seniors, it is important to note that the two most popular occupational categories for young women remained the same during that time period: Professional 1 (1972: 21%, 1980: 29%) and clerical/sales (1972: 31%, 1980: 19%). Similarly, the two most popular occupational categories for young men remained the same: Professional 1 (1972: 19%, 1980: 25%) and craftsman/operator (1972: 25%, 1980: 17%).

A study of undergraduate students graduating in 1970 and 1980 found an increase in the college women's average career status aspirations and occupational values during that time (Regan & Roland, 1985). Senior students were asked to specify long-range vocational plans. These occupations were categorized into an occupational-status/prestige-scale. Occupations were classified as professional if they included elements of prestige, high-income, and upward social and occupational mobility. From 1970 to 1980, the proportion of female subjects who aspired to professional occupations increased from less than 1/5 to more than 2/5. During that time, the proportion of male subjects who aspired to professional occupations decreased from 3/5 to 1/2. The subjects were also asked to indicate whether certain occupational values were important to them selecting a life's vocation, yielding a career values dimension (each on a scale of 0-5): a job where you could be a leader; a job where you could be looked highly upon by your fellow workers; a job where you could be boss; a very highly paid job; and a job where you could make a name for yourself and be recognized. The authors reported that in 1970, the higher the score, the lower the proportion of women on the career values scales with a modal score of 0, while in 1980, the modal score was 3 and women were dispersed across the scale. However, it is unclear what the means or standard deviations were for these items, or if a significant difference exists between the decades. These findings support the idea that from 1970 to 1980, there was a rise in the occupational aspirations of college women and a shift towards more professional careers.

Bubany and Hansen (2011) found a shift in the vocational preferences of male and female college students using a meta-analysis of research from 1976 to 2004. An

analysis of 18 articles and dissertations that included an interest inventory with scales reflecting Holland's RIASEC typology found a significant temporal increase in female interest in Enterprising occupations, and a significant temporal decrease in male interest in Realistic, Investigative, and Artistic occupations. This is particularly noteworthy because the Enterprising, Realistic, and Investigative types have traditionally been considered more masculine occupation types. The trends may reflect a change in gender stereotypes or a shift in the needs of our society. Therefore the difference between male and female interests helps to elucidate the nature of the temporal shift. If both male and female interests change together, this may reflect a common cause in the demands of the economy and environment. If male and female interests become more similar or dissimilar, the fluctuation likely cannot be attributed solely to a shift of occupations required by the economy. The authors found a significant temporal decrease in the difference between male and female interests for Investigative, Enterprising, and Conventional occupations. This suggests that while female interest related to the Enterprising type has increased, and male interest related to the Realistic, Investigative and Artistic types have decreased, the gender gap has actually decreased for certain occupations in recent years.

Gender Differences in Aspirations

A study using data from the 1979-1990 waves of the National Longitudinal Survey of Youth found gender differences in the occupational aspirations of high school students. Occupational aspirations were assessed in an item inquiring about the type of work the students would like to be doing at age 35 if they were to be working (Powers & Wojtkiewicz, 2004). The occupations were grouped by the five major

occupational categories used in the Census at that time: professionals and managers, clerical, craft, operative, and service. The results indicate that there were gender differences in non-professional or managerial occupational categories. Of the remaining categories, men most frequently choose craft (20%) and operative (8%) occupations, and women most frequently chose clerical (20%) and service occupations (11%). Conversely, women least frequently chose craft (2%) or operative (1%) occupations, and men least frequently chose clerical (1%) or service (3%) occupations. For the professional managerial occupations, men and women responded similarly: 52.5% of men and 52.0% of women chose professional and managerial occupations. However, this study did not elucidate the types of professional and managerial occupations desired by men and women. It is possible that there is gender segregation within this category, specifically in the fields of work. Of the entire sample, 23% of women selected “homemaker” as their intended occupation at age 35, as opposed to 1% of men, adding another gender difference to c and social occupational aspirations of this cohort.

A study of 237 college undergraduate psychology students at a university in the Midwest in the 1980s found a link between gender and Holland-categorized vocational preferences (Brown, White, & Gerstein, 1989). The students were given course credit in exchange for completing a questionnaire that included demographics and the Vocational Preference Inventory (VPI). There were significant sex differences for the VPI scores of Holland’s occupational types. Specifically, the average men’s score on the Realistic dimension ($M = 2.98$, $SD = 2.76$) was significantly higher than that of the average women’s score ($M = 0.74$, $SD = 1.19$),

and the average women's score on the Social dimension ($M = 5.80$, $SD = 3.70$) was significantly higher than that of the average men's score ($M = 4.81$, $SD = 4.20$).

However, the most common dominant vocational types were Enterprising (37 men of 85, 44 women of 127), and Social (55 women of 127, 20 men of 85). These findings suggest that there may be sex differences in vocational preferences of different Holland types. The results are of unknown generalizability due to the circumstances under which the data were collected and the racial composition of the students (85% White).

A survey of 633 undergraduates at the University of Iowa found that male and female students had significantly different Holland codes for present occupational choice, career aspirations, ideal occupational choice, and college major (Cook, 1981). Each occupation and major was classified as the dominant Holland code in the Self-Directed Search Manual (Holland, 1972) or the Dictionary of Occupational Titles (using the closest occupation in the case of majors). Sex typicality of the occupations and majors was calculated using the proportion of men and women in each occupation using the 1970 Census data. There were overall statistically significant differences between men and women for all of the career choice variables. Men were more likely than women to choose Investigative and Enterprising occupations and women were more likely to choose Social occupations for present occupational choice. However, for ideal occupational choice, women and men had similar preferences for Investigative, Artistic, and Social occupations. Men endorsed a narrower range of sex typicality than did women, favoring occupations with more men, while women endorsed a wider range of sex typicality in the middle of the scale.

Ninety-three percent of men endorsed male-dominated occupations for all four career variables, while 43-54% of women chose male-dominated occupations for all of the career variables except for ideal occupational choice. Seventy-five percent of women chose a male-dominated occupation as an ideal occupational choice. This suggests that at this point in time, while women did endorse Social occupations as their present occupational choice, they may not have been able to or have considered themselves able to enter occupations that they considered “ideal.”

A study of 216 undergraduate students in a residence hall at a college in the Mid-Atlantic region found gender differences in occupational interests associated with Holland types (Murray & Hall, 2001). The sample was comprised of 90% White students. The subjects were administered a demographics questionnaire, the Vocational Preference Inventory (VPI) and a student activities interest questionnaire (SAIQ). The average female student VPI scores for the Social type, and the Enterprising type, were statistically significantly greater than that of male students. This is of note because the Enterprising occupations in the field of business have traditionally been associated with men. The average male student VPI score for the Realistic type was statistically significantly greater than that of female students. The SAIQ classified responses about campus activity involvement into Holland interests. On this measure, male students averaged a higher score on two traditionally male-oriented types of interests, Realistic and Investigative, while female students averaged a higher score on the two traditionally female-oriented types, Artistic and Social. No significant gender differences were reported for the Enterprising or Conventional types on the SAIQ.

A 2009 meta-analysis of technical manuals for 47 interest inventories including American and Canadian subjects ($N = 503,188$) found gender differences in occupational interests as classified by Holland's 6 categories (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional), Prediger's Things-People and Data-Ideas dimensions, and the STEM (science, technology, engineering, and mathematics) interest areas (Su, Rounds, & Armstrong, 2009). In terms of the Holland categories, men had stronger Realistic ($d = 0.84$) and Investigative ($d = 0.26$) interests than did women, while women had stronger Artistic ($d = -0.35$), Social ($d = -0.68$), and Conventional ($d = -0.33$) interests than did men. On the Things-People dimension, men preferred working with things and women preferred working with people, with a large effect size ($d = 0.93$). In the STEM interest areas, sex differences were found for engineering ($d = 1.11$), science ($d = 0.36$), and mathematics ($d = 0.34$) interests, with a greater male interest in these areas than female interest. The authors suggested that occupational interests partially accounts for the gender segregation in occupations.

A 2009 study of college students found gender differences in the students' career aspirations and expectations. Metz, Fouad and Ihle-Helledy (2009) used Holland's theory of vocational personalities to categorize types of occupational aspirations and expectations of 677 college students in introductory psychology classes at three sites in the Midwest. The students were asked "If everything was [sic] possible for you, what occupation or job would you like to have as your lifetime career?"(p. 159) to assess aspiration and "Taking into account reality factors, what occupation or job do you expect to have as your lifetime career?"(p. 159) to assess

expectation. The students were also administered a perceived barriers scale; a differential status identity scale (DSIS; Brown et al., 2002); a measure of confidence in performing career-related tasks and making career-related decisions; and a measure of perceptions of one's economic resources, power, and social standing. The authors calculated the congruence of the participants' career aspiration and expectation, and the difference in cognitive complexity of the aspirational occupation and expected occupation. The most popular occupational type was Social for both men (aspirational 34%, expected 33%) and women (aspirational 38%, expected 55%). A univariate ANOVA test found significant differences between the sites' congruence scores and parent occupational prestige, possibly due to the variation in the locations and types of colleges attended by the subjects. Significant associations between gender and Holland coded career aspirations were found, with significant gender differences for Investigative, Enterprising, and Conventional occupational aspirations (Table 3). Significant differences between gender and Holland coded career expectations were found, with significant gender differences in Realistic, Social, Enterprising, and Conventional occupational expectations. No significant difference based on gender was found for complexity of career aspiration and expectation. This study indicates that there may be gender differences in college students' aspirational occupations and expected occupations and suggests that a larger scale study of a more representative sample of young adults' occupational aspirations, expectations and first jobs may be useful to determine gender differences in potential first jobs and in actual first jobs.

Table 3

Percentage of Subjects who Aspired to or Expected to Pursue a Career in Each Holland Category

		Holland occupational code					
		<u>Realistic</u>	<u>Investigative</u>	<u>Artistic</u>	<u>Social</u>	<u>Enterprising</u>	<u>Conventional</u>
Aspirations	Female	2.0	25.3	15.7	37.8	17.4	1.7
	Male	6.3	13.4	17.6	33.6	23.1	5.9
Expectations	Female	1.5	15.7	7.3	55.5	15.1	4.9
	Male	7.1	12.2	9.7	33.2	25.6	12.2
Current labor market	Female	15.9	4.4	2.1	26.0	22.8	28.9
	Male	45.9	7.5	1.8	8.8	28.2	9.2

Note. Adapted from A.J. Metz, N. Fouad, and K. Ihle-Helledy, 2009, *Journal of Career Assessment*, 17, 163.

In order to focus on how to support students in the pursuit of their goals, studies seek to answer why young people choose and desire these goals as opposed to others, and what may stand in their way. This is, undoubtedly, a useful undertaking, but does not answer the question of, regardless of adolescent and college-aged aspirations, and college academic major, what first jobs do young people ultimately perform after high school or college and how have they changed over the years. The goal of the present study is to determine if there are gender trends from 1960 through 2010 in the Holland-typed occupations of young adults in the United States based on data from the Census and the American Community Survey.

The literature on gender differences in occupational interests of young adults has, in large part, supported the original gender associations (that Realistic, Investigative, and Enterprising occupations are masculine, and that Social and Artistic occupations are feminine) described by Holland (1966) even though gender-related social norms have evolved since then. Conventional occupations, originally described as masculine, have tended to be occupied by more women in assisting jobs. Men still endorse Realistic, Investigative, and Enterprising occupations and interests more so than do women, and women still endorse Artistic and Social occupations and interests

more so than do men. Additionally, by focusing on pure increase or decrease in interest of a single gender, we ignore the effect of the economic and social environment that affects the popularity and availability of jobs for both men and women. It is the size of the gender differences and the trends of both men and women over time that show the changes in gender segregation.

Since the 1970s, the roles of women and men in the workforce have evolved. Crossing traditional gender barriers in occupational choice has become more commonplace, particularly for women who have seen domestic role changes interact with professional progress. A study of the 1971 through 2006 data for college students from the Higher Education Research Institute's *The American Freshman: Forty year Trends*, and *The Freshman Survey* annual reports from 2007 to 2012 found a decrease in the difference with which male and female first-year college students endorse Holland's RIASEC occupations (Hong, 2013). The data on first-year college women's and men's occupational aspirations was classified according to Holland's occupational types and level of complexity and to determine whether first-year college students have increasingly crossed traditional gender career barriers. While the gap between the occupational aspirations of female and male first-year college students has decreased from 1971 to 2012, the aspirations of female and male first-year college students follow similar trends over time.

Occupational Choices

Occupational Sex Segregation

Around World War II and its aftermath, some trends in female employment began to change. De la Viña (1985) used disaggregated 1940-1950 Census data to show that changes in occupations were disparate among different occupational

categories for women. In certain groups, including professionals, managers, clerical and sales, service, and labor, the representation of females and males became more representative of the labor force, while in others, including crafts and operatives, there was increased occupational sex segregation. This contradicts a previous study by Treiman and Terrell (1975) that had utilized data aggregated over all occupations, thereby masking the changes among various occupational types.

During the next three decades, sex segregation in occupations continued to evolve. From 1950 to 1981, sex segregation, as measured by the index of dissimilarity described below, declined more quickly in the public sector than in the private sector (Wharton, 1989). Using Census data from 1950, 1960, and 1970, and the March 1981 Current Population Survey, Wharton found that approximately two-thirds of both male and female workers were employed in the private sector in each of the years sampled. However, in the public sector, the percentage of both men and women who were working increased from 1950 to 1981 (9% to 15% for men and 13% to 20% for women). The percentage of men who were self-employed decreased during that time (from 23% to 12%), while the percentage of women who were self-employed increased (from 3% to 9%), although it was still lower than that of men. The types of occupations within those sectors differed for men and women. In the private sector, women were more likely to be employed in service and clerical occupations, while men were more likely to be employed in craft and managerial occupations. In the public sector, women were more likely to be employed as elementary school teachers, librarians, and nurses, while men were more likely to be employed in semiprofessional and technical occupations, such as police officers and firefighters. In

the self-employment area, most people took part in service occupations. The most popular occupations for self-employed women were child care worker, hairdresser, and bookkeeper, while self-employed men were most likely to participate in craft occupations. Wharton calculated an index of postwar trends in occupational sex segregation for employment settings and for occupational groups within those employment settings. Ranging from a possible 0 to 100, the index represents the “percentage of women (or men) who would have to change occupations for the employment distribution of the two groups to be identical” (Blau and Hendricks, 1979, p. 99). In the private sector, the index of segregation increased in the 1950s from 68.5 to 70.9, before decreasing in the 1960s to 68.5 and in the 1970s to 62.3, for an overall decline of 6.2 percentage points. The greatest decline in segregation in the private sector from 1950 to 1981 occurred in service occupations (17.7 percentage points), professionals (16.4), managers (11.8), and semiprofessionals or technicians (11.7). The decline in sex segregation was smaller for operative, craft, and sales occupations. Although Wharton separated the office clerical occupations and nonoffice clerical occupations, distinctions between the occupations in the groups were not defined. In other work, nonoffice clerical positions have included occupations such as mail clerks and physical plant workers (Nelson & Bridges, 1999). Sex segregation increased in the private sector for clerical occupations by 1.6 percentage points. In the public sector, the weighted index of segregation declined at a progressively increasing rate each decade from 66.1 in 1950 to 62.7 in 1960, 62.2 in 1970, and 55.3 in 1981, for an overall decline of 10.8 percentage points. The greatest overall decline in sex segregation in the public sector from 1950 to 1981 occurred in

operative, professionals, sales, and semiprofessionals/technicians (Table 4). There was an increase in sex segregation in clerical and service occupations. Among the self-employed, the weighted index of segregation increased very slightly from 62.5 in 1950 to 63.1 in 1960 and 63.7 in 1970, and remained stable at 63.7 in 1981, for an overall decline of 1.8 percentage points. The greatest declines in sex segregation among the self-employed from 1950 to 1981 were in semiprofessional/technician occupations with 18.4 percentage points, operative (9.1), and managers (7.5). Sex segregation among the self-employed increased in the professional occupations (10.7 percentage points).

Table 4

Index of Sex Segregation and Changes from 1950 to 1981

Occupational Group	Public Sector			Private Sector		
	1950	1981	1950 to 1981 change	1950	1981	1950 to 1981 change
Professionals	67.0	35.6	-31.4	64.6	48.2	-16.4
Semiprofessionals/technicians	79.6	63.6	-16.0	71.2	59.5	-11.7
Managers	51.1	44.1	-7.0	54.4	42.6	-11.8
Sales	46.7	23.9	-22.8	53.8	50.3	-3.5
Nonoffice clericals	26.3	47.2	+20.9	53.5	60.5	+7.0
Office clericals	86.0	87.8	+1.8	88.3	89.9	+1.6
Crafts	95.5	94.3	-1.2	89.6	88.1	-1.5
Operatives	81.6	49.0	-32.6	57.6	54.6	-3.0
Laborers	92.8	81.1	-11.7	76.6	68.6	-8.0
Service	59.0	61.1	+2.1	79.0	61.3	-17.7
All Workers	66.1	55.3	-10.8	68.5	62.3	-6.2

Note. Adapted from A.S. Wharton, 1989, *Social Science Quarterly*, 70, p. 935.

These findings suggest that while sex segregation decreased in these three employment settings in the decades following World War II, there was still a disparity in the types of occupations and positions being filled by men and women.

An analysis of Census data from 1950 to 1989 revealed a more rapid decline in sex segregation in the labor force in the 1960s and 1970s than in the 1950s or 1980s, which slowed in the 1980s. Carlson (1992) used data from the 1950, 1960, 1970, and 1980 Census, the 15% Public Use Sample from the 1970 Census, and the 1989 March Current Population Survey to study trends in sex and racial occupational inequality during that time. She found that occupation distribution inequality, the sex distribution within occupational categories as compared to the sex distribution in the labor force as measured by an index of occupational segregation, $D (= \frac{1}{2} \sum_i |X_i - Y_i|)$, where X_i is the percentage of race or sex group X in the labor force employed in occupation i and Y_i is the percentage of race or sex group Y employed in occupation i , decreased more rapidly in the 1960s and 1970s than it did in the decade preceding and following that period (Table 5). Carlson suggested that these changes may have been due to equal employment opportunity as a result of Title VII of the Civil Rights Act of 1964.

Table 5

Change in Distribution Inequality of Sex in Decades from 1950 to 1989

Years	D_1	D_2	Change	% Change
1950-1960	66.06	67.75	+1.69	+2.56
1960-1970	67.75	62.79	-4.96	-7.32
1970-1980	67.47	59.40	-8.07	-11.96
1980-1989	59.40	55.20	-4.20	-7.07

Note. Adapted from S.M. Carlson, 1992, *Social Problems*, 39, p. 276.

Joy (2006) used data from the National Center for Education Statistics Baccalaureate and Beyond Longitudinal Study 1993/94 to determine gender differences in first-jobs of recent college graduates. The study included a nationally representative sample of 8000 college graduates from 1993, 5200 of whom were

included in the analysis. The occupations were grouped not by Holland code, but into eight categories: clerical, management, labor, medical, sales/technical, engineering/computer, teaching (K-12), and service. Clerical included “clerical secretarial, clerical financial, and clerical other” (p. 223). Management included “manager sales, manager government, manager retail, manager manufacturing, manager other, and professional arts, entertainment, and media” (p. 223). Labor included “laborer, skilled operative, crafts, and military” (p. 223). Medical included “nurses, paramedics, orderlies, and physical therapists” (p. p. 223). Sales/technical included “sales and noncomputer technical occupations” (p. 223). Engineer/computer included “only engineers and computer-related occupations” (p. 223). Teaching included “teachers of K through 12th grades” (p. 223). Service included “service and protective service occupations” (p. 223). Joy found that the female graduates were more likely to enter medical (11% of women versus 3% of men), teaching (20% of women versus 8% of men), clerical (20% of women versus 12% of men), and service (6% of women versus 5% of men) occupations, and the male graduates were more likely to enter managerial (36% of men versus 30% of women), technical/sales (13% of men versus 8% of women), engineering/computer (17% of men versus 3% of women), and labor (6% of men versus 2% of women) occupations. The greatest differences were the 12 percentage points of women in teaching over men and the 14 percentage points of men in engineering/computer occupations over women. Those individuals who were unemployed or earned less than \$1000 annually were excluded, which could bias the sample, possibly underrepresenting women who were supported by their husbands or in caretaking roles. There may also be a gender bias because

graduates who were still students were excluded and women have outnumbered men in postbaccalaureate programs since 1988 (U.S. Department of Education, National Center for Education Statistics, 2012). This snapshot of recent college graduates is able to shed light on a general depiction of first-jobs of young Americans in 1993. However, it is not representative of all young Americans at that time, particularly those who were not college educated.

L. S. Gottfredson (1978a) found that women were disproportionately represented in certain types of occupations in 1970 according to the Census. Occupational data from the 1970 Census was categorized by Holland type and level of prestige. At the time, 38% of workers were women. The percentage of women in different Holland types of occupations and different levels within those types led Gottfredson to conclude that women were over-represented in certain areas and under-represented in other areas. Of women, 28% were employed in Realistic jobs, while 21% were employed in Social occupations. Within the Enterprising occupations, a greater percentage of women were in low-level jobs (ex. sales clerk) and a lower percentage, 8% of women, in the high-level Enterprising work (ex. lawyers). In the Conventional jobs, women held nearly 80% of the jobs, but were under-represented at the highest-level (ex. accountants). Her study reported the percentage of low, medium, and high level female and male workers in each Holland occupational category, but it did not separately report the percentage by prestige of female and male workers of each Holland occupational category. This makes it difficult to compare the relative representation in each category. It is possible that

within each field, that each sex is comparably represented at various prestige levels by percentage of workers. But this cannot be determined from Gottfredson's report.

G. D. Gottfredson and Daiger (1977) found a shift in the sex composition of occupational categories from the 1965 to 1970. They used data from the 1970 Census regarding current (1970) and retrospective (1965) employment, and organized the data using Holland's occupational classification in order to determine if men and women performed different kinds of work with different frequencies, and if there was a difference in the kind of work performed at different ages. In 1965 and 1970, of employed adults ages 21 to 65 years, a higher percentage of men than women were employed in Realistic, Investigative, Artistic (although Artistic employment for both men and women was under 2% at both times), and Enterprising occupations, while a higher percentage of women than men were employed in Social and Conventional occupations (Table 6).

Table 6

Percentage of Men and Women Employed in Holland Occupational Type Categories in 1965 and 1970

Holland Type	Men		Women	
	1965	1970	1965	1970
Realistic	65.1	58.4	32.3	27.7
Investigative	6.6	7.3	1.5	1.6
Artistic	1.5	1.6	1.1	1.2
Social	5.8	6.4	22.4	22.5
Enterprising	15.7	20.6	2.8	10.4
Conventional	5.3	5.7	36.9	36.3

Note. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p.

126.

When tabulated separately by age groups and sex, we can see that women in the older age groups were employed in Realistic occupations at a higher frequency in 1965 and 1970 as compared to women in the younger age groups (Figure 1, which

may be an effect of age or cohort (Schaie, 1965). In 1965 and 1970, men in their late 20s and early 30s were employed in Investigative occupations at a slightly higher frequency than men in the older age groups (G. D. Gottfredson & Daiger, 1977; Figure 2). In 1965 and 1970, women in their late 30s and 40s were least likely to be employed in Social occupations as compared to younger and older women (Figure 4). In 1965 and 1970, older women were more likely to be employed in Enterprising occupations than younger women, and men in their 20s were less likely than their older counterparts to be employed in Enterprising occupations (Figure 5). In both 1965 and 1970, older women were less likely than younger women to be employed in Conventional occupations (Figure 6). The present study elaborates these findings by reporting how the trends in sex and age differences extended through 2010.

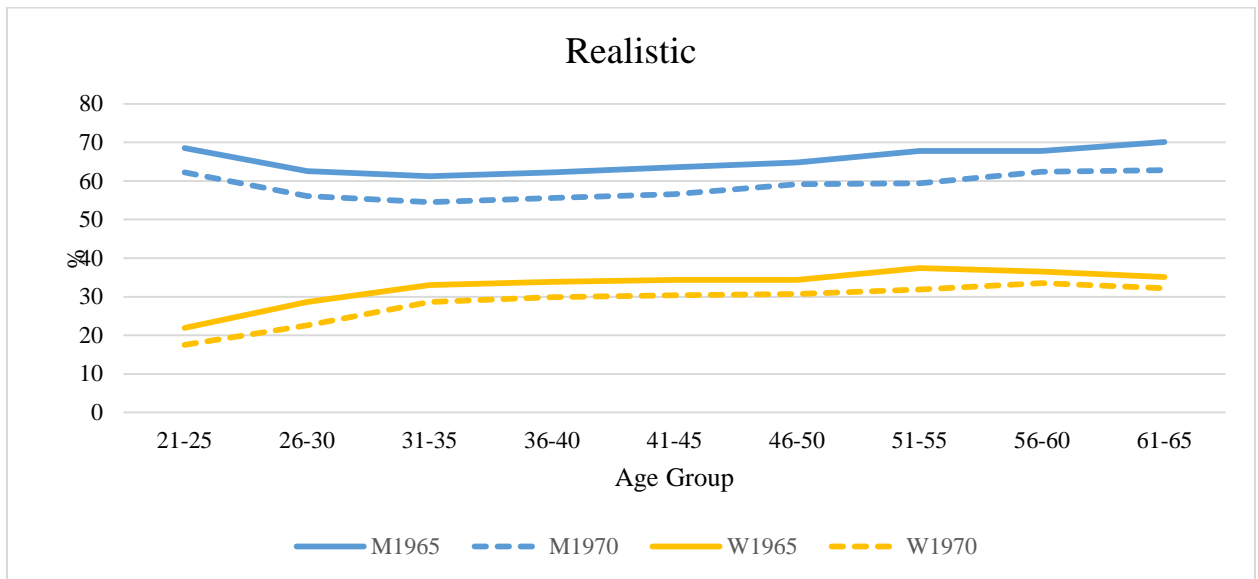


Figure 1. Percentage of men and women in Realistic type occupations in 1965 and 1970. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p. 126.

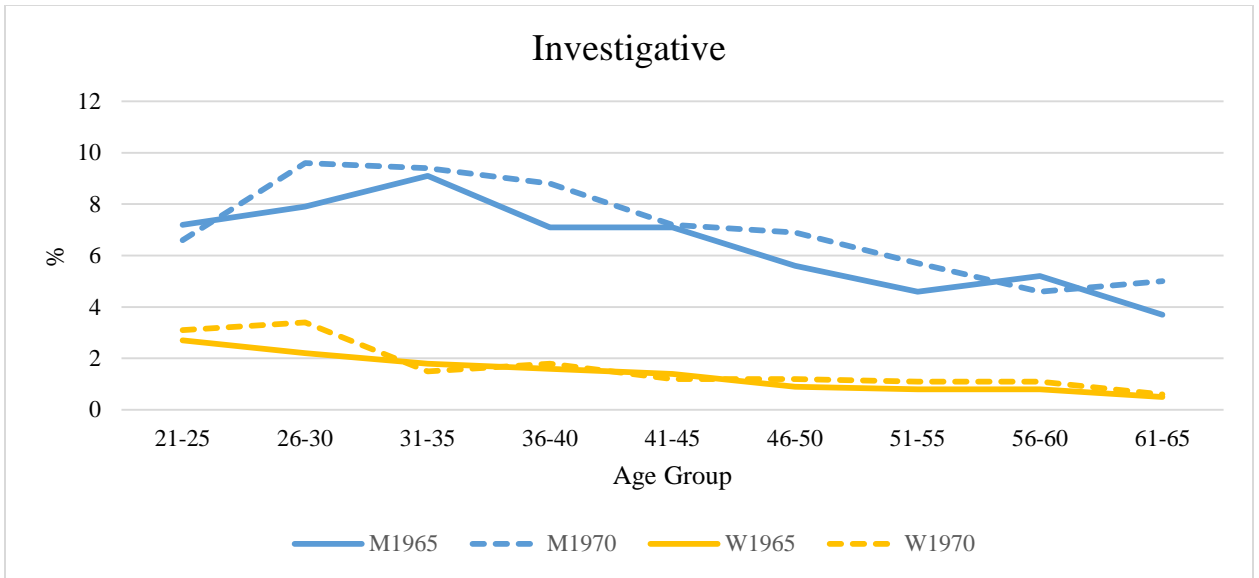


Figure 2. Percentage of men and women in Investigative type occupations in 1965 and 1970. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p. 126.

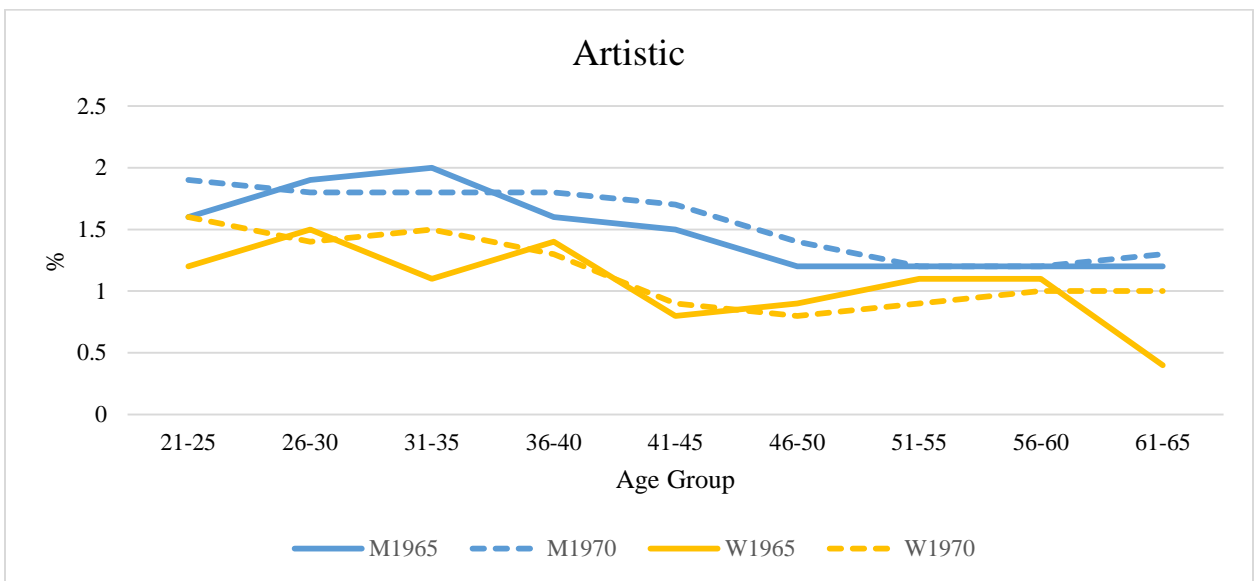


Figure 3. Percentage of men and women in Artistic type occupations in 1965 and 1970. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p. 126.

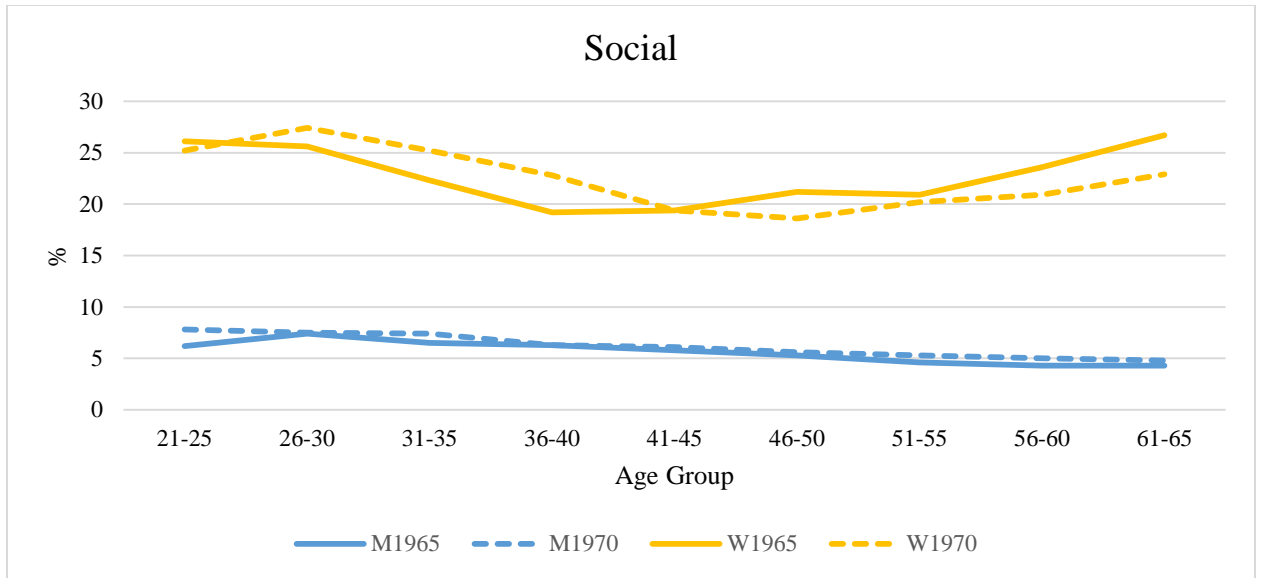


Figure 4. Percentage of men and women in Social type occupations in 1965 and 1970. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p. 126.

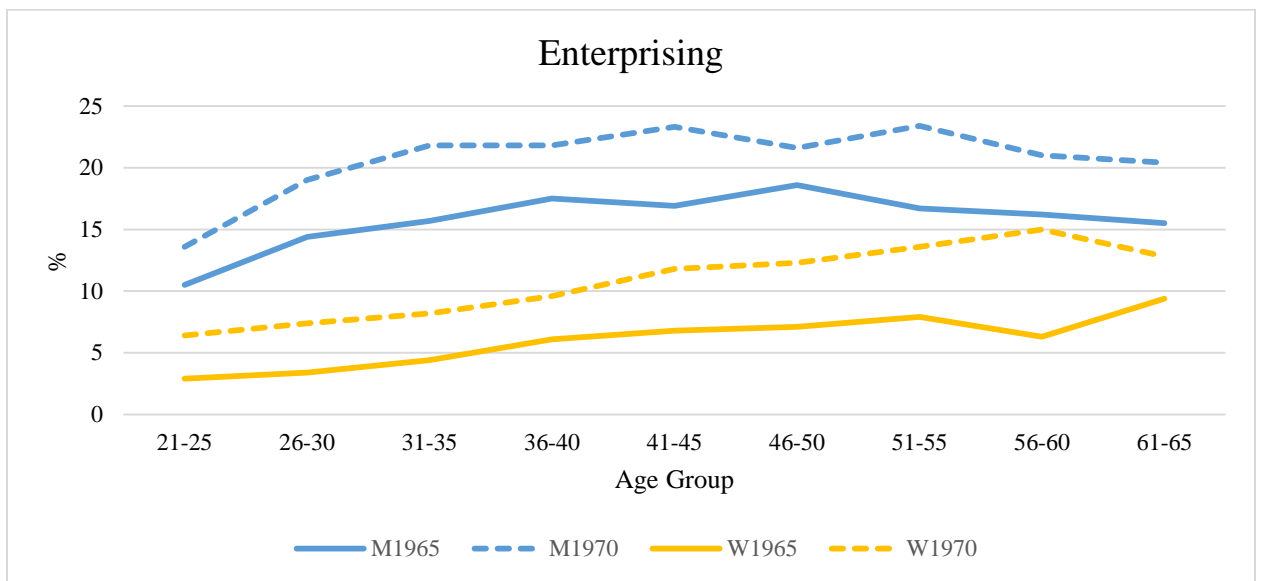


Figure 5. Percentage of men and women in Enterprising type occupations in 1965 and 1970. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p. 126.

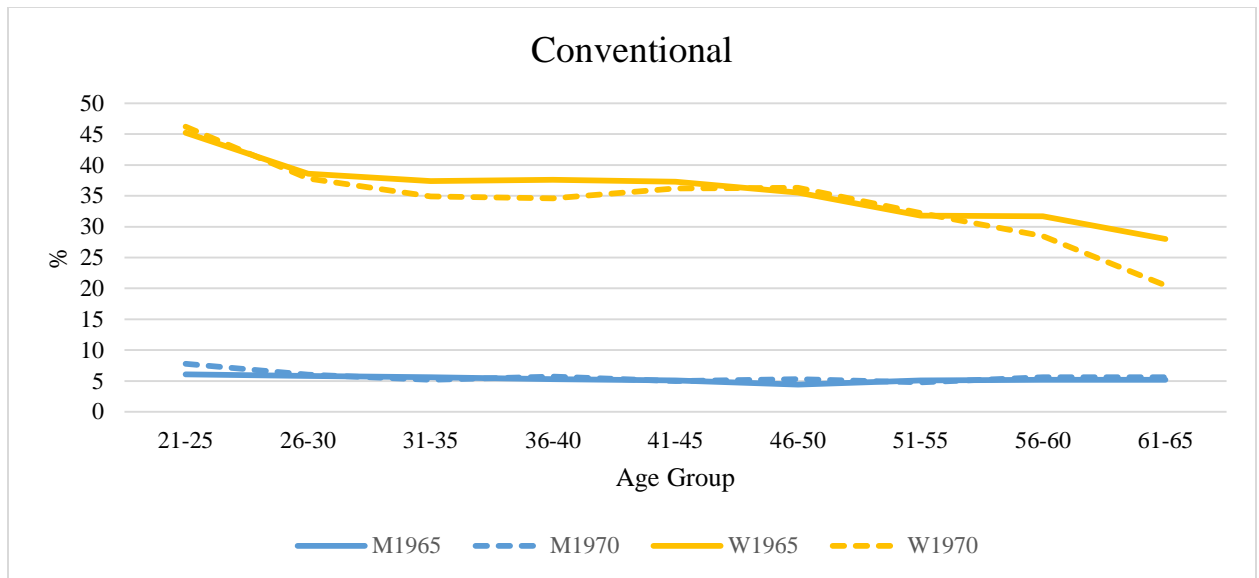


Figure 6. Percentage of men and women in Conventional type occupations in 1965 and 1970. Adapted from G.D. Gottfredson and D.C. Daiger, 1977, *Journal of Vocational Behavior*, 10, p. 126.

A single study was found that used the Public Use Microdata Series to interpret trends in occupations of American women. A study of the Integrated Public Use Microdata Series data from 1970 to 2007 analyzed trends in women's occupational mobility and subsequent pay during that time (Mandel, 2013). While women entered highly rewarded occupations, feminization in those occupations limited the pay scale, devaluing the work that they did. The theory of devaluation states that the compensation for work done by women decreases because employers underestimate the traits and skills associated with femininity, thereby lowering the social valuation and subsequent pay of women's work (England, 1992, 2010). Mandel argued that prestigious male-dominated occupations would experience more pronounced devaluation as a result of more women entering the field than would occupations with lower prestige and pay that require less education or skill, because the former begin with a greater social and economic value.

Mandel combined data from the 5% sample Census of 1980, 1990 and 2000, the 1% Census of 1970, and the American Community Survey sample of 2007. Sample sizes per year ranged from over 700,000 in 1970 to over 6 million in 2000. By calculating the index of dissimilarity, the percent of either men or women that would have to change occupations to reach equal occupational distributions, Mandel found that sex segregation levels over time declined from 1970 (66) to 2007 (50). The occupations were further separated into deciles based on average male wage. The ratio of male to female participation in those occupational deciles was calculated. From 1970 to 2007, the proportion of women in the top two deciles increased (the ratios decreased from 1.81 to 1.45 for decile 1, and 1.53 to 1.35 for decile 2). Conversely, the proportion of women in the bottom two deciles decreased (the ratios increased from 0.90 to 1.13 for decile 9, and from 0.25 to 0.81 for decile 10), suggesting that the proportions of men and women in these occupations were becoming more similar as the representation of women in high-paid occupations increased and the representation of women in low-paid occupations decreased. Using regressions in separate groups of occupations in tertiles according to average male wage (low-wage, mid-wage, and high-wage), Mandel found that in all decades across all groups (except mid-wage occupations in 1990 and 2007), a higher proportion of women is significantly associated with a lower average earning of men in that occupation ($p < 0.05$), controlling for individual (race, marital status, number of children, weekly working hours, education, and potential work experience) and occupational variables (educational requirements of occupations, percentage of White people in the occupation, and average years of work experience). This effect is

significantly greater in the high-wage group than in the low-wage or mid-wage groups ($p < 0.05$), although it is greater in the low-wage group than in the mid-wage group, suggesting that women entering prestigious high-wage male-dominated occupations may have a devaluing effect on those occupations. Mandel suggested that the differences between the low-wage and mid-wage groups may be due to the disparity in the types of blue-collar and pink-collar occupations available, although they may be attributable to the segregation within gross occupational categories.

England (2010) theorized that due to the persistent devaluation of female-dominated occupations, there is a greater pecuniary incentive for women to move into male-dominated occupations than for men to move into female-dominated occupations. This would explain, in part, the shift in the latter part of the twentieth century of more women entering traditionally male occupations and fields of study than in the past (England & Li, 2006). This trend is mirrored in the social acceptance of girls with more traditional “boy’s” interests, but the social disrespect towards boys with more traditional “girl’s” interests (England, 2010). England also explained the greater increase in women in white collar occupations than in blue-collar occupations as a function of financial incentive as well as ease of entering the field. A woman in a pink-collar occupation may increase her income by entering a blue-collar occupation against the social norm or by gaining more education and entering a traditionally female-dominated but higher paying occupation. The majority choose the latter option. Those women who already have the higher education and higher paying occupations, but want to increase their earning potential, only have the option of entering the male dominated white collar occupations.

Gender Segregation Theories

Cha (2013) hypothesized that one contributor to gender segregation in occupations is the number of working hours expected in male-dominated occupations because women are more likely to choose family time over working extra hours. She used data from the Survey of Income and Program Participation (SIPP), a household-based survey designed as a continuous series of national panels conducted by the Census Bureau. Male-dominated occupations include 173 occupations such as legislators, physicians, lawyers, engineers, natural scientists, architects, technologists, technicians, protective service workers, farm managers, computer software developers, construction workers, production supervisors, and operative workers. Part-time work was defined as less than 35 hours, full-time work as 35 to 49 hours, and overwork as 50 hours or more per week. Three cohorts of SIPP respondents were interviewed every four months starting in 1996 for 4 years, starting in 2001 for 3 years, and starting 2004 for 4 years. The subjects were limited to noncontingent workers ages 18 to 64 years with positive earnings at the start of their panel. The sample consisted of 201,135 observations (176,086 for men, and 25,049 for women). Cha's study considered a dichotomous outcome of remaining in a male-dominated occupation, either the same or a different one, or moving out of all male-dominated occupations after four months. She found that women with children, as opposed to women without children and all men, are more likely to exit male-dominated occupations when they *overwork*. Overall, 4% of men exited male-dominated occupations after 4 months as opposed to 8% of women in male-dominated occupations. Additionally, overworking and having children produced a significant interaction effect of increasing women's odds of exiting male-dominated occupations

by 52% over that of overworking non-mothers. Cha surmised that the culture of overworking as the norm in male-dominated fields reinforces gender segregation in occupations, particularly in many prestigious and demanding jobs, because overworking mothers leave these occupations at a higher rate than do others.

England (2010) described the change in gender-segregated occupational trends as inconsistent amongst different types of occupations. More attention has been paid to upward mobility and the highly educated, where women have made great strides crossing gender barriers and entering professional fields since a century ago, than to blue collar workers. More women have entered the workforce than the number of men who have left it (Figure 7), Women at different economic levels may enter the workforce for different reasons. At the lower pay grade, women may work outside the home out of necessity in order to pay bills, while at the higher pay grade, women may work outside the home because they would otherwise lose the opportunity to make money that exceeds that saved by working at home.

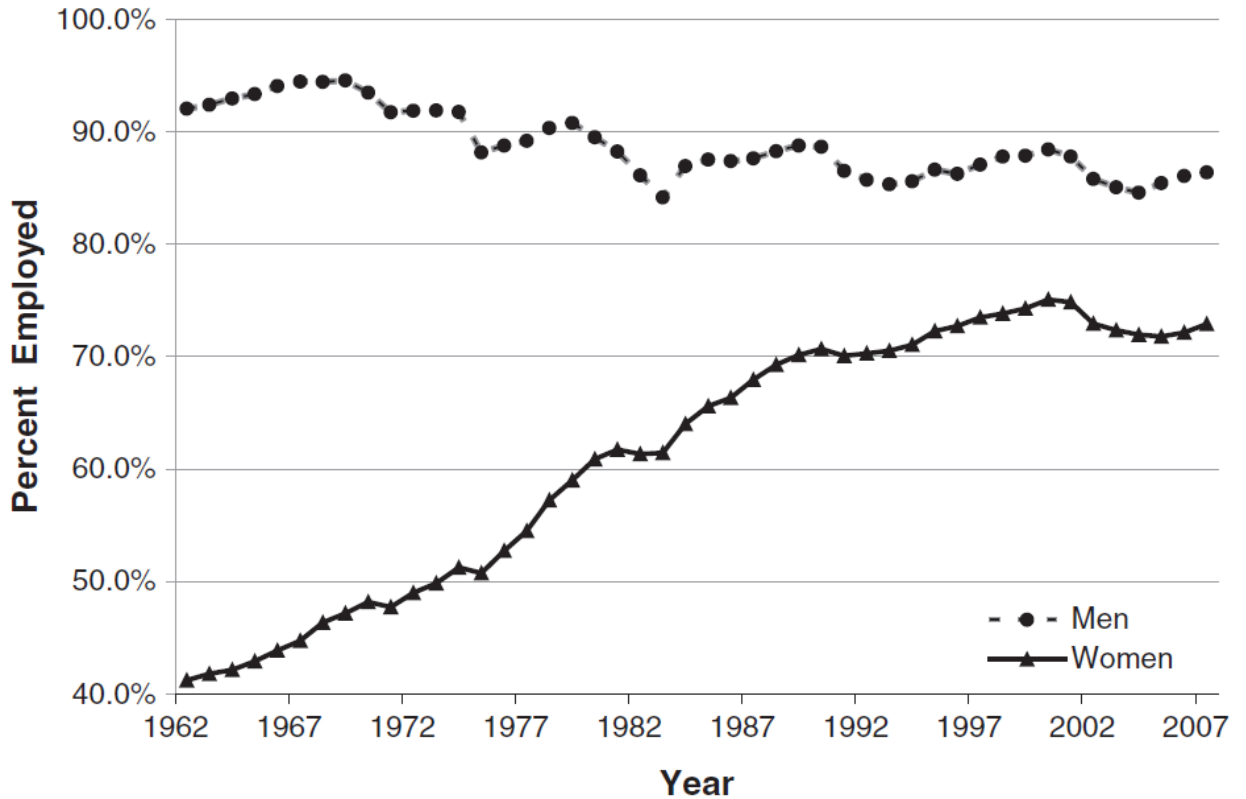


Figure 7. Percentage of American men and women employed from 1962 to 2007 on a truncated scale
 SOURCE: Cotter, Hermsen and Vanneman (2004)

Sex desegregation in the workforce may have occurred due to women entering male-dominated occupations, such as business and the sciences, as opposed to men entering female-dominated occupations, such as education, because male-dominated occupations traditionally have higher pay and prestige. This is also true at the college level when it comes to choosing majors, even though more women now graduate from college than do men. However, according to data from the National Center for Education Statistics (1971-2003), the index of dissimilarity for sex segregation in fields of study (the percentage of men or women who would have to change their major for the sexes to be equally represented) has decreased quickly 1971 to the mid-1980s, after which it remained steady until 2006 (Figure 8).

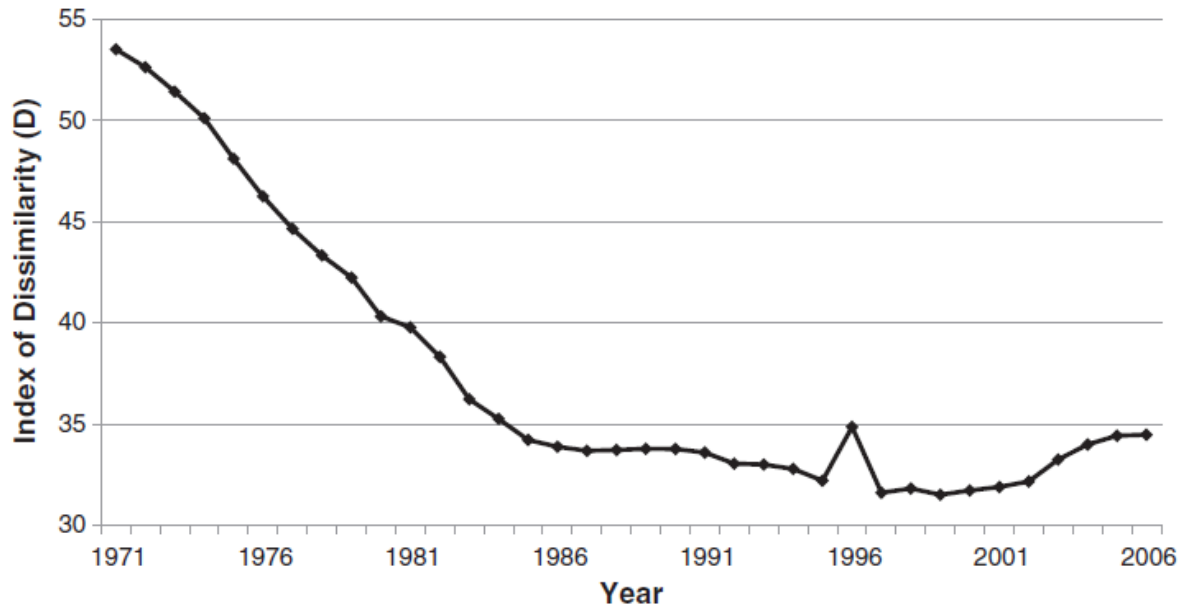


Figure 8. Sex segregation of fields of study for U.S. bachelor degree recipients from 1971 to 2006. Adapted from P. England, 2010, *Gender & Society*, 24, p. 155.

England (2010) defined the *middle class* as professional, management, or nonretail sales occupations, and the *working class* was defined as retail sales, assembly work in manufacturing, blue-collar trades, and other nonprofessional service work. She believed that the reason that the index of dissimilarity for sex segregation in the workforce has decreased between 1950 and 2000 in the middle class, but not in the working class (Figure 9), is due to the potential for upward mobility for women in the middle class who have the same level of education as their male counterparts and are able to enter traditionally male-dominated fields. Working class women, however, are employed in occupations where there is little room for upward mobility or gender cross-over due to the types of labor involved in blue-collar and pink-collar occupations. In these occupations, men and women tend to stay within their own gender-dominated occupation types.

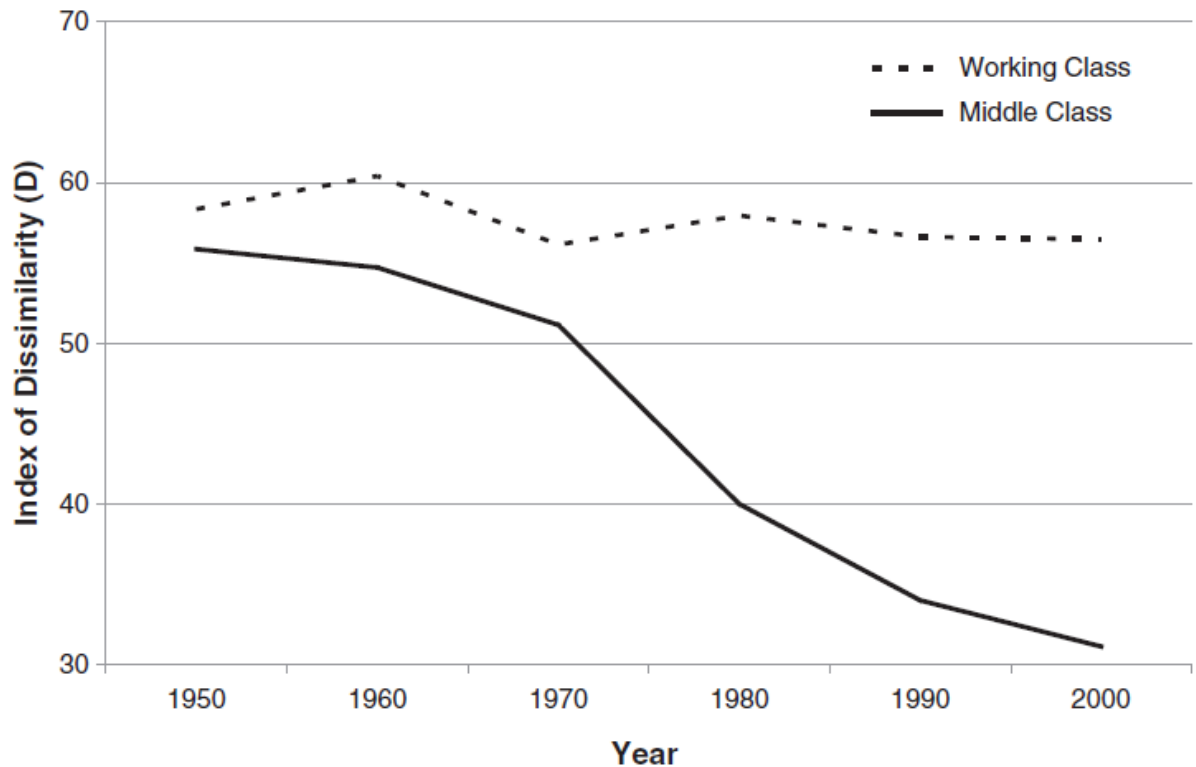


Figure 9. Sex segregation of middle-class and working-class occupations in the United States from 1950 to 2000
 SOURCE: Cotter, Hermsen and Vanneman (2004)

Elesh (2002) hypothesized that occupational shifts for men and women from 1980 to 1990 were primarily the result of the restructuring of work and that women fared better than did men during that time. He did not dispute the existence of sex segregation in occupation or industry, but believed that women were at an advantage. He argued that, although women's length of unemployment was longer than that of men's and their subsequent pay was lower, women were at an advantage because they were paid lower wages and therefore were less costly to retain than were men during a time of financial restriction. Using the 1980 and 1990 Census data for adults ages 25-54 in 1980 and 35-64 in 1990, Elesh compared the change in number of men in certain fields and the change in number of women in those fields. He found that the change in the number of men in managerial positions was 16% of the increase in the number of women in managerial positions. His data showed that the increase was

only 4% of the male baseline, while women experienced an increase of 56% of their 1980 baseline. However, the number of males in managerial positions was still greater than that of women (4.8 million men in 1980 to 5 million in 1990, as opposed to 1.9 million women in 1980 to 3 million in 1990). He makes a similar interpretation of the data for the decrease in the number of males employed in scientific professional occupations and the increase in female scientific professional occupations, however there is also a much greater number of males in those positions at both points in time (1.6 million males in 1980 to 1.3 million in 1990, and 219,400 females in 1980 to 224,202 in 1990). Focusing on the percentage change from the baseline in 1980 may be misleading when used to draw conclusions about advantage, equality, and sex segregation in occupations. Rather, the relative odds of those employed in various fields may be a more accurate means of assessing trends over a period time.

Prediger and Hanson (1976) found that men and women in the same occupation do not necessarily have the same personality patterns and career potentials. Data on 39,000 men and women in 104 occupations were gathered from Project TALENT, studies of the Strong Vocation Interest Blank (SVIB) criterion group distributions, and a report on the VPI profiles of occupational preference groups of college students. Given the sample bias, the occupational groups are likely not representative of the occupations in the economy or for men and women. Groups of men and women within the same occupation showed sex differences in the same direction as do unselected samples of men and women. Social and Artistic interests have traditionally been female-dominated fields. Out of the 104 occupational groups

in this study, Social was the highest interest scale for women in 85 of the groups, but only for 39 of the groups for men. Artistic was highest or second highest for 68 of the 104 occupational groups for women, and 35 of the occupational groups for men. Similarly, Enterprising, Realistic, and Investigative interests have traditionally been male-dominated fields, and were more often first or second as interests in the occupational groups for men (36 Enterprising, 17 Realistic, 72 Investigative) than for women (4 Enterprising, 1 Realistic, 31 Investigative). This suggests that while women and men may have entered the same occupation, they endorsed different primary and secondary Holland code interests.

Temporal Trends in Gender and Occupation

Blau, Brummund, and Liu (2013) used data collected by the Census Bureau for the Current Population Survey and the American Community Survey to analyze trends in gender segregation of occupations in the United States from 1970 to 2009. They created and applied gender-specific crosswalks to determine that, while decreasing, the pace of the decrease in gender segregation in occupations, as measured on an occupational segregation index, has slowed in the decades since 1970. They acknowledged that this may be partially due to the rise in the availability of gender traditional service jobs in recent years. Their study did not describe the specific types of occupations in which men or women were employed, nor did it account for the potential variety of experiences in the wide range of ages of working adults in the United States. However, it did include a population of working adults that was not limited by education level or geography, and included actual occupations as opposed to aspirations.

Mintz and Krymkowski (2010) found not only gender traditional occupational segregation, but also race x gender occupational segregation. Using data from March Current Population Surveys, occupations of women and racial groups (White, African American, and Hispanic persons, specifically) were compared in 1983 and 2002. Occupations were coded with the three-digit census occupational codes and a dissimilarity index was calculated to include the mean earnings, mean number of years of education, mean proportion employed in the public sector, mean firm size, and training and authority variables. At both those times, occupational segregation existed based on gender and racial minority status. Gender differences in occupation, as reflected in the index of dissimilarity between men and women of the same race, decreased for all three racial groups analyzed (Table 7). The sex differences were larger than racial differences among people of the same sex (Table 8). These occupational differences suggest that occupational segregation of race and sex exists, although it may have decreased since 1982 for some groups, such as between men and women of the same racial group, White and African American men, White and African American women, and African American and Hispanic women.

Table 7

Occupational Index of Dissimilarity Between Men and Women of Different Racial Groups

Occupational index of dissimilarity between men and women		
<u>Racial group</u>	<u>1982</u>	<u>2002</u>
White	0.61	0.52
African American	0.60	0.52
Hispanic	0.61	0.56

Note. Adapted from B. Mintz and D.H. Krymkowski, 2010, *International Journal of Sociology*, 40,

p.43.

Table 8

Occupational Index of Dissimilarity Between Different Racial Group Pairs of the Same Sex

	Men				Women				
	AA		Hispanic		AA		Hispanic		
	<u>1983</u>	<u>2000</u>	<u>1983</u>	<u>2000</u>	<u>1983</u>	<u>2000</u>	<u>1983</u>	<u>2000</u>	
White	0.37	0.32	0.33	0.36	White	0.34	0.28	0.29	0.31
AA			0.25	0.29	AA			0.26	0.24

AA: African American.

Note. Adapted from B. Mintz and D.H. Krymkowski, 2010, *International Journal of Sociology*, 40, p.43.

Reardon, Vernick, and Reed (2004) used the Holland codes of occupational types to conceptualize the distribution of the United States workforce from 1960 to 1990. They found that while distributions of employment were similar from 1960 to 1990, there were some major shifts within several categories. They found that there were the most Realistic occupations and the most people were employed in that area. Conversely, there were the fewest Artistic occupations and the fewest people were employed in that area. Relative to other kinds of work, the percentage of Realistic employment declined between 1960 and 1990, but it was consistently the largest area of employment, with employment numbers increasing during that time. Employment in the Enterprising area increased from 1970 to 1980 in percentage of employment and number of workers. Employment in the Investigative area increased from 1960 to 1990 in percentage of employment and number of workers. Percentage of employment in the other areas was fairly stable during that time. During this time period, the percentage of men employed in the Realistic area decreased, but was still greater than that of the percentage of men employed in the other Holland occupational areas. The occupations in which women were employed were not as

concentrated in one type as that of men. Women were predominantly employed in the Conventional, Realistic, Social, and Enterprising areas, with an increase in the Enterprising area and slight decreases in the Conventional, Social, and Realistic areas. They found that, in 1990, women consistently earned less than men in each RIASEC occupational area, and that Conventional and Realistic occupational types had the lowest average incomes and cognitive complexities, while Investigative occupational types had the highest average incomes and cognitive complexities.

McClain and Reardon (2015) recently extended the previous findings to include data from 2000 and 2010 Censuses. They found that while Realistic occupations were the most populated overall, the percent of people employed in this area steadily decreased from 55% of adults in 1960 to 27% of adults in 2010. Investigative occupations increased from 3% of adults in 1960 to 10% of adults in 2010. Artistic occupations hovered around 1-2%, while Conventional occupations vacillated between 15% and 17% during that time. Social occupations increased from 9% in 1960 to 24% in 2010. Enterprising occupations increased from 17% in 1960 and 1970 to peak at 30% in 2000 and drop to 20% in 2010. The Investigative area had the highest income levels in 1990, 2000, and 2010, while the Conventional and Realistic areas generally had the lowest.

Autor (2014) cited the rise of skill demands in industrialized countries as contributing to the earnings inequality. Using data from the Census bureau, he showed that there has been an increase in the median annual earnings gap of high-school educated Americans and college-educated Americans from 1979 to 2012. A skill premium is based on skill demand (the skills that employers require) and skill

supply (the skills that workers have). Autor interpreted the decrease in demand for physical labor and increase in demand for cognitive labor over the last century as the reasons behind the rise in demand for cognitive skills, such as analytical skills, written communication, and technical knowledge. The increase in the supply of cognitive skills has been due to the American education system, which has shifted from commonly having six to eight grades before educational completion to high-school, college, and post-graduate levels before educational completion during the last century as farm employment decreased and industrialism increased.

The Occupational Aspiration-Occupational Choice Relationship

Factors that Influence Aspiration & Occupational Choice

Occupational and personal characteristics both influence the occupational interests and choices of young adults. Blau, Gustad, Jessor, Parnes, and Wilcock (1956) proposed a conceptual framework to guide research on how people choose occupations. Social structure was defined as “the institutionalized patterns of activities, interactions, and ideas among various group of the environment” (p. 533). They posited that there are two ways in which social structure affects occupational choice that must both be understood in order to explain entry into occupations: social experiences shape the personality development of individuals, and occupational opportunity limits the realization of their aspirations. Four characteristics of occupations and four complementary characteristics of individuals determine occupational entry. The occupational characteristics include: (1) formal opportunities, the demand for new members in an occupation, including the number of vacancies and the turnover rate; (2) functional requirements, the technical qualifications needed for occupational tasks; (3) nonfunctional requirements, the criteria affecting selection

that are not relevant to actual performance; and (4) amount and types of rewards, such as income, prestige, power, opportunities for advancement, likeable coworkers, and emotional gratification. The individual characteristics include: (1) occupational information, what people know about an occupation, including information about the requirements for entry, rewards, and employment opportunities; (2) technical qualifications, people's technical skills to perform occupational duties, (3) social role characteristics, non-technical characteristics that influence hiring decisions, and (4) reward value hierarchy, individual's value orientations that determine the relative significance of types of rewards. In modern times, some of the suggested social role characteristics may not be acceptable, such as skin color, while others may still play a role in hiring decisions, such as veteran status. Occupational choice is then considered a process of continually evolving compromise between preferences for and expectations of being able to get into various occupations resulting from a series of interrelated decisions.

A survey of high school senior women found an effect of socioeconomic status (SES) on occupational aspiration levels (McLaughlin, Hunt, & Montgomery, 1976). SES was determined based on father's occupation, family income, and average family education. There was an inverse relationship of SES and certainty of career plans, possibly because lower SES students are forced to make career decisions earlier. Additionally, all three group levels of SES (low, medium, and high) indicated a preference for the more traditionally female-dominated occupations of teacher and social worker. Less traditional careers for women, such as lawyer, minister, army officer, and engineer were less popular overall. Differences appeared when

occupations were categorized by the type of training. The preference for occupations that require extensive training, including craftsperson, author, scientist, lawyer, and teacher, was associated with higher SES, likely because those women could afford the training. Preferences for careers with less of an apprenticeship-type program, such as minister, army officer, engineer, and salesperson, were associated to lower SES, possibly due to the ability to earn a living while training. Therefore, SES may be a predictor of the type of training required for an occupation rather than the field of study of an occupation.

Gerdes (1995) found that undergraduate women differ from undergraduate men in coping with occupational stressors. A study of 397 undergraduates in the early 1980s who had selected their career track found greater vulnerability to stressors in the women in traditionally male fields of study with congruent career intentions (engineering, management, and medicine) than in the men in those same fields of study and career intentions. Additionally, these women also displayed greater vulnerability to stressors than those women in traditionally female fields of study with congruent career intentions (education, sociology, and psychology). The fields of study were associated with gender based on the higher percentage of one gender with that field as a major. Questionnaires included items about future plans, perceptions of work environment, stressful life events, and physical and psychological symptoms. Gerdes found that, even when controlling for exposure to stressors, nontraditional women were more susceptible than men with the same professional goals to anxiety ($p < 0.10$) and physical illness ($p < 0.001$). Gerdes theorized that these differences in susceptibility could be due to differences in personality or coping style related to

gender rather than group differences in exposure to the stressors or dramatic differences in lifestyle, both of which were assessed in the questionnaire.

Gackebach (1978) compared the attitudes toward women's expanding sex roles at home and at work of White and Black female and male college undergraduate students at a school in Virginia. The Attitudes Toward Women Scale included items about women's role in their personal life (ex. "Husbands and wives should be equal partners in planning the family budget."), and in the workplace (ex. "Women cannot be assertive in business situations that demand it."). Using an analysis of variance, Gackebach found significant main effects for race and for sex ($p < 0.01$). Specifically, men and Black students responded in a more traditional and gender-typed manner than did women and White students. While there was a significant sex x race interaction ($p < 0.05$), there was not a large difference between the attitudes of White men and Black men, or Black men and Black women. The difference was largely due to the more liberal attitudes of the White female students.

Aspiration-Outcome Relationship

Gottfredson, Holland and Gottfredson (1975) used Holland's classification scheme to analyze people's occupational aspirations. Occupational aspirations were calculated from data from the American College Testing Program, data obtained in the Project TALENT follow-up of persons going on to college, and American Council on Education data on entering college freshmen. Actual employment information was gathered from the 1970 Census. All occupations were categorized into Holland's classification scheme. Occupational levels were classified as either higher (some college or above) or lower (some high school or above). They found

that gender differences in occupational aspirations are similar to the distribution of employment, except that both men and women at the higher and lower occupational levels aspired to Enterprising jobs at levels below the employment rate, and men and women at the lower occupational level aspired to Artistic and Social jobs above the employment rate.

Holland and Gottfredson (1975) found that vocational aspirations were a better predictor of future vocational status than interest inventories, such as the Self-Directed Search. They used data on high school juniors, college students, and employed adults from two previous studies that utilized the Self-Directed Search (SDS) (Holland, Gottfredson and Nafziger, 1973; Nafziger, Holland and Gottfredson, 1973). Vocational aspiration information was collected from the Daydreams section of the SDS in which subjects were asked to report the occupations considered and to list them in order from most to least recent. The most recent aspirations were considered current aspirations, while the others were considered retrospective aspirations. Occupational choice was assessed from students one year later by a questionnaire in which students were to select one of a coded list of 98 occupation categories. Vocational aspirations and choices were coded using Holland's occupational classification. Coherence among aspirations was coded as the average degree to which they were part of the same or similar Holland codes (proximity in the hexagonal model of Holland's codes, Figure 10). The authors found that a significant relationship between a person's current aspiration and retrospective aspirations, with stronger agreement with more recent aspirations for both men and women. This relationship was significant from the second to the sixth retrospective aspiration for

high school men, from the second to the seventh retrospective aspiration for high school women and college men, and from the second to the third retrospective aspiration for college women at the $p \leq 0.05$ level, suggesting that a person's vocational aspirations across time may be related to one another. The authors found that the first letter of the aspiration summary code was a better predictor of occupational choice if the person's vocational aspirations have high average agreement (men: increase in correct predictions 37% to 51%, women: increase in correct predictions 56% to 66%). Similarly, the first letter of the SDS summary code was a better predictor of occupational choice when it agrees with the first letter of the aspiration summary code (men: 40% to 48%, women: 66% to 72%) or the first letter of the most recent aspiration code (men: 40% to 64%, women: 66% to 85%). This suggests that vocational aspirations and SDS may supplement one another in their ability to predict future occupational choice in students.

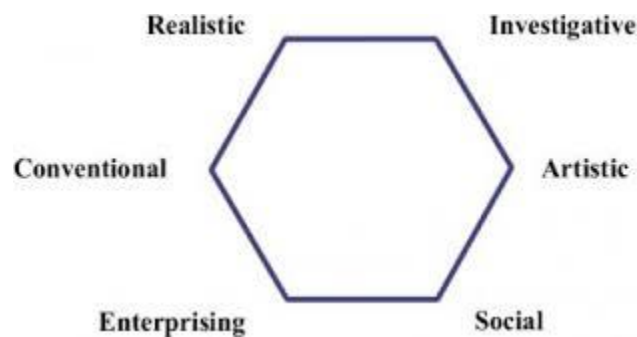


Figure 10. Holland occupational code model

A 1979 study found that cognitive skills in gender-atypical areas are associated with less traditional occupational aspirations and outcomes as compared to skills in gender-typical areas (Baird, 2012). By analyzing the gender-typical and gender-atypical occupational aspirations for age 35 of then-high school-aged students

in the 1979 cohort of the National Longitudinal Survey of Youth, Baird found that women and men with higher cognitive skills in areas considered gender-atypical have less gender-traditional occupational aspirations and outcomes than their peers with gender-typical skills. Gender-typicality of occupational aspiration was calculated by the percent of females in the occupation in 1982. Gender-typicality of an occupational outcome was calculated by the percent of females in the occupation in 1998. Gender beliefs were assessed from questions about the female role in the household.

Cognitive skills were calculated from verbal and math measures administered to the participants in 1980. The findings indicate that for women, the gender-typicality of occupational aspirations was similar to that of the gender-typicality of occupational outcome. That is, in 1982, women desired to work in occupations that were 63% female, and in 1998, they worked in occupations that were 62% female. In 1982, gender beliefs and cognitive math skills were predictors for the gender-typicality of the occupational aspirations of women. Those women with less traditional gender beliefs aspired to work in occupations with 62% women. Those women with above-average math skills aspired to occupations with 53% women. Those women with above average math skills and less-traditional gender beliefs aspired to occupations that were 47% female. These findings suggest that gender beliefs and math skills were predictors for occupational aspiration of young women. The author surmised that the programs designed to encourage women to enter male-dominated fields may only be encouraging those who were previously interested in those fields and are, thus, already more likely to pursue them. This study did not distinguish between the

types of work that were considered male-dominated and female-dominated in their level of difficulty or field of interest.

General Research Aims

The goal of this study was to examine data of the occupational choices of young Americans ages 18 to 29 years to learn whether some anticipated convergence in the types of work done by men and women had occurred. This study expands upon the work done by Holland, G. Gottfredson, D. Gottfredson, Robert, Vernick and Reed, depicting trends in employment, comparing men and women, and focusing on young people in the post-high school and college stage of life. My hypothesis was that between 1960 and 2010, young women have participated decreasingly in occupations in the more traditional caretaking and assisting fields and shifted towards the more assertive business field and intellectual sciences. In other words, I expected that, while a greater percentage of women than men ages 18 to 29 years would have been employed in Holland's Social, Artistic, and Conventional occupations, the difference between the percentage of women and men would have decreased from the 1960 Census to the 2010 American Community Survey as social norms of masculinity and femininity have evolved. Conversely, I expected that, while a greater percentage of men than women ages 18 to 29 years have been employed in Holland's Realistic, Investigative, and Enterprising occupations [which were originally defined as "masculine" (p. 21, 23, 29, 34) and have since been likely aspirations of young men], the difference between the percentage of men and women would have decreased from the 1960 to the 2010 data as social norms and expectations evolved to reduce social and institutional barriers for women to pursue traditionally male-

dominated jobs. Additionally, I expected that, from 1960 to 2010, the difference between the average cognitive complexity of occupations held by men and by women decreased as women's educational aspirations rose.

Methods

The United States Census is a means of systematically acquiring and recording information about the people who reside in the United States. Through the Population and Housing Census, demographic information, including sex, age, and occupation, is collected every 10 years. The data reported are estimated to be representative of the population although not every individual responds. Data from the 1960, 1970, 1980, 1990, and 2000 Census, and the 2010 American Community Survey (ACS) were collected from the website for the Integrated Public Use Microdata Series (IPUMS-USA) website (<https://usa.ipums.org/usa/>) because they were not available directly from the Census website.

IPUMS-USA consists of data drawn from the fifteen surviving federal censuses from 1850 to 2000 and from the American Community Surveys of 2000-2012. IPUMS is composed of microdata. Each record is a person, with characteristics numerically coded. The data used in this study include the 1960 1% Public Use Microdata Sample (PUMS), the 1970 1% PUMS, the 1980 5% PUMS, the 1990 5% PUMS, the 2000 5% PUMS, and the 2010 American Community Survey 2010. The 2010 PUMS is not available. According to the Census website as of June 9, 2014, the PUMS files for the 2010 Census have been delayed and possibly cancelled. The 1% PUMS include a 1-in-100 national random sample of the population. The 5% PUMS include a 1-in-20 national random sample of the population. When available, the 5%

PUMS was selected over the 1% PUMS. The variables collected from these surveys are age, sex, and occupation. Age was reported in whole years. Sex was dichotomously reported as male or female. The occupation variable reported was the person's primary occupation, coded into a contemporary census classification scheme. Generally, the primary occupation would be the one from which the person earned the most money. If respondents were not sure about this, they were to report the one at which they spent the most time. Unemployed persons were to give their most recent occupation. For persons listing more than one occupation, the samples use the first one listed. In the beginning of the twentieth century, prior to 1960, the occupation code was completed by those who were in the labor force and not yet retired or those in the labor force who were currently working or looking for work, depending on the year. Starting in 1960, the occupation code was completed by all persons of a given age who had worked during a specific and lengthy reference period. For Censuses 1960 and 1970, the reference period was the preceding 10 years for persons age 14+ and were not new workers. For Censuses 1980 to 2000, and the 2010 American Community Survey, the reference period was the preceding five years for persons ages 16+ and were not new workers. New workers were defined as persons seeking employment for the first time, who had not yet secured their first job.

Each of the IPUMS samples have their own occupation codes. Each occupation code list is divided into occupational categories. By recoding the Census occupations into Holland's six environmental types, the data was used to map trends in occupations of young adults ages 18 to 29 years by RIASEC category over time. This age range was selected in order to capture the early occupational choices of

young adults after schooling, as compared to the long-term and more mature occupational choices of older adults. Two individuals rated the primary Holland occupational code for each of the occupations using the *Dictionary of Holland Occupational Codes* (Gottfredson & Holland, 1996). Additionally, overall average level of cognitive complexity for each sex's occupational choices and the average level of cognitive complexity of each Holland occupational type for each sex's occupational choices was calculated by taking the mean level of complexity based on the classification in the *Dictionary of Holland Occupational Codes*. The classification of the career and occupational titles is not an exact science and was subject to judgment. The careers and occupations were classified first using the Occupational Employment Statistic Occupations (OES) section of the book. If the occupation could not be found, then it was then classified by the Standard Occupational Classification Occupations (SOC), followed by the Dictionary of Occupational Titles (DOT). The OES classification is used by the Bureau of Labor Statistics as the basis of developing national information on occupational employment. The SOC was developed by the U.S. Office of Federal Statistical Policy and Standards to provide a uniform method of classifying occupations of agencies and is slightly longer because it does not consolidate categories as much as the OES classification. The DOT is the most specific and, therefore, longest list of occupations. If an occupational description on the other two lists is not specific enough to be considered equivalent with the Census occupation as classified in the IPUMS data, it would likely be more specific on the DOT list. For example, the OES and SOC have one Holland code and cognitive complexity score for all "Psychologists," but the DOT has multiple classifications for

psychologists, including “Psychologist, Chief,” “Psychologist, Counseling,” “Psychologist, Developmental,” “Psychologist, Educational,” etc. The primary Holland code (the first of the three letters according to the appropriate section of the book), was considered its code. In the event of a career category spanning multiple occupations with different primary Holland codes, see Kang and Gottfredson (in press) for the method for obtaining a code for several occupational titles. For any occupations that are not in the dictionary, the raters researched the definition of the occupation online on the O*NET website and completed a Position Classification Inventory form according to the Position Classification Inventory (PCI) professional manual (Gottfredson & Holland, 1991). An index of agreement between the two raters was calculated using the κ coefficient (Cohen, 1960), the proportion of agreement after chance agreement is removed from consideration. When agreement is equal to chance agreement, $\kappa = 0$. The κ coefficient can be expressed in terms of proportion, using the proportion of units in which the judges agree, p_0 , and the proportion of units for which agreement is expected by chance, p_c :

$$\kappa = \frac{p_0 - p_c}{1 - p_c}$$

with an approximation of the standard error of κ in terms of proportion:

$$\sigma_\kappa = \sqrt{\frac{p_0(1 - p_0)}{N(1 - p_c)^2}}$$

It can also be expressed in frequencies, for ease of computation, using the frequency of units in which the judges agree, f_0 , and the frequency of units for which agreement is expected by chance, f_c :

$$\kappa = \frac{f_0 - f_c}{N - f_c}$$

with an approximation of the standard error of κ in terms of frequencies:

$$\sigma_{\kappa} = \frac{\sqrt{\frac{f_0(N - f_0)}{N(N - f_c)^2}}}{N - f_c} = \frac{\sqrt{f_0(1 - \frac{f_0}{N})}}{N - f_c}$$

Less than chance agreement results in negative values of κ , while greater than chance agreement results in positive values of κ with an upper limit of 1.00, when there is perfect agreement. The raters then jointly reviewed the disputed Holland type recodes, first to determine if an explicit Holland type of the occupation was overlooked in the Dictionary, and secondly to come to a consensus given the PCI classification and supporting online descriptions of the occupation. In order to code the millions of cases' census occupations into Holland types, the recodes were automated in SPSS so that each subject was not recoded individually. Each decennial census occupational classifications are somewhat different, so different recode syntax was written for each census.

Super's (1954) initial theory of vocational development divided the lifetime into stages based on age: the crystallization stage from 14 to 18 years, the specification stage from 18 to 21 years, the implementation stage from 21 to 24 years, the stabilization stage from 24 to 35 years, the consolidation stage at age 35, and the readiness for retirement stage at age 55. He later changed the stages and expanded the age range to: growth from birth to 14 years, exploration from 15 to 24 years, establishment from 25 to 44 years, maintenance from 45 to 64 years, and decline starting at 65 years (Super, 1977). Since then, career development has been viewed as a more flexible process, even by Super himself. Later theories acknowledge that

career development stages may occur cyclically as people explore new career options, and may occur at different points in life (Blustein, 1988; Freeman, 1993; Super, 1990). An exploratory analysis of age differences utilized Super's initial age ranges by dividing the subjects into the following groups: 18-21 years, 22-25 years, and 26-29 years. The Holland occupational type and cognitive complexity trends for women and men were compared between those age ranges and discussed separately if differences between the age range groups were found.

Holland Occupational Types and Cognitive Complexity

The data was reported as percentages of women and men employed in occupations in the six Holland codes each Census and the American Community Survey, and the mean cognitive complexity index of occupations in which women and men were employed from 1960 to 2010. Trends over time were examined by plotting the percentages of women and men employed in occupations in each of the six Holland categories and mean cognitive complexity index for occupations for women and men, and the mean cognitive complexity for each Holland occupational code for women and men in each age group from 1960 to 2010.

The trends in percentages of young men and women who were employed in the traditionally male-dominated career types (Realistic, Investigative, and Enterprising) and those who endorse the traditionally female-dominated career types (Artistic, Social, and Conventional), as well as the mean level of complexity of occupations were analyzed. The trends in the percentage of men and women who were employed in Realistic, Investigative, Artistic, Social, Enterprising, and Conventional career types in 1960, 1970, 1980, 1990, 2000, and 2010 were plotted

and the differences between men and women compared. The hypotheses were that while young women (ages 18 to 29 years) had greater percentages in the Artistic, Social, and Conventional types, the difference between young women and young men has decreased from 1960 to 2010; that while young men had greater percentages in the Realistic, Investigative, and Enterprising types, the difference between young men and young women has decreased from 1960 to 2010; and that while young men had a higher mean cognitive complexity index score of occupations, the difference between young men and young women decreased from 1960 to 2010.

In order to capture the overall change from 1960 to 2010, the following was calculated: odds of men and women being employed in each Holland occupational category, the relative odds from men to women in 1960 and 2010, the relative odds for women and men from 1960 to 2010, and the change in relative odds (ratio of relative odds) from 1960 to 2010.

Racial Groups

An exploration was conducted as to the feasibility of comparing racial groups of men and women across time. This feat is made more difficult because of the change in the census racial categories from 1960 to 2010. In 1960, the item was open ended and asked if a person was “White, Negro, American Indian, Japanese, Chinese, Filipino, Hawaiian, Part Hawaiian, Aleut, Eskimo, etc.?” In 2010, the forced choice item included: White; Black, African Am., or Negro; American Indian or Alaska Native; Asian Indian; Japanese; Native Hawaiian; Chinese; Korean; Guamanian or Chamorro; Filipino; Vietnamese; Samoan; Other Asian -- Print race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on; Other Pacific Islander --

Print race, for example, Fijian, Tongan, and so on; Some other race -- Print race.”

Even if there appear to be corresponding categories with different labels, in order to compare racial differences across time, I would have to assume that the survey respondents also considered the labels equivalent. A July 2, 2014 search in the literature (in Academic Search Premier, PsycARTICLES, PsycINFO, Social Sciences Full Text; keywords: Census, race, and longitudinal or repeated measure) about how race has been compared as a variable over time with Census data, given the differences in terminology in different decades, was completed in order to determine if a precedent for racial comparisons existed in Census research. It found that previous research avoided this issue by focusing on either a short period of time in which the terminology was similar (Abel & White, 2011; Flores & Lin, 2013; Gonzalez, Sanders-Jackson, Song, Cheng, & Glantz, 2013), or the subject pool was limited to those who identified with White, Black and Hispanic groups, and classified any other racial group as “Other” (Cleveland & Gilson, 2004; Britton & Goldsmith, 2013). Passel (2011) compared White, Black, Asian, and Hispanic groups in in the 1900s and 2010, but did not specify how the Census race labels were grouped for each of those years, and did not compare each racial group across time, thereby avoiding the issues of equating terms in different Censuses and of accounting for racial groups that were not measured in the earlier Censuses.

Due to the difficulty in determining equality of racial categories in the Census from 1960 to 2010, trends in occupational choices of different racial groups are not compared. However, racial composition of each sample was calculated.

Income

Income data of men and women in each RIASEC occupational category was compared from 1960 and 2010 in 2010-dollars. Income data was gathered from the 1960 Census and 2010 ACS as they report each respondent's total pre-tax wage and salary income (money received as an employee) for the previous year (for the Census) or 12 months (for the ACS). Sources of income include wages, salaries, commissions, cash bonuses, tips, and other money income received from an employer. Payments-in-kind or reimbursements for business expenses are not included. The reported income was not designated as solely from the primary occupation indicated by the respondent. For the 1960 and 2010 income data, the average of the log of the incomes was derived. This average was transformed back into dollars. For the 1960 data, the income was converted into 2010 dollars using the United States Bureau of Labor Statistics Consumer Price Index (CPI) Inflation Calculator (<http://data.bls.gov/cgi-bin/cpicalc.pl?cost1=1&year1=1960&year2=2010>). Income differences between gender across time were calculated as the change from 1960 to 2010 in 2010 dollars. Number of hours per week of work or full-time/part-time status of occupational employment were not included because this information was not available. Given that hours worked was not reported, income per hour worked could not be calculated.

Results

The index of agreement between the two raters, the κ coefficient (Cohen, 1960), the proportion of agreement after chance agreement is removed from consideration was calculated from the frequency of units in which the judges agreed,

f_0 , and the frequency of units for which agreement was expected by chance, f_c , to be $\kappa = 0.94$.

$$\kappa = \frac{f_0 - f_c}{N - f_c} = \frac{2719 - 822.98}{2834 - 822.98} = 0.942815102104985$$

with an approximation of the standard error of κ in terms of frequencies:

$$\begin{aligned} \sigma_\kappa &= \sqrt{\frac{f_0(N - f_0)}{N(N - f_c)^2}} = \frac{\sqrt{f_0(1 - \frac{f_0}{N})}}{N - f_c} = \frac{\sqrt{2719(1 - \frac{2719}{2834})}}{2834 - 822.98} \\ &= 0.00522320547302943 \end{aligned}$$

Descriptives

Sex

Percent of males and females in each year's sample was calculated (Table 9).

Males and females were approximately evenly represented, with no more than a 2.8 percentage point difference between the two in any year.

Table 9

Sex	Year					
	1960	1970	1980	1990	2000	2010
% Male	48.9	48.6	49.7	50.0	50.5	50.5
% Female	51.1	51.4	50.3	50.0	49.5	49.5
N =	265013	733375	2456749	2259153	2192104	438895
Sample	1% PUMS	1% PUMS	5% PUMS	5% PUMS	5% PUMS	ACS

Age

Percent of individuals ages 18-29 was calculated for each year's sample

(Table 10). Percentages ranged from 6.6 to 10.2.

Table 10

Percent of Census Samples of Each Age in Years

Age	Year					
	1960	1970	1980	1990	2000	2010
18	9.4	10.2	8.6	8.0	9.2	9.7
19	8.6	9.5	8.9	8.5	9.1	9.1
20	8.2	9.2	8.8	8.2	8.7	8.6
21	8.4	8.8	8.6	7.7	8.1	8.2
22	8.2	9.2	8.6	7.4	7.9	8.0
23	8.0	9.2	8.5	7.7	7.8	7.8
24	8.1	7.3	8.4	7.8	7.7	8.0
25	8.2	7.4	8.3	8.6	7.8	8.1
26	7.8	7.6	8.1	8.7	7.7	7.9
27	8.2	7.9	8.0	9.0	8.2	8.2
28	8.2	7.0	7.6	8.9	8.6	8.2
29	8.7	6.6	7.6	9.5	9.1	8.2

Race

Comparisons were not made between racial categories based on the difference in how the item was presented in each year's survey. The 1960-1990 Censuses did not include options for multiple races. Although the racial categories were coded similarly in the data and the data were compiled in the same categories, the difference in the terms used in the race item and the availability of different choices each year make it difficult to assume that the categories are comparable. However, the racial composition of the sample was calculated for each year based on the available data (Table 11).

Table 11.

Percent of Census Sample Who Identified with Racial Category (1960-1990 Censuses do not include options for multiple races)

Year	1960			1970			1980			1990			2000			2010		
	Total	Male	Fem ale	Total	Male	Fem ale	Total	Male	Fem ale	Total	Male	Fem ale	Total	Male	Fem ale	Total	Male	Fem ale
White	87.9	88.5	87.4	87.6	88.1	87.1	84.5	85.1	83.8	78.8	79.1	78.6	70.5	70.7	70.4	72.9	72.9	73.0
Black/ Negro	11.0	10.5	11.5	10.9	10.4	11.4	12.6	11.9	13.2	11.6	11.0	12.3	12.5	11.8	13.1	12.1	12.0	12.1
Indian or Alaska Native	0.3	0.4	0.3	0.4	0.4	0.4	0.7	0.7	0.8	1.0	1.1	1.0	1.2	1.2	1.2	1.1	1.2	1.1

Chinese	0.1	0.2	0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.7	0.7	0.7	0.9	0.9	1.0	1.3	1.2	1.3
Japanese	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2
Other Asian or Pacific Islander	0.1	0.1	0.1	0.3	0.3	0.4	1.0	0.9	1.1	2.1	2.1	2.1	3.2	3.2	3.3	4.0	3.9	4.1
Other race, nec	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.4	5.3	5.7	5.0	8.4	9.0	7.8	5.4	5.7	5.1
Two major races	-	-	-	-	-	-	-	-	-	-	-	-	2.8	2.8	2.7	2.8	2.8	2.8
Three or more major races	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.2	0.3	0.2	0.3

Immigration

The percentage of each year's sample who indicated a specific year of immigration was calculated (Table 12). The 1960 Census does not include this data. Occupational choices between immigrants and non-immigrants were not compared due to the difficulty determining from the available data on immigration year whether an individual was an immigrant.

Table 12

Percent of Sample who Indicated an Immigration Year

Year	% who indicated an immigration year
1960	-
1970	3.9
1980	5.9
1990	10.8
2000	15.9
2010	13.5

Gender composition of RIASEC occupational types

The percentage Realistic occupation type workers who were women generally decreased slightly from 1970 to 2010, while the percentage of Realistic occupation type workers who were men increased during that time for all age groups (Figure 11). During that time period, men have consistently outnumbered women in Realistic occupations.

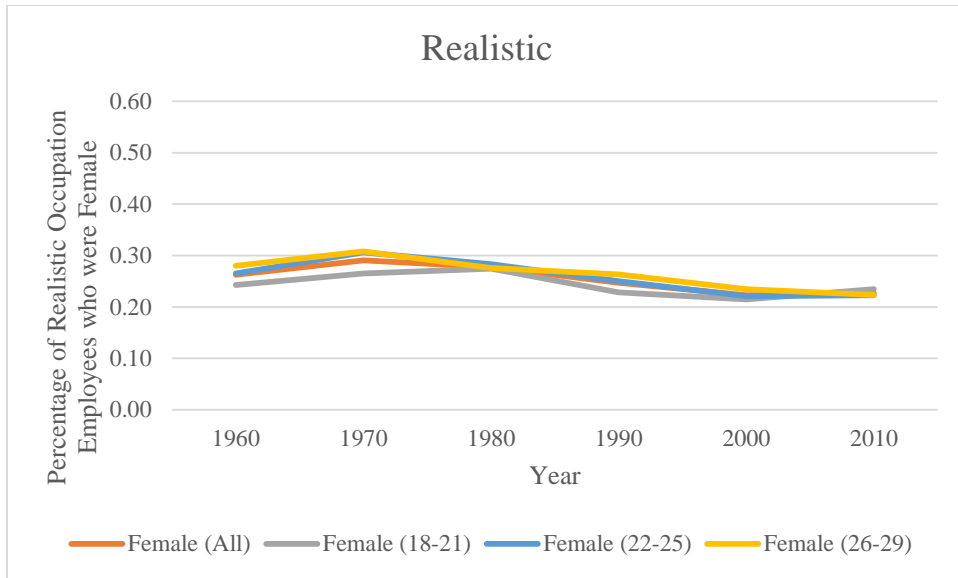


Figure 11. Percentage of Realistic type occupation workers who were female from 1960 to 2010.

The percentage of Investigative occupation type workers who were women decreased dramatically from 1960 to 1980, and then increased moderately until 2010 for all age groups (Figure 12). During this time period, men have fairly consistently outnumbered women in Investigative occupations, with the exception of the 22-25 year age group in 1960, when women comprised 51% of Investigative occupation workers in that age group. However, after that, the percentage of Investigative occupation type workers who were women has decreased.

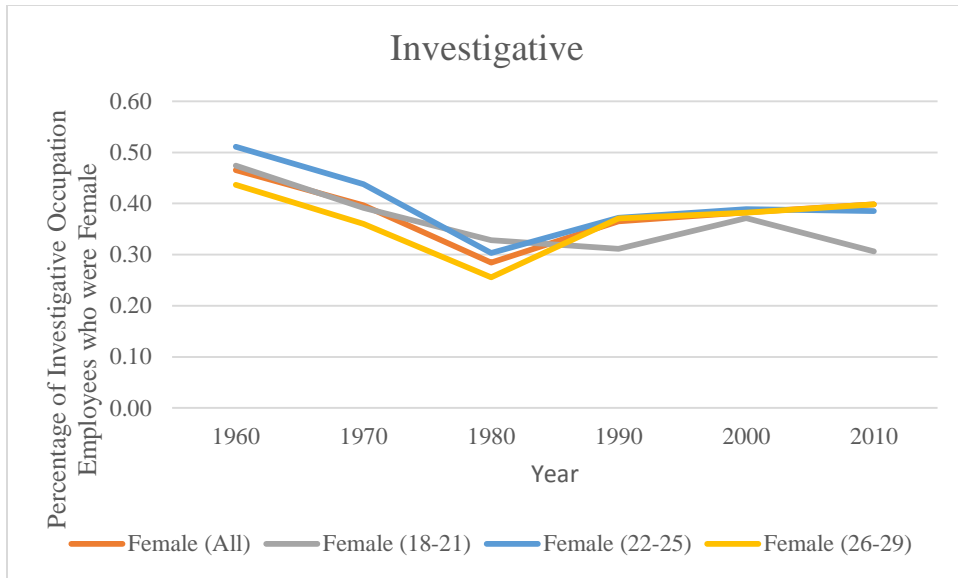


Figure 12. Percentage of Investigative type occupation workers who were female from 1960 to 2010.

The percentage of Artistic occupation type workers who were women has been fairly consistent from 1960 to 2010, with a dip in 1970 (Figure 13).

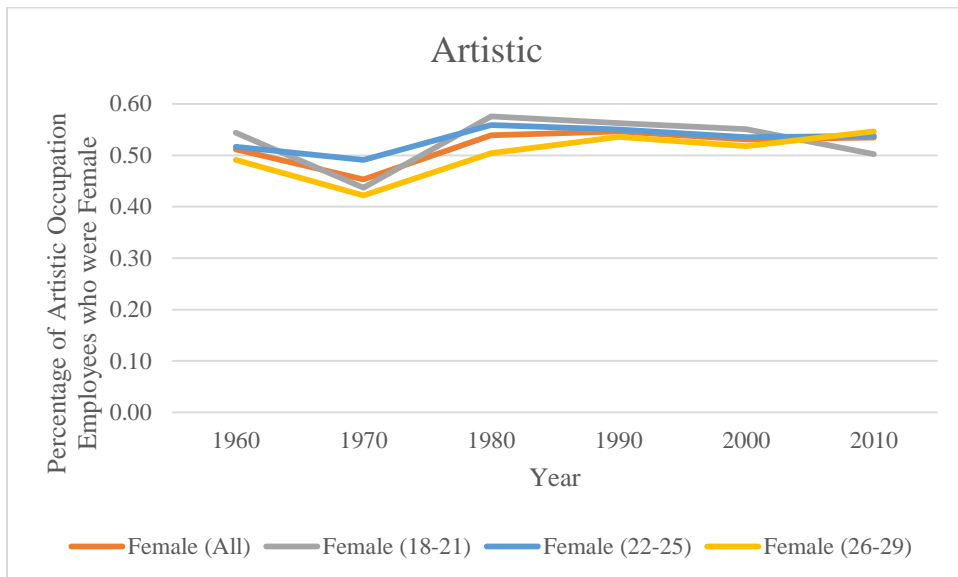


Figure 13. Percentage of Artistic type occupation workers who were female from 1960 to 2010.

The percentage of Social occupation type workers who were women has been fairly consistent from 1960 to 2010 (Figure 14). During that time period, women have consistently outnumbered men in Social occupations (63-76% of the Social occupation workers).

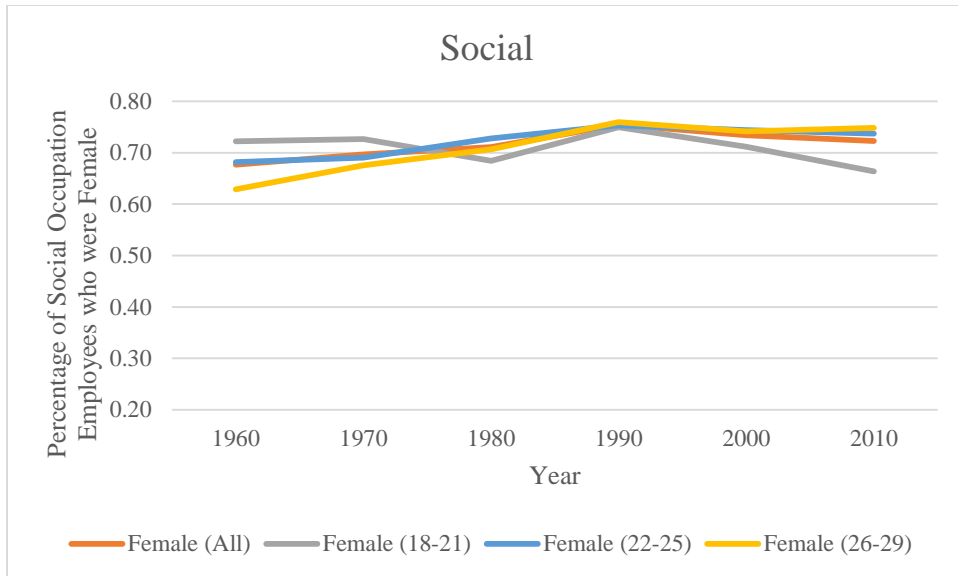


Figure 14. Percentage of Social type occupation workers who were female from 1960 to 2010.

The percentage of Enterprising occupation type workers who were women increased from 1970 to 1980, after which it has remained fairly stable (Figure 15). The youngest age group of women, ages 18-22 years, consistently comprised a greater percentage of their age group of Enterprising occupation workers than did the middle age group, ages 22-25 years, which was consistently higher than oldest age group, ages 26-29 years. For the youngest group, the majority of Enterprising occupation type workers were always women during that time period. For the middle and older group, the majority of Enterprising occupation type workers were male until 1980, at which point the middle age group surpassed their male counterparts in numbers, and the older age group rivaled their male counterparts.

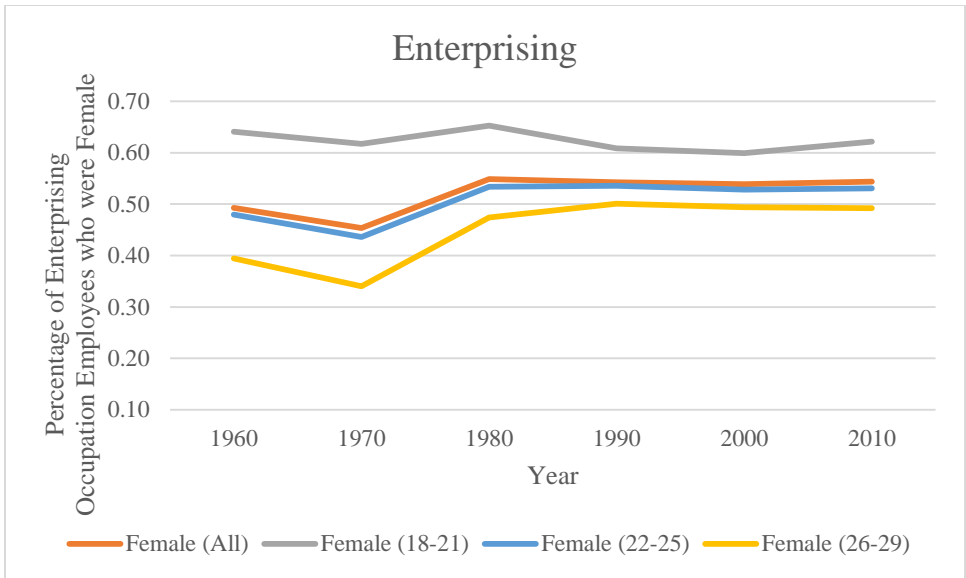


Figure 15. Percentage of Enterprising type occupation workers who were female from 1960 to 2010.

The percentage of Conventional occupation workers who were female decreased from 1980 to 2010 for all age groups (Figure 16). The vast majority of Conventional occupational workers (68-85%) were women from 1960 to 2010.

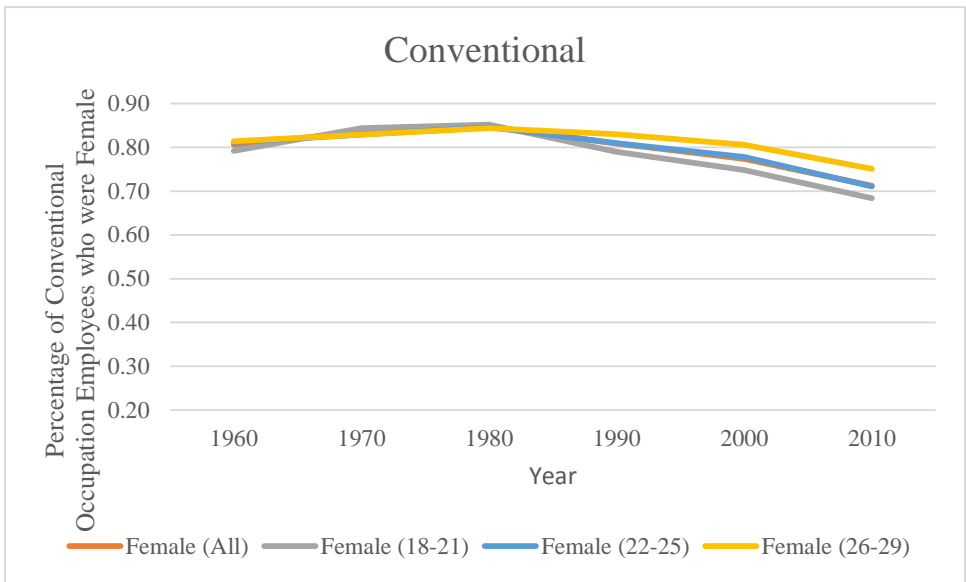


Figure 16. Percentage of Conventional type occupation workers who were female from 1960 to 2010.

A higher percentage of the male population than the female population in all age groups, 18 to 29 years, were employed in Realistic occupations from 1960 to 2010 (Figure 17).

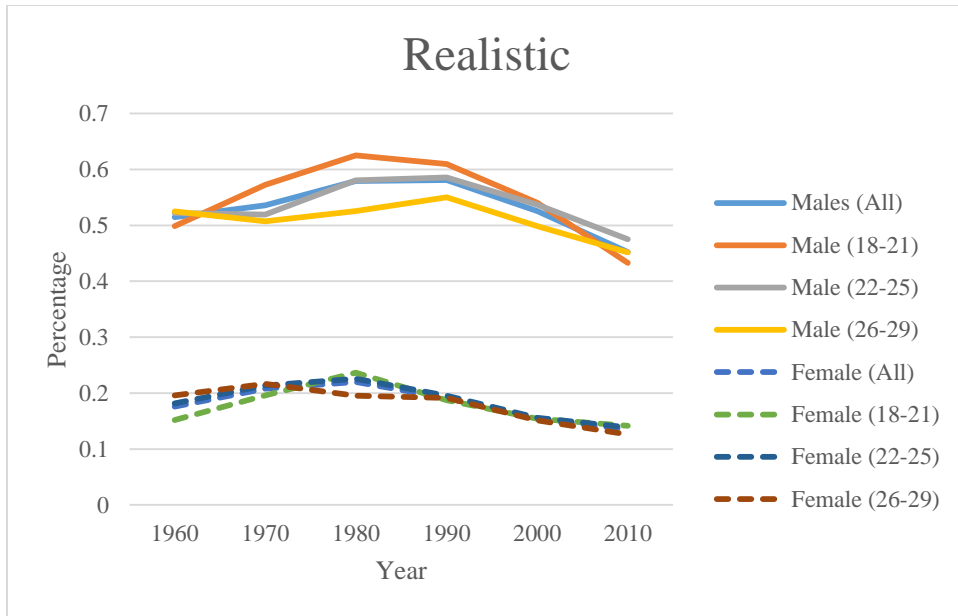


Figure 17. Percentage of workers of each sex in each age range employed in Realistic type occupations from 1960 to 2010.

Overall, a higher percentage of males were employed in Investigative occupations than of females (Figure 18). The trends for all groups remained fairly consistent for most of the time between 1960 and 2010. However, the oldest age group, 26-29 years, increased in representation in Investigative occupations for both sexes from 2000 to 2010.

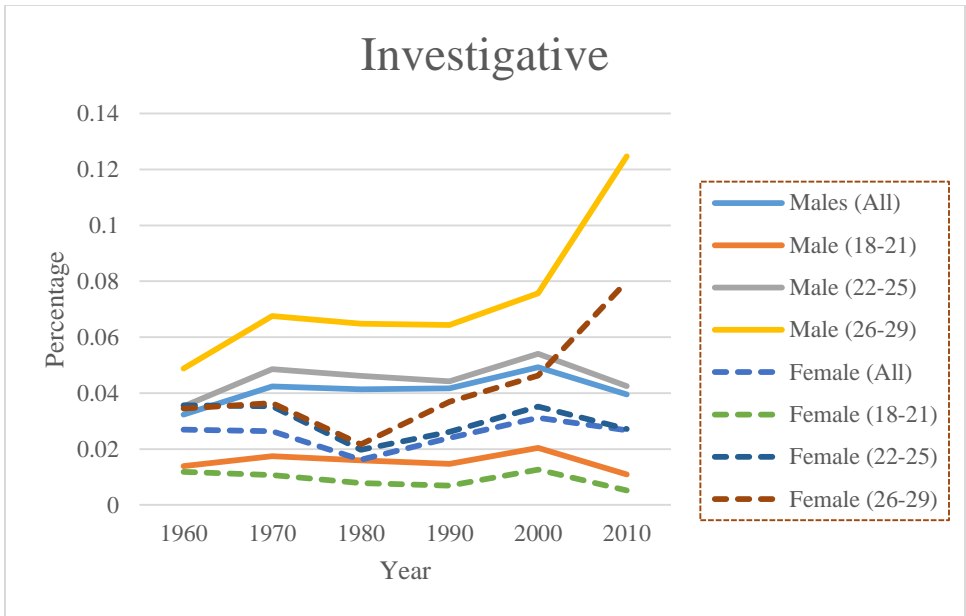


Figure 18. Percentage of workers of each sex in each age range employed in Investigative type occupations from 1960 to 2010.

Although the percentage of men and women employed in Artistic type occupations increased from 1970 to 2010, there were still less than 2% of men and women employed in Artistic occupations during that time (Figure 19).

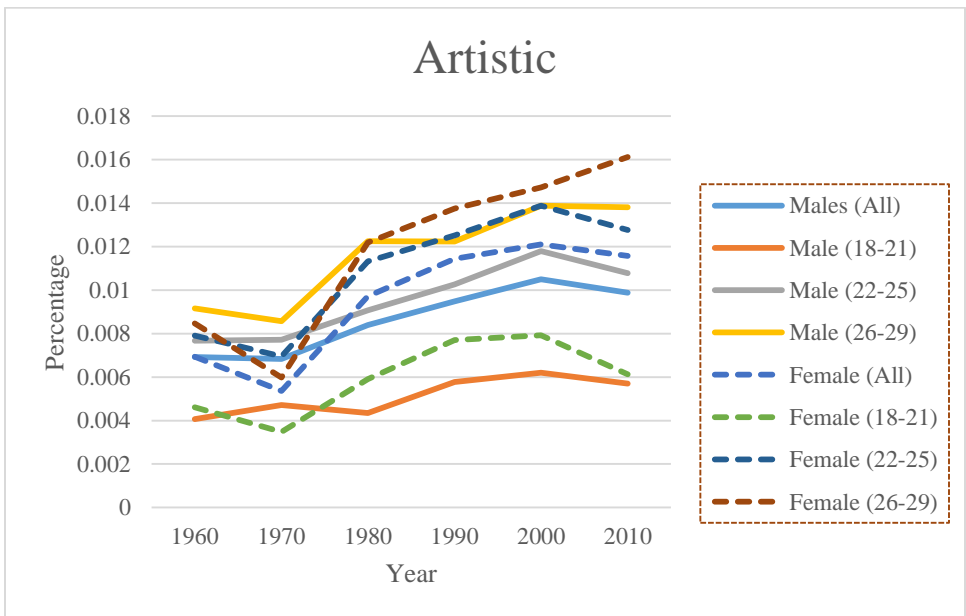


Figure 19. Percentage of workers of each sex in each age range employed in Artistic type occupations from 1960 to 2010.

From 1960 to 2010, all age groups of men were fairly consistent in their representation in Social occupations with less than 10% of men employed in this area (Figure 20). However, while all groups of women decreased in representation in Social occupations from 1970 to 1980, they all increased approximately 10 percentage points from 1980 to 2010.

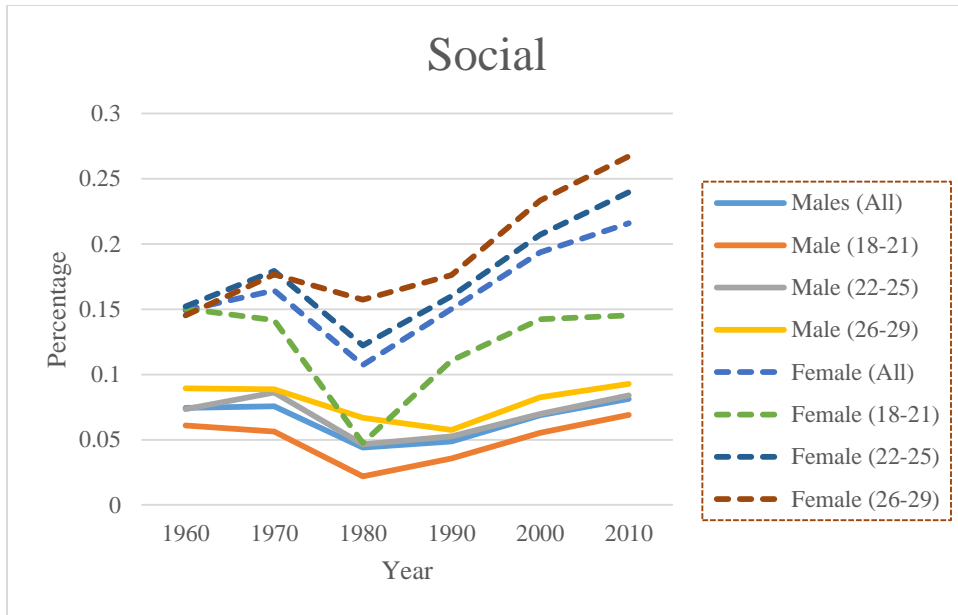


Figure 20. Percentage of workers of each sex in each age range employed in Social type occupations from 1960 to 2010.

All age groups in both sexes increased proportional representation in Enterprising occupations from 1960 to 1980 or 1990, after which the percentage of men and women in Enterprising occupations stabilized (Figure 21).

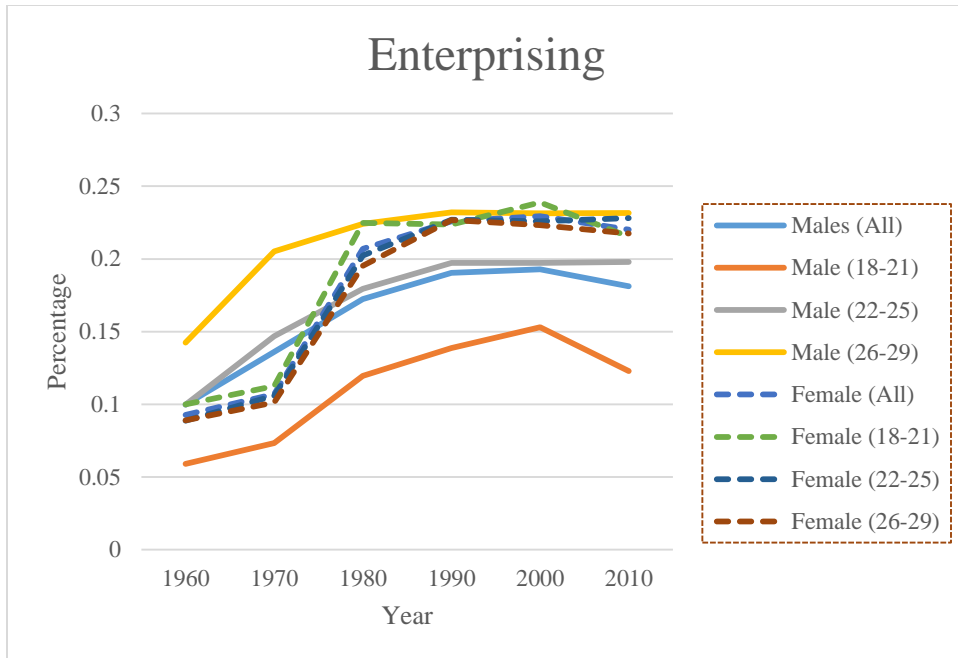


Figure 21. Percentage of workers of each sex in each age range employed in Enterprising type occupations from 1960 to 2010.

The percentage of women employed in Conventional occupations has consistently been greater than that of men from 1960 to 2010 (Figure 22). While the percentage of women in all age groups has decreased during that time, the percentage of men in Conventional occupations remained fairly stable.

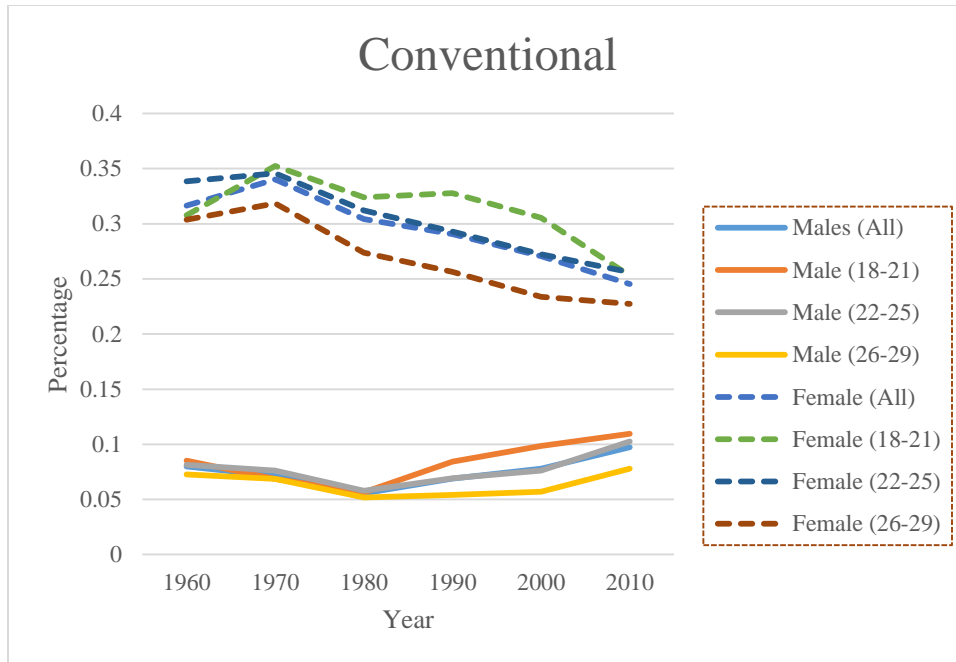


Figure 22. Percentage of workers of each sex in each age range employed in Conventional type occupations from 1960 to 2010.

Cognitive Complexity

Average cognitive complexity of occupations within each RIASEC category

held by males and females in each age group were calculated for each decade.

Overall, average cognitive complexity in each decade was between 49 and 58 for males and females in each age group, with trends increasing from 1960 to 2010 (Table 13). When all RIASEC categories were combined, average female cognitive complexity was typically higher than average male cognitive complexity in the whole group (ages 18-29 years).

Table 13

Average Cognitive Index of Occupations in All RIASEC Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
All 18-29 years						
Male	52.08	52.93	52.57	52.94	53.39	53.45
Female	52.69	52.93	54.07	54.49	55	55.24
18-21 years						
Male	49.19	49.43	49.61	49.96	50.93	50.68

Female	51.73	51.28	51.99	52.18	52.54	52.14
22-25 years						
Male	52.44	53.88	52.95	53.29	53.66	53.62
Female	53.26	53.84	54.56	54.94	55.44	55.47
26-29 years						
Male	54.21	55.72	55.16	55.15	55.54	55.82
Female	53.06	53.88	55.8	56.02	56.96	57.77

Among those in Realistic type occupations, average cognitive complexity was higher for males than for females in nearly all age groups and years (Table 14).

Table 14

Average Cognitive Index of Occupations in Realistic Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
All 18-29 years						
Male	48.61	48.54	48.32	48.68	48.79	48.73
Female	46.99	45.66	46.26	46.46	46.88	48.67
All	48.18	47.7	47.75	48.13	48.36	48.72
18-21 years						
Male	47.31	47.12	47.32	47.27	48.1	47.94
Female	46.78	45.43	45.96	46.03	46.92	48.25
22-25 years						
Male	48.94	49.16	48.6	49	48.93	48.87
Female	47.21	45.94	46.4	46.6	46.91	48.97
26-29 yrs						
Male	49.58	49.9	49.33	49.82	49.43	49.46
Female	46.95	45.6	46.49	46.71	46.8	48.87

Among those in the Investigative occupations, average cognitive complexity was higher for males than for females for all age groups and all decades (Table 15).

Table 15

Average Cognitive Index of Occupations in Investigative Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
All 18-29 years						
Male	71.15	70.76	70.97	71.29	71.05	71.41
Female	67.55	68.75	70.14	70.94	69.99	70.92
All	69.48	69.96	70.73	71.16	70.64	71.22
18-21 years						

Male	68.86	68.9	69.01	70.14	69.61	69.64
Female	66.81	68.54	68.79	70.11	68.11	69.43
22-25 years						
Male	70.79	70.54	70.71	71.04	70.88	71.06
Female	67.53	68.73	70.06	70.82	69.79	70.47
26-29 yrs						
Male	72.09	71.56	71.71	71.69	71.58	71.95
Female	67.84	68.84	70.75	71.14	70.64	71.33

Among those in the Artistic occupations, average cognitive complexity was similar for males and females for all age groups and decades (Table 16).

Table 16

Average Cognitive Index of Occupations in Artistic Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
ALL 18-29 yrs						
Male	66.18	65.76	65.98	64.98	65.32	65.34
Female	66.17	65.63	66.09	64.88	65.1	64.98
All	66.17	65.7	66.04	64.93	65.2	65.15
18-21 years						
Male	66.04	65.73	65.87	64.75	65.23	65.4
Female	65.96	65.33	65.88	64.6	64.72	64.39
22-25 years						
Male	66.01	65.65	65.98	65.03	65.33	65.3
Female	66.25	65.66	66.06	64.99	65.19	65.22
26-29 yrs						
Male	66.39	65.88	66.02	65.05	65.36	65.34
Female	66.22	65.82	66.23	64.93	65.23	65.04

Among those in the Social occupations, average cognitive complexity was typically higher for males than for females when all ages were combined (Table 17), and for the oldest group, 26-29 years. However, for the 18-21 year old and 22-25 year old groups, there was variability, with cognitive complexity ultimately being higher for males than females in the later years.

Table 17

Average Cognitive Index of Occupations in Social Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
All 18-29 years						
Male	53.57	57.93	60.28	59.31	59.24	58.71
Female	53.26	55.66	62.31	57	56.83	57.11
All	53.36	56.35	61.72	57.57	57.47	57.55
18-21 years						
Male	50.2	52.19	56.44	57.27	54.86	54.61
Female	50.89	50.94	58.53	53.84	52.72	52.47
22-25 years						
Male	54.05	59.27	60.01	59.56	60.17	59.48
Female	54.64	57.15	62.49	57.44	57.46	57.34
26-29 yrs						
Male	55.58	61.17	61.91	60.29	61.64	61.53
Female	54.43	58.13	63.42	58.39	58.87	59.54

In the Enterprising occupations, cognitive complexity of males was consistently higher than that of females for all age groups at all decades. The trend from 1960 to 2010 showed a decrease in the difference over time.

Table 18

Average Cognitive Index of Occupations in Enterprising Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
All 18-29 years						
Male	62.37	60.28	59.02	59.28	58.51	57.9
Female	50.83	52.25	54.88	57.09	57.12	56.3
All	56.68	56.64	56.75	58.09	57.76	57.03
18-21 years						
Male	58.55	56.83	55.7	56.01	55.64	54.53
Female	50.21	51.08	52.65	53.84	54.15	53.24
22-25 years						
Male	52.54	60.41	59	59.23	58.48	57.59
Female	50.85	52.92	55.51	57.68	57.52	56.31
26-29 yrs						
Male	63.91	61.76	61.04	61.14	60.58	60.24
Female	51.55	53.12	57.03	59.36	59.99	59.44

Among those in the Conventional occupations, average cognitive complexity was typically slightly higher for females than for males in the two younger age groups and decades, with the exception of 22-25 year olds in 1970, 1980, and 2010, when the average for males was slightly higher (Table 19). For the older group, 26-29 year olds, there was some variability, with averages being very close (differences ranging from 0.43 to 1.27)

Table 19

Average Cognitive Index of Occupations in Conventional Categories of Males and Females Ages 18-29 from 1960 to 2010.

	1960	1970	1980	1990	2000	2010
All 18-29 years						
Male	51.27	54.74	55.03	54	53.79	53.83
Female	54.58	54.83	55.03	54.68	54.3	54.05
All	53.93	54.82	55.03	54.55	54.18	53.98
18-21 years						
Male	48.95	52.45	52.63	51.85	52.16	51.96
Female	54.29	54.06	54.32	53.32	53.08	52.52
22-25 years						
Male	51.86	55.52	55.98	54.75	54.48	54.41
Female	54.71	55.22	55.33	55.17	54.69	54.35
26-29 yrs						
Male	53.46	56.72	56.84	56.25	55.92	56.1
Female	54.73	55.46	55.57	55.72	55.49	55.49

The trend in average cognitive complexity of women in all RIASEC categories appeared to have increased from 1960 to 2010 (Figure 23). Average cognitive complexity of men in all RIASEC categories also appeared to have increased, but to a lesser extent than that of women.

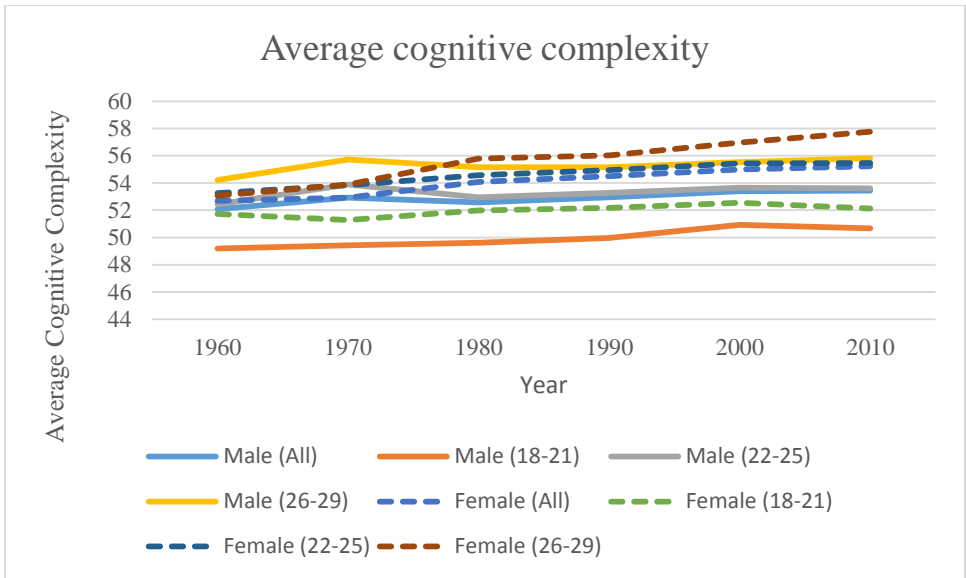


Figure 23. Average cognitive complexity of both sexes in each age group from 1960 to 2010.

The average cognitive complexity of Realistic occupations of men has been fairly consistent from 1960 to 2010, while it ultimately increased for women with a decrease between 1970 and 2000 (Figure 24).

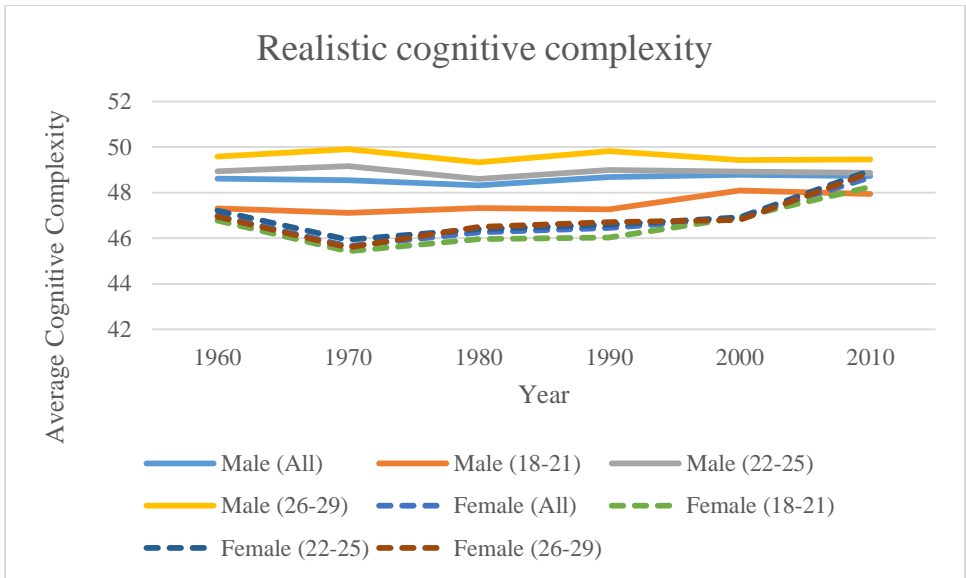


Figure 24. Average cognitive complexity of both sexes in each age group in Realistic type occupations from 1960 to 2010.

The average cognitive complexity of Investigative occupations has been fairly consistent for men from 1960 to 2010. From 1960 to 1980, there was an increase in

the average cognitive complexity of occupations held by young women, after which it has generally remained stable (Figure 25).

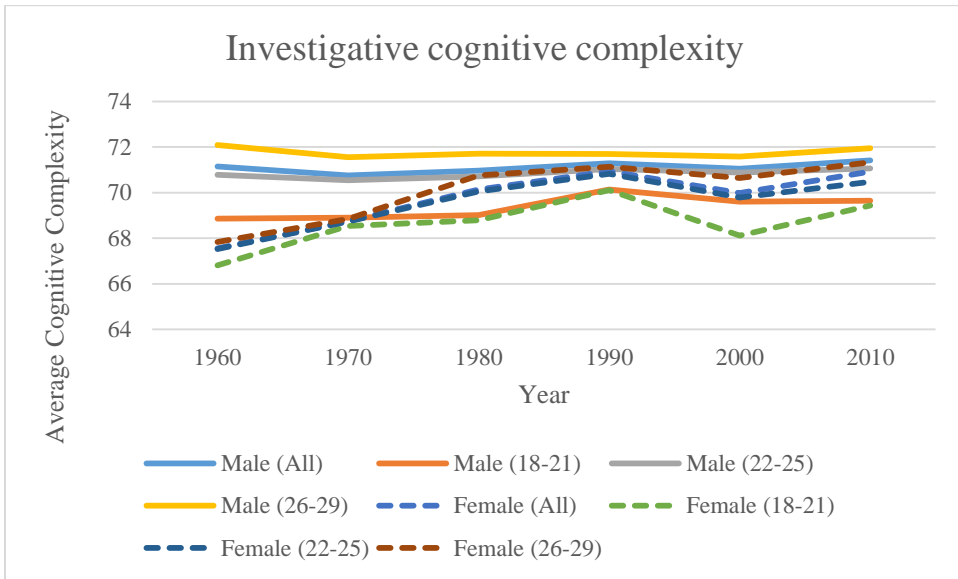


Figure 25. Average cognitive complexity of both sexes in each age group in Investigative type occupations from 1960 to 2010.

The average cognitive complexity of Artistic type occupations held by men and women has decreased very slightly from 1960 to 2010 (Figure 26).

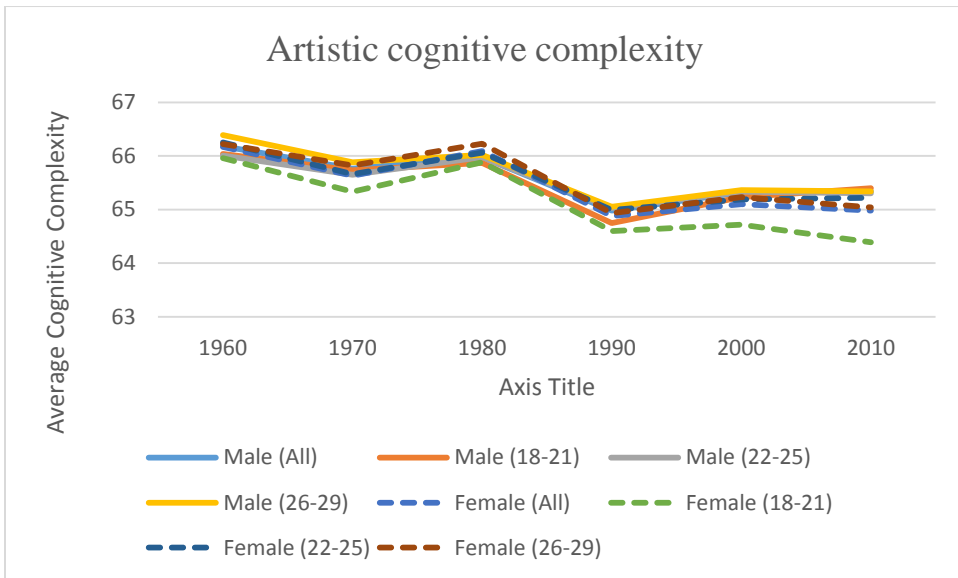


Figure 26. Average cognitive complexity of both sexes in each age group in Artistic type occupations from 1960 to 2010

The average cognitive complexity of Social occupations increased from 1960 to 1970 for men and from 1960 to 1980 for women, after which it leveled and has been more consistent (Figure 27).

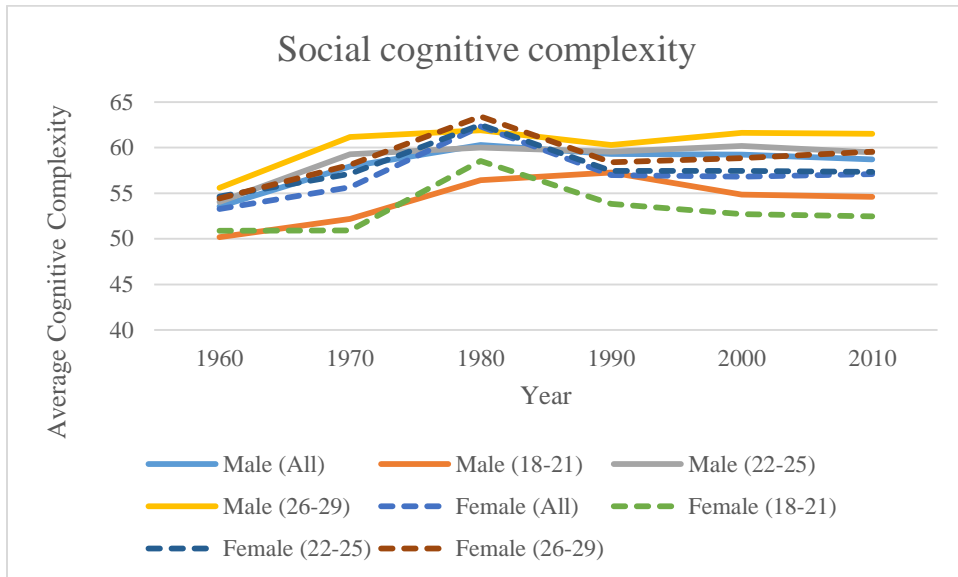


Figure 27. Average cognitive complexity of both sexes in each age group in Social type occupations from 1960 to 2010

Average cognitive complexity of Enterprising type occupations decreased for men from 1960 to 1980, and increased for women from 1960 to 1990, after which the trends have been more consistent (Figure 28).

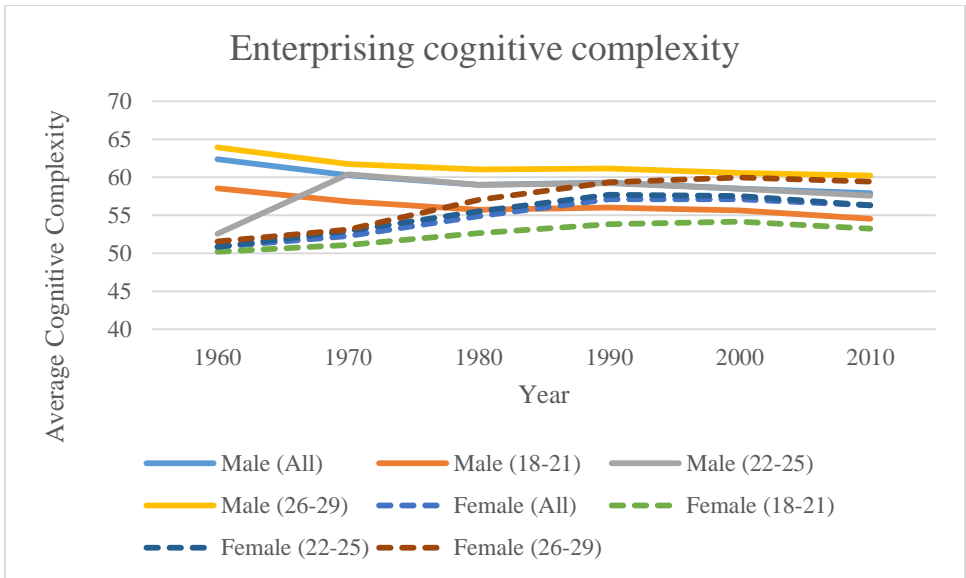


Figure 28. Average cognitive complexity of both sexes in each age group in Enterprising type occupations from 1960 to 2010

Average cognitive complexity of Conventional jobs has been fairly consistent for women from 1960 to 2010, but increased for men between 1960 and 1970 (Figure 29).

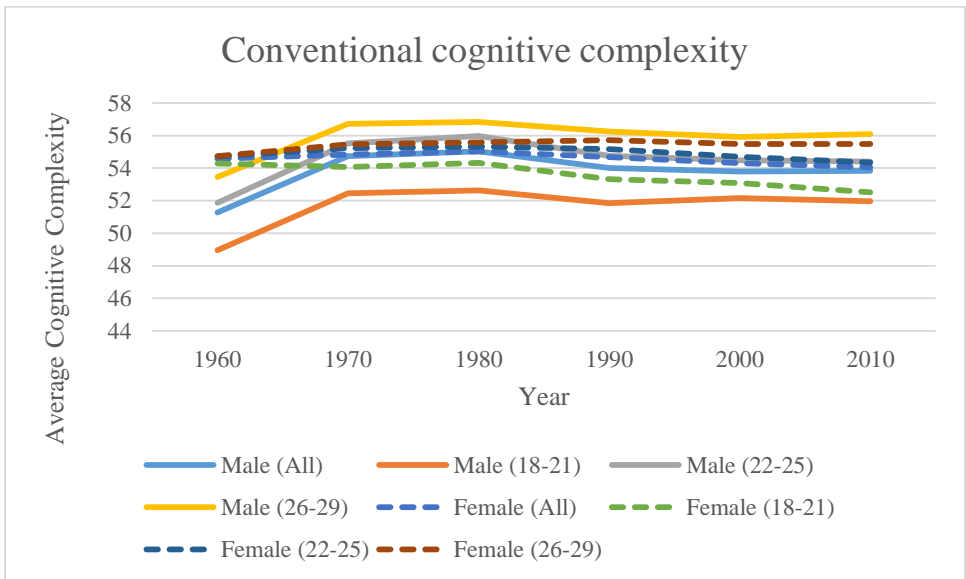


Figure 29. Average cognitive complexity of both sexes in each age group in Conventional type occupations from 1960 to 2010

Income

Average wage and salary of men in all occupational groups decreased in all RIASEC categories except for in the Investigative area. Average wage and salary of

women in all occupational groups increased with the exception of the Conventional occupations. This may be, in part, attributed to an increase in the number of hours worked and a shift in the types of occupations in which women were employed in these areas. The greatest gains for women were made in the Investigative, Social, and Enterprising areas.

Table 20

Average Wage and Salary of Males and Females Ages 18-29 Years in RIASEC Occupation Types in 1960 and 2010.

Group	1960 mean log	1960 in 1960\$s	1960 in 2010\$s	2010 mean log	2010 in 2010\$s	% change from 1960 to 2010 in 2010\$s
Male						
Realistic	3.3358	\$2,167	\$15,962	4.0204	\$10,481	-34
Investigative	3.5393	\$3,462	\$25,502	4.4847	\$30,528	20
Artistic	3.4445	\$2,783	\$20,501	4.1229	\$13,271	-35
Social	3.3773	\$2,384	\$17,562	4.0409	\$10,988	-37
Enterprising	3.434	\$2,716	\$20,011	4.1752	\$14,969	-25
Conventional	3.3299	\$2,137	\$15,746	3.9445	\$8,800	-44
Female						
Realistic	2.944	\$879	\$6,476	3.8496	\$7,073	9
Investigative	3.2180	\$1,652	\$12,170	4.4449	\$27,855	129
Artistic	3.1238	\$1,330	\$9,797	4.1174	\$13,104	34
Social	2.8156	\$654	\$4,818	4.0817	\$12,070	151
Enterprising	2.8018	\$634	\$4,667	4.0021	\$10,048	115
Conventional	3.1729	\$1,489	\$10,969	3.9421	\$8,752	-20
All RIASEC types						
Male	3.3405	\$2,190	\$16,135	4.0717	\$11,795	-27
Female	3.01	\$1,023	\$7,538	3.9997	\$9,993	33

Note. “1960 mean log”: the mean log (base 10) income in 1960; “1960 in 1960\$s”: 1960 mean log translated to the original metric, $10^{1960 \text{ mean log}}$; “1960 in 2010\$s”: conversion of 1960’s wage and salary into 2010 dollars; “2010 mean log”: the mean log (base 10) income in 2010; “2010 in 2010\$s”: 2010 mean log translated to the original metric, $10^{2010 \text{ mean log}}$.

Odds

Table 21 provides one way to summarize the changes in the employment patterns of men and women by Holland category of occupation over the half century between 1960 and 2010. The first column of results in the table reports the proportion of men and women employed in occupations in each of the six Holland categories in 1960 and 2010. The use of proportions is handy, because most readers feel that they understand proportions. Because proportions do not lend themselves to relative comparisons, the second column of results recasts these proportions as odds. Each entry is the odds that a man or a woman who is employed will be employed in the respective Holland category in 1960 or 2010. The next two columns report relative odds. First the odds that an employed woman or a man is employed in work in the respective RIASEC category in 2010 relative to 1960, then the odds that an employed man is employed in the RIASEC category in 1960 or 2010 relative to the odds that an employed woman is in that category of work. Finally, the last column summarizes the change in representation of men and women in each of the six categories between 1960 and 2010 by showing the ratio of the relative odds in 2010 to relative odds in 1960.

So, for instance, the table shows in the third column of results that the odds that an employed woman was in Realistic work in 2010 was .73 (about three-quarters) of the odds she would be employed in 1960. For men, the odd in 2010 were also reduced, but not quite so much, to .78 of the odds in the earlier year. The fourth column of results shows that in both 1960 and 2010, the odds that an employed man

would be in Realistic work is about five times the odds than an employed woman would be so employed.

The relative odds of Artistic, Social, and Enterprising work was higher for both women and men in 2010. Relative odds of Realistic work was lower for workers of both genders in 2010. The odds that an employed man will be in Conventional work relative to the odds for an employed woman is low, .19 in 1960 and .33 in 2010.

The odds of a female or a male worker being employed in a Realistic occupation decreased from 1960 to 2010 (relative odds 0.73 and 0.78, respectively). The odds of a male worker being employed in a Realistic occupation were higher than they were for a female worker in 1960, with a 6% increase in that ratio from 1960 to 2010.

The odds of a female worker being employed in an Investigative occupation was approximately the same in 1960 and 2010 (relative odds 0.99), although there was a 23% increase in the odds of a male worker being employed in this area during that time. From 1960 to 2010, there was a 25% increase in the relative odds that a male worker was employed in this category to the odds that a female worker was employed in the category.

The odds of a female or male worker being employed in an Artistic occupation increased from 1960 to 2010 (relative odds 1.67 and 1.43, respectively). The ratio of odds that a male worker was employed in this category to the odds that a female worker was employed in the category decreased from 1960 to 2010 (relative odds 0.86).

The odds that a female or male worker was employed in a Social occupation increased from 1960 to 2010 (relative odds 1.57 and 1.10, respectively). The odds of females being employed in this area were consistently greater than that of males, increasing during that time period (ratio of relative odds 0.70).

The odds that a female or male worker was employed in the Enterprising field increased from 1960 to 2010 (relative odds 2.76 and 2.00, respectively). The odds of females being employed in this area increased to surpass that of males during that time (ratio of relative odds 0.72).

The odds that a female worker was employed in the Conventional field decreased from 1960 to 2010 (relative odds 0.70), while that of a male worker increased (relative odds 1.24). During that time, the ratio of relative odds that a male worker was employed in this area to a female worker being employed in this area was 1.77, which was a 77% increase.

Table 21

Table of Proportion and Odds of Americans Ages 18-29 Years Who Were Employed in Holland Occupational Types

Gender	Year	p(Emp.)	odds(Emp.)	Relative odds		Ratio rel. odds M/F 2010/1960
				2010/1960	M/F	
Realistic						
Female	1960	0.18	0.21	0.73		
	2010	0.14	0.16			
Male	1960	0.51	1.06	0.78	4.97	1.06
	2010	0.45	0.83		5.27	
Investigative						
Female	1960	0.03	0.03	0.99		
	2010	0.03	0.03			
Male	1960	0.03	0.03	1.23	1.21	1.25
	2010	0.04	0.04		1.50	

Artistic						
Female	1960	0.01	0.01	1.67	1.00	0.86
	2010	0.01	0.01			
Male	1960	0.01	0.01	1.43	0.85	
	2010	0.01	0.01			
Social						
Female	1960	0.15	0.18	1.57	0.46	0.70
	2010	0.22	0.28			
Male	1960	0.07	0.08	1.10	0.32	
	2010	0.08	0.09			
Enterprising						
Female	1960	0.09	0.10	2.76	1.08	0.72
	2010	0.22	0.28			
Male	1960	0.10	0.11	2.00	0.78	
	2010	0.18	0.22			
Conventional						
Female	1960	0.32	0.46	0.70	0.19	1.77
	2010	0.25	0.33			
Male	1960	0.08	0.09	1.24	0.33	
	2010	0.10	0.11			

Note. $p(\text{Emp.})$ = proportion of workers of the respective gender employed in this type of work, $\text{odds}(\text{Emp.})$ = odds that a worker of the respective gender was employed in this type of work, relative odds 2010/1960 is the ratio of odds of employment in this category in 2010 to the odds of employment in this category in 1960, relative odds M/F = the ratio of odds that a male worker was employed in this category to the odds that a female worker was employed in the category, ratio of relative odds M/F 2010/1960 is the ratio of the relative odds in the previous column for 2010 to 1960.

Discussion

Hypothesis 1

The first hypothesis was that while greater percentages of young women than young men (ages 18 to 29 years) would have been employed in the Artistic, Social, and Conventional categories in more recent decades, the differences in proportionate representation of young women and young men would have decreased from 1960 to 2010.

In 1960 and 1970, there was similar representation of men and women in Artistic occupations, after which there were slightly more women than there were men (Figure 13). There was a general upward trend in the percentage of men and women in each age range who were employed in Artistic occupations, although the percentages hovered around 1% of the employed population (Figure 19). From 1980 to 2010, a slightly greater percentage of women than men ages 18 to 29 were employed in Artistic occupations (Figure 19). This was generally true for each three-year age range, with the percentage increasing with age. The 0.86 ratio of relative odds of men to women from 2010 to 1960 (Table 21) indicates that there was a decrease in the representation of men in this area from 1960 to 2010 and a 17% increase in the odds during that time that an employed Artistic worker would be female. Artistic occupations include artists, art/drama/music teachers, authors, designers, musicians, entertainers, editors, reporters, desktop publishers, and television editors. The employment increase in this area may be due to an increase in the types of media in which artists and entertainers could be employed, business expansion that requires designers to create space and resources for commercial use, and increased popularity of computer technology such as web publishing and other applications (U.S. Bureau of Labor Statistics, 1975). Of course, with a decline in the proportion of the population engaged in Realistic work, and because all employment must add to 100%, other categories of employment increase as a percentage by default.

From 1960 to 2010, women dominated Social occupations, making up more than 60% of the Social occupational workers (Figure 14). The percentage of women

employed in Social occupations consistently exceeded that of men for all age cohorts 18-29 years (Figure 20). The gender groups generally followed similar trends, with Social work increasing in popularity from 1960 to 1970, and dropping in 1980 before steadily rising to 2010, supporting the findings of McClain and Reardon (2015). Social occupation workers are a larger percentage of the female and male populations as the cohort age increases. Contrary to my hypothesis, the difference between the percentage of women and men employed in Social occupations increased over time, with the most overt divergence occurring between 1980 and 2010. The lowest percentage of men and women ages 18-29 years in Social occupations was in 1980 (4% of men and 11% of women) and the greatest in 2010 (8% of men and 22% of women). The 0.70 ratio of relative odds of men to women from 2010 to 1960 (Table 21) indicates that there was a decrease in the representation of men in this area from 1960 to 2010 and a 43% increase in the odds from 1960 to 2010 that a worker in the Social area would be female, further separating the representation of women and men in this area. Social occupations include mental health professionals, clergy, teachers, nurses, medical assistants, personal care aides, and police officers. An increase in the demand for young teachers was expected in the 1960s and 1970s due to the number of students in the baby boomer generation and the older age of the current teachers who were expected to leave the field (U.S. Bureau of Labor Statistics, 1975; U.S. Bureau of Labor Statistics, 1981). The decrease in participation in the Social occupations in 1980 may be, in part, due to the decrease in demand for teachers and related educational personnel as the number of students dropped. Similarly, there was an increased demand for police officers due to population and economic growth.

From 1960 to 2010, women dominated the Conventional occupations, making up more than 65% of Conventional occupational workers (Figure 16). The percentage of women in Conventional occupations is consistently greater than that of men from 1960 to 2010, with the percentage of women never dipping below 20% and the percentage of men never climbing above 15% (Figure 22). For both sexes, Conventional occupations are more popular among the younger cohorts. However, unlike the trends for the other Holland types, the female and male trends for the Conventional occupations do not follow similar patterns. Rather, they appear to mirror one another and begin to converge, with a slight increase for men in each age group after 1980, and a greater decrease for women in each age group after 1970. The increase in representation of men in this area is reflected by the ratio of relative odds of men to women from 2010 to 1960 being 1.77 (Table 21), indicating a 77% increase in the odds that an employed Conventional worker would be male between 1960 and 2010. These trends support my hypothesis that the difference in the representation of women and men in the Conventional area would decrease, although women would still dominate the occupational type. Conventional occupations include accountants, clerks, administrative assistants, and office assistants. Accounting was a popular Conventional occupation, particularly for young men. Demand for young accountants was expected to increase due to increasing pressure on businesses and government agencies to improve budgeting and accounting procedures at the same time that the older members of the field were expected to leave the workforce (U.S. Bureau of Labor Statistics, 1975; U.S. Bureau of Labor Statistics, 1981). In the late 1970s and early 1980s, women were more likely than men to work as administrative assistants.

However, young women may not have entered this occupation as much as they had in previous years due to the increase in opportunities in other fields, given that the 1980s marked the point at which women began to outnumber men in higher education degrees and likely had more professional choices (Snyder & Dillow, 2013).

Hypothesis 2

The second hypothesis was that while there would have been greater percentages of young men than young women employed in the Realistic, Investigative, and Enterprising categories, the differences in proportionate representation of young men and young women would have decreased from 1960 to 2010. The proportion of men in Realistic occupations was consistently greater than women at all age levels across time, making up more than 65% of the Realistic occupational workers (Figure 11). The percentage of men in Realistic occupations is consistently greater than that of their female counterparts by at least 20 percentage points from 1960 to 2010 (Figure 17). This is true for all of the age groups. All of the trends follow a similar pattern, increasing percentages employed in this type of work from 1960 to 1980 and decreasing from 1980 to 2010. While the three female age group trends are similar, Realistic occupations employ a slightly higher percentage of younger men than older men, ages 18 to 29 years. Contrary to the prediction, the trends in the percentage of men and women in Realistic occupations did not converge from 1960 to 2010. The odds that an employed male or female would be employed in Realistic work decreased over the half-century, and the ratio of the odds that men would be employed in this category to the odds that women would be increased from 4.97 to 5.27 (Table 21) – opposite the hypothesized pattern. The 1.06 ratio of relative

odds of men to women from 2010 to 1960 (Table 21) reflects a 6% increase in the odds that an employed Realistic worker would be male between 1960 and 2010. The difference in employment percentages between women and men remained fairly consistent for all age groups. Realistic jobs were the most numerous throughout the entire period of study. They included occupations that typically involve more physical labor, such as mechanical technicians, mechanics, machine operators, maintenance workers, and mechanical engineers. The rise in Realistic jobs in the 1960s may be related to the increase in the use of mechanical technology, such as cars, and the need for workers to build the technology (U.S. Department of Labor, 1968). The year 1956 marked the “first time in the Nation's history, white collar workers—professional, managerial, clerical, and sales—outnumbered blue-collar workers—craftsmen, operatives, and laborers” (U.S. Bureau of Labor Statistics, 1975, p. 18). The latter generally comprise Realistic occupations. The predictions were that it would take some time for the Enterprising and Investigative occupations to become more common, which may account for the considerable decrease in popularity of the Realistic occupations beginning in the 1980s which was likely impacted by the major development of the American economy more so than changing role expectations.

The proportion of men in Investigative occupations was generally greater than women across time (Figure 12). A higher percentage of men than women was employed in Investigative occupations at all age groups from 1960 to 2010 (Figure 18). While the trends followed similar patterns during that time, the overall difference between men and women at each age level increased from 1960 to 2010. The 1.25 ratio of relative odds of men to women from 2010 to 1960 (Table 21) reflects a 25%

increase in the odds that an employed Investigative worker would be male in 2010 than in 1960, contradicting my hypothesis. The age group with the greatest spike in percent of men and women employed in Investigative occupations between 1990 and 2010 was the oldest group, 26-29 year olds (Figure 18). Given the age of the group, they had greater opportunity to have been college educated at the undergraduate or graduate level, which may be required for certain occupations in this field, than did the younger groups. Investigative occupations include natural and social scientists, actuaries, engineers, physicians, computer programmers, and laboratory technicians. The expectation during this time was for an expansion of opportunities in scientific and technical occupations based on the growing demand for industrial machinery and machine tools, and the increasing complexity of industrial machinery, and the computerization of equipment, potentially resulting in the spike of interest in Investigative careers (U.S. Bureau of Labor Statistics, 1975; U.S. Bureau of Labor Statistics, 1981). In the 1990s and 2000s, employment of engineers, scientists, and computer programmers was expected to increase faster than the average due to growth of research and development as companies updated and improved products more frequently (U.S. Bureau of Labor Statistics, 1991). This is supported by McClain and Reardon's (2015) findings that the percentage of workers of all ages in the United States who were employed in Investigative occupations increased from 3% in 1960 to 10% in 2010.

The percentage of men and women ages 18 to 29 years employed in Enterprising occupations generally increased from 1960 to 2010, with the exception of a slight decrease for the younger age group of men in 2010 (Figure 21). These

findings are opposed to those of McClain and Reardon (2015), who found a decrease in Enterprising employment in 2010. These differences are likely due to the difference in the age range of the samples since McClain and Reardon used all ages and this study limited the ages to adults 18-29 years. The National Bureau of Economic Research, Inc. (2015) cites the last United States business cycle contraction (recession), also known as the Great Recession, as December 2007 to June 2009. Through early 2010, unemployment rose steadily from approximately 7.6 million people in December 2007 to about 15 million people in January 2010 (Federal Reserve Economic Data, 2015), and older workers delayed retirement (Johnson, 2012). Although younger workers may have been more willing to enter the Enterprising field at the beginning of their working life, anticipating an eventual rebound in the economy, older workers who continued to work or returned to work from retirement may have sought more stable working conditions and entered different types of employment for the remainder of their working years. Thus, this sample of younger workers may be more skewed toward Enterprising occupations than would be the general American population. Contrary to predictions, the percentage of men employed in Enterprising occupations was not greater than that of women. Instead, from 1980 to 2010, the percentage of women in the two younger age groups was higher than that of their male counterparts. During that time period, the percentage of women in the oldest age group approached that of their male counterparts. The 0.72 ratio of relative odds of men to women from 2010 to 1960 (Table 21) indicates that there was a decrease in the representation of men in this area from 1960 to 2010 and a 38% increase from 1960 to 2010 that an employed

Enterprising worker would be female. These trends not only show a decrease in the difference between the percentage of men and women in Enterprising occupations, but a reversal in the dominance in terms of percentages. Similarly, the percentage of the Enterprising occupational workers that were men and women were similar for the two older age groups from 1980 to 2010 (Figure 15). In the youngest age group, 18-21 years, women comprised a larger percentage of the Enterprising occupational workers in all years. Enterprising occupations included business managers and supervisors, businesspeople, lawyers, human resource workers, public relations specialists, and salespeople. As business was expected to grow in the 1980s, employment was expected to grow faster than average through the mid-1990s, as sales and finance were expected to expand, which corresponds with the rise in interest in Enterprising occupations through the late 1980s (U.S. Bureau of Labor Statistics, 1985). Then, after the corporate boom of the 1980s, expectations of growth slowed back to the average rate of growth for all occupations through the 2000s (U.S. Bureau of Labor Statistics, 1991; U.S. Bureau of Labor Statistics, 2001).

Hypothesis 3

The third hypothesis was that while young men would continue to be employed in work of higher mean cognitive complexity than young women, the difference in the complexity level of work done by young men and young women would have decreased from 1960 to 2010. Overall, the average cognitive complexity of occupations held by both young men and women ages 18 to 29 years appears to have increased from 1960 to 2010, with greater average cognitive complexity among the older age group (Table 13). Contrary to my expectation, the average cognitive

complexity of men was not consistently higher than that of women. When taking all of the RIASEC categories together, the average cognitive complexity of women's occupations were typically slightly higher than or equal to that of men's occupations with the exception of those ages 26-29 in 1960 and 1970, and ages 22-25 in 1970. The standard deviation for occupations in the cognitive complexity of demands is 10. Differences between sexes were all within 2 points, or 2/10 of a standard deviation. The highest ranges of average cognitive complexities were in the Investigative (66.81-72.09) and Artistic (64.39-66.39) occupations (Tables 14-19). The lowest range of average cognitive complexities was in the Realistic occupations (45.43-49.90). The Enterprising (50.21-63.91), Social (50.20-63.42), and Conventional (48.95-56.84) occupations fell in the middle. The widest range of average cognitive complexities was in the Conventional occupations, which suggests a shift in the types of occupations that were popular within that category (Table 19). The average increase in the cognitive complexity of women's occupations from 1960 to 2010 was greater for the older groups than for the younger. This may be a result of the older groups having a greater opportunity for more years of higher education, suggesting progress in terms of increased opportunities for women during that time. The Holland occupational types ranked in order of increase in cognitive complexity from 1960 to 2010 for women ages 18-29 years was ESIRCA [Enterprising (+5.47), Social (+3.85), Investigative (+3.37), Realistic (+1.68), Conventional (-0.53), and Artistic (-1.19)] (Tables 14-19). The large gains in the Enterprising, Social, and Investigative areas suggest changes in the opportunities for women during that time. The only category in which the average male cognitive complexity was consistently greater than the

average female cognitive complexity by at least 1 point was the Enterprising occupations (Table 18). This suggests that in this arena, there is a disparity in the type of occupations held by men and women.

Income

From 1960 to 2010, average income for males decreased, while average income for females increased. Because my data did not include full-time/part-time status or number of hours worked, it is possible that the increase in average wage for females could be partially attributed to an increase in the number of hours that women worked outside of the home during that time. Between 1975 and 2010, the average female full-time, year-round workers 16 years of age and older worked between 35 and 38 hours per week, and their average male counterparts worked between 41 and 44 hours per week (Women in the workforce, 2010). For men, all of the occupational types had decreases in average income, except for the Investigative occupations. For women, there were increases in all of the occupational areas except for the Conventional occupations, which may reflect a shift away from these occupations and a movement to diversify into other areas. Overall, the average wage and salary for men ages 18-29 years decreased by 27% between 1960 and 2010. The average wage and salary for women ages 18-29 years increased by 33% during that time period. This may reflect the types of jobs that were valued and be explained by the rise in the prominence of technology as higher education and college graduation became more common than ever before (U.S. Department of Education, 1993) and the increase in the cognitive complexity of women's occupations. It may also reflect the increase in the average age of first-time mothers from 21.4 years in 1970 to 25.0 years in 2006

(Mathews & Hamilton, 2009). During that time period, the average age of first-time mothers increased for all 50 states and the District of Columbia. Younger women are more likely to work longer hours than their older counterparts with children due to other social responsibilities outside of the workplace. (Tang & Smith, 1996). Therefore, the women in this age cohort of 18-29 years may be increasingly less likely to have those responsibilities in 2010 than their predecessors in 1960, and therefore be able to work more hours and be paid more.

Odds

Table 21 shows the relative odds M/F (the ratio of odds that a male worker was employed in this category to the odds that a female worker was employed in the category) and the ratio of relative odds M/F 2010/1960 (the ratio of the relative odds M/F for 2010 to 1960).

Based on hypothesis 1, I would expect that the ratio of relative odds M/F 2010/1960 would be greater than 1.00, indicating that the relative odds that a male worker was employed in an Artistic, Social, or Conventional occupation to the odds that female worker was employed in these fields would have increased between 1960 and 2010 as more men entered these occupations and more women were able to explore other areas of employment. In fact, this was only true for the Conventional occupations (ratio of relative odds 1.77), but not the Artistic (ratio of relative odds 0.86) or the Social (ratio of relative odds 0.70) areas.

Based on hypothesis 2, I would expect that the ratio of relative odds M/F 2010/1960 would be less than 1.00, indicating that the relative odds that a male worker was employed in a Realistic, Investigative, or Enterprising occupation to the

odds that female worker was employed in these fields would have decreased between 1960 and 2010 as more women entered these occupations and more men were able to explore other areas of employment. This was true for the Enterprising area (ratio of relative odds 0.72), but not the Realistic (ratio of relative odds 1.06) or the Investigative (ratio of relative odds 1.25) areas.

These findings suggest that from 1960 to 2010, crossing gender gaps in areas of employment only occurred in certain types of work, specifically in the Conventional and Enterprising areas. Young men were more likely to be employed in Conventional occupations and young women were more likely to be employed in Enterprising occupations. It is unclear from the data whether this was a result of interest, willingness to pursue traditionally gender-atypical occupations, or greater opportunity in occupations of interest that had previously been less available in these areas.

Summary of Findings on Hypotheses

In summary, Hypothesis 1 was generally not supported, in that the difference in the percentages of young men and women in Artistic occupations did not decrease over time, and the difference in the percentages of young men and women in Social occupations actually increased over time. The difference in the percentages of young men and women in Conventional occupations decreased over time, but this may not be due to men entering traditionally female occupations. Rather, it may be better attributed to a shift in the types of Conventional occupations in demand. This suggests that young men have not increasingly entered traditionally female-dominated occupations. In 1960, the top three Conventional jobs were clerical

workers, secretaries, and typists for both sexes combined and for women. For men, the top three Conventional occupations were clerical workers, auto service and parking attendants, and accountants/auditors. Of Conventional workers ages 18-29 years, 27.3% were clerical workers (38.1% of men, 24.7% of women), 20.5% were secretaries (1.0% of men, 25.3% of women), 10.0% were typists (1.7% of men, 12.1% of women), 3.7% were auto service and parking attendants (18.7% of men, 0.1% of women), and 2.1% were accountants/auditors (8.6% of men, 0.6% of women). In 2010, the top three Conventional occupations were cashiers, customer service representatives, and secretaries/administrative assistants for both sexes combined and for women. For men, the top three Conventional occupations were cashiers, customer service representatives, and accountants/auditors. Of Conventional workers ages 18-29 years, 30.9% were cashiers (31.0% of male Conventional workers, 30.8% of female conventional workers), 12.1% were customer service representatives (15.7% of males, 10.7% of females), 9.6% were secretaries and administrative assistants (3.1% of males, 12.2% of females), and accountants/auditors were 4.8% of Conventional workers (6.8% of men and 4.0% of women). The difference between the representation of men and women in the different types of Conventional occupations indicates that the decrease in the percentage of women and increase in the percentage of men employed in Conventional work are not solely explained by changes in participation in the same occupations. Although the highest percentage of men and the highest percentage of women in Conventional occupations were in the same occupation (clerical workers in 1960 and cashiers in 2010), women were more likely to be employed in Conventional occupations as assistants in an

office (administrative assistants and typists), and men were more likely to be employed as parking attendants or accountants, which are different in nature from each other and from some of the more female-dominated Conventional occupations. The decrease in female participation in Conventional occupations may be explained by the opportunity to enter other types of higher-paid and complex work, given that, among females, Conventional work was among the lowest two cognitively complex and well-paid areas along with Realistic work. The increase in male participation in Conventional occupations may be attributed to the increased need for cashiers and customer service representatives as businesses and retail sales increased in the latter part of the twentieth century.

Hypothesis 2 was generally not supported. While there were greater percentages of young men than young women employed in the Realistic and Investigative occupations, the difference between these percentages did not decrease over time. The odds of male employment in Realistic work remained high (1.06 to 0.83) over the half century, while the odds of female employment in Realistic work fell from 0.21 in 1960 to 0.16 in 2010. This change is opposite the direction hypothesized. But, the Enterprising occupations better reflected the hypothesis. There were greater percentages of young men than young women in the Enterprising occupations in the 1960s and 1970s. This difference not only decreased, but inverted so that there were greater percentages of young women than young men in these occupations starting in 1980, suggesting that, in this arena, women were more likely to enter traditionally male-dominated occupations. This was the most impressive change in participation from 1960 to 2010. The percentage of Enterprising type

occupation workers ages 18-29 years who were female increased from 49% in 1960 to 54% in 2010. The percentage of women ages 18-29 years who were employed in Enterprising type work went from 9% in 1960 to 22% in 2010. The average cognitive complexity of female Enterprising workers' jobs went from 50.83 in 1960 to 56.3 in 2010. Taken together with the findings based on Hypothesis 1, these trends somewhat mirror lifespan developmental findings in children, where it is more acceptable for girls to have traditionally male interests than it is for boys to have traditionally female interests (Helwig, 1998; England & Li, 2006; England 2010). Women may have entered Enterprising type work during this time period due to the nature of Enterprising work that lends itself to encompass a variety of different interests. While Investigative type work is predominantly scientific and mathematical, Enterprising work can involve any business, whether it be in a traditionally female dominated area of interest or a traditionally male dominated area of interest. Additionally, as women were more successful in earning promotions in their current field, they were more likely to be in managerial positions, and thus primarily Enterprising work.

The third hypothesis that the work of young men would have a higher mean cognitive complexity than that of young women was not supported. Although not universal, the mean cognitive complexity of the occupations of all young women in was generally higher than that of the occupations of young men, particularly during the later years. When separated by Holland occupational type, the cognitive complexity was similar for women and men in the Artistic, Social, and Conventional areas. In the Realistic, Investigative, and Enterprising areas, the cognitive complexity for men was typically higher than that of women, but the trends converged toward the

later years, representing gains in the type of work in which women were employed within these fields. For both men and women, the area in which the largest percentage of workers were employed were the two lowest areas of cognitive complexity and income (Realistic for men and Conventional for women). The average Realistic income for men ages 18-29 in 2010 was \$15,455, and the average cognitive complexity was 48.73. The average Conventional income for women ages 18-29 in 2010 was \$8,752, and the average cognitive complexity was 54.05. Recent decreasing trends for women in the Conventional area and both men and women in the Realistic area, coupled with rising trends in the Social and Enterprising fields, suggest a potential for more complex and better paid work when taking all the Holland types together. However, within each Holland occupational type, there was a large decrease in the average male income from 1960 to 2010 (-25% to -44%) in all of the areas except for the Investigative area (+20%). Meanwhile, there was an increase for women in all of the areas (+9% to +151%) in all of the areas except for the Conventional area (-20%), although the average female income was still less than that of the average male income in all areas with the exception of the Social area. Although number of hours worked was not indicated, this may represent a decrease in the value of work in most areas other than math and science. The increase in women's income is likely due to an increase in the number of hours that the average woman worked outside of the home.

Limitations

Maturity level of ages in years

The age groups that are being examined over time may not necessarily represent the same maturity level and social expectations at different points in time. For example, more young adults in their 20s move in with their parents and may be dependent on their parents now than in the 1960s. Similarly, a greater percentage of young people now pursue postsecondary education, and it has become much more common for young people to delay marriage and child rearing than in earlier decades (National Campaign to Prevent Teen and Unplanned Pregnancy, the National Marriage Project at the University of Virginia, and the RELATE Institute, 2013). Even within the same cohort, there is great disparity in maturity and lifestyle in this age range.

The age range of 18-29 years is intended to capture the early occupational choices of young adults after schooling, but it may not capture the occupational choices of those adults who remain in school until a later age or return to school at a later age. Furthermore, it is not true that people make a single career choice and never revisit or make other choices at other points in time (Super, 1990; Savickas, 2011).

Aspirations of adults

Due to the nature of Census data, aspirations and desires cannot be ascertained. This study was not able to determine the desired occupations of young adults or other factors that contributed to employment in their occupations, but only the occupations that they entered, without a description of whether they were able to pursue their desired occupations. In short, my data reflect employment, not necessarily the choices individuals might wish to make.

Racial composition

The change in the racial composition of the American workforce makes it difficult to determine if there has been a societal shift in culture over time that is independent of demographic change, or if the influx of persons from different cultures has affected American culture. While racial composition was calculated (and showed that the percentage of the population composed of White Americans has decreased and the percentage of the population composed of most groups of color has increased), trends within racial or ethnic cultural groups were not tracked due to the difference in how the Census's race item was written each year and the difficulty in determining if the similarly coded racial groups were in fact synonymous from decade to decade.

Income

Income data examined were total pre-tax wage and salary income for the previous year (for the Census) or 12 months (for the ACS). Sources of income include wages, salaries, commissions, cash bonuses, tips, and other money income received from an employer, but not capital gains, gifts, or inheritance. Although any income reported as \$0 was removed from the calculations, there were a significant number of lower incomes reported (from \$4 to hundreds of dollars) that indicated that many of the respondents were not full-time employees. This makes it difficult to compare averages for each year because the average may depend on the proportion of respondents who worked full-time, and possibly reflect the increase in the proportion of young people who attended college (and may not have worked as much in their

late teen years and early twenties, or may have had a lower earning potential in their late twenties).

The abstract of Census data that I used does not include information about the part-time or full-time work status or number or hours worked of the individuals in my sample. Therefore, the average income for women and men that I have reported possibly reflects the greater likelihood of women working fewer hours beyond full-time status (Women in the Workforce, 2010), contributing to the lower incomes that I have reported for women. However, this difference is seen primarily in the cohort of women who have young children (Tang & Smith, 1996), and would not be expected to greatly impact young women prior to parenthood.

Change in occupational titles in the Census

The occupational titles used by the Census and the American Community Survey have changed between 1960 and 2010 both in name and in function. For example, technological work such as computer programming has increased in recent years. The occupation of web developer had to be introduced to the Census when it was created. The assignment of Holland codes using the Dictionary of Holland Occupational Codes (G. D. Gottfredson & Holland, 1996) was intended to allow for the comparison between types of occupations with similar characteristics, even if the occupations themselves have changed.

Classification of jobs into RIASEC categories

The classification of thousands of jobs into the Holland occupational type categories requires judgment and skill. Although in instances where the raters felt

ambiguity, these judgments are based on ratings in the Position classification inventory (PCI) (G.D. Gottfredson & Holland, 1991). Nevertheless, there remains some subjectivity in the use of the classification. The use of two raters was intended to reduce the effect of individual rater bias, while the calculation of κ determined that there was an acceptable level of agreement between the raters.

Census sampling

The sample was based on a sampling procedure used by the Census Bureau. Results were generalized from this sample to the entire U.S. population with the assumption that the sampling procedure used by the Census Bureau was accurate and reliable. Although the sample is no doubt imperfect, it is the best available sample and its large size makes standard errors for proportions (percentages) reported here miniscule. The way in which the occupational data was collected by the Census and ACS made employed and recently unemployed workers indistinguishable because those who were employed in the last five or ten years (depending on the year of the Census) indicated an occupation. However, this did prevent those who had been unemployed or retired for more than five or ten years from being included in the calculations.

Virtues and Implications

The literature currently focuses predominantly on occupational interests, aspirations, and choices of young people, particularly those of students, and the context in which these aspirations are shaped. The findings of the present analysis expand upon extant longitudinal studies of occupational aspirations and choices, going beyond the years available to and ages examined by G.D. Gottfredson and

Daiger (1977), Reardon, Vernick and Reed (2004), and McClain and Reardon (2015), and adding the trends in actual occupational choices of young adults to the information Hong (2013) provided about trends in the aspirations of college students.

This study explicitly depicts the trends in occupation choices pursued by young women and men with data based on representative samples of the American workforce. The trends have been separated not just by type of work, but also by level of cognitive difficulty. The information gained from this study is more concrete than speculations about changes in the gender composition of various types of work according to a psychological classification of occupations. Knowing the basic facts of the proportions of occupations and career levels is fundamental in understanding occupational choice and career planning. With the results of this study, researchers have concrete evidence of male and female trends in occupational choice, rather than speculation based on changes in popular culture and social norms. This study provides evidence that the odds of both male and female employment in Realistic work decreased from 1960 to 2010, while the odds of male and female employment in Enterprising and Social work increased during that time, more so for female employment than for male employment. Rather than blindly encouraging young people to cross gender gaps, these findings indicate that certain gender gaps may be more appealing or pragmatic to close than others. For instance, women may prefer to seek employment in the corporate world in a traditionally male-dominated area (Enterprising) than in farming, also in a traditionally male-dominated area (Realistic). Similarly, the potential for opportunities in corporate employment has increased in the past half century more so than the potential for opportunities in agriculture.

Mental health professionals are able to utilize the findings in understanding the social context in which children, adolescents, and college students have developed their occupational expectations and interests in comparison to the occupational reality of the present. Occupational gender norms that existed during the time in which mental health professionals developed their occupational interests may be different for young people in the present day. Psychologists and counselors who guide young people in making occupational choices during high school and college could use this understanding of the evolution of early employment in the past 60 years, and the associated social expectations, to help young people navigate the development of their own occupational interests and choices with projections of occupational distributions based on the trends of the past. From 1960 to 2010, employment in Realistic occupations has decreased, while employment in Social and Enterprising occupations has increased. This may reflect changes in opportunity, where manual labor is in less demand and teaching, caretaking, and business needs have risen. They would also benefit from understanding the nature of the job market as compared to the current occupational aspirations of young people. Similarly, young adults entering the workforce for the first time may find it useful to know what types of occupations are more common and plentiful when seeking employment. Employment in Artistic occupations was relatively low in 1960 and 2010 as compared to the other occupational areas with similar average income (Social and Enterprising), and income as well as cognitive complexity for Realistic and Conventional occupations is still relatively lower than that of the other occupational areas. Meanwhile, Investigative employment has the highest average income, although it is not as common as Social

or Enterprising employment, but may be too cognitively complex for some. Given these findings, it appears that young people have tended to take employment in areas in which they have the best economical payoff at an appropriate cognitive level in fields with more opportunities. In the last few decades, that has been in the Social and Enterprising, and Conventional areas for young women, and in the Enterprising and Realistic areas for young men. Young adults could appreciate the availability of jobs and how it has changed over time. The types of jobs that are more plentiful may not necessarily be compatible with their aspirations, and they may have to adapt their educational and occupational goals and choices based on the job market.

The occupational aspirations of both female and male college students have shifted over time (Hong, 2013). Extending the findings on the relation of aspirations and assessments to employment reality (G.D. Gottfredson, Holland & Gottfredson, 1975), the present results show that trends in occupational employment of young people have differed from the aspirations of college students. As compared to college students' occupational aspirations, the odds of employment in Realistic and Conventional occupations were higher, the odds of employment in Investigative and Artistic occupations were lower, the odds of employment in Social occupations were similar, and the odds of employment in Enterprising occupations were similar for men and higher for women. Differences between aspirations and employment reality may be attributed to the greater diversity of the population examined in the Census data than in Hong's college sample, and the reality of occupational supply. The Census includes a greater number of people and a larger proportion of people who did not attend college. As compared to the general population, college students may be

more likely to aspire to and enter fields that demand higher cognitive complexity and supply higher income—and that are more difficult to enter—such as those in the Investigative and Artistic occupations, and they may be less likely to aspire to and enter fields with a lower cognitive complexity and income, such as those in the Realistic or Conventional occupations. However, even if college students aspired to certain fields, there is no guarantee that there would be an adequate supply of jobs in those fields when it came time for them to enter the labor market. The availability of jobs affects the ultimate occupational choices of young people (Blau, Gustad, Jessor, Parnes & Wilcock, 1956; G.D. Gottfredson, Holland, & Gottfredson, 1975). The present findings provide information about the actual American occupational landscape, and suggest that the interests of college students do not necessarily match the reality of occupational choices and job availability. Career advising may use this information to help young people understand the economic realities of current employment possibilities, direct students to seek employment in occupational areas with greater job availability, and work to match interests in those areas in unconventional ways rather than encourage the pursuit of employment in fields that are already oversaturated with potential employees. Even the nature of shifts between age groups within the 18-29 year old cohort indicate that certain types of jobs, such as those in the Investigative, Artistic, Social, and Enterprising areas, may be more desirable and young people move into them when they are able, and other types of jobs, such as those in the Realistic and Conventional areas, tend to be those from which young people migrate. This information should not be used to funnel young people into occupations that are a poor fit for their personality types. Rather, it should

be used to inform young people about the realistic landscape of job opportunities, and shape the direction of the career advising. A personality profile can consist of up to six Holland types. A good fit for a job may account for the first few types. A creative person may not have many job opportunities in a primarily Artistic field, but if the person is also Enterprising, an advisor may assist the individual in identifying a job path that can combine the person's strengths, increased financial security, and greater opportunity.

Young adults who expect to enter careers in desired occupational categories may choose different occupations at first, making multiple occupational choices rather than a single occupational choice at a point in time. As people age, the distribution of employment in Holland types shift (G.D. Gottfredson, 1977; G.D. Gottfredson, & Daiger, 1977; L.S. Gottfredson, 1980). Based on the findings from the present study and on earlier research on careers, young adults should not expect to be employed in their expected ultimate job immediately after schooling. Career counseling may benefit from taking into account career trajectory and not just occupational choice when advising young people. Counseling psychologists may also address the impact of stereotyping associated with types of work and the underrepresentation of men or women in different areas. When working with young people, they may use the information developed here to support them in the pursuit of occupations in which they are underrepresented, or challenge them to consider occupations that they might not have otherwise due to gender stereotypes.

In summary, these findings indicate the existence of stability and change in occupational choices from 1960 to 2010. For example, trends of percentages of

women and men in the Realistic and Conventional occupations were fairly consistent during that time with more men in Realistic and more women in Conventional occupations. Meanwhile, trends in the percentage of women in Social occupations and both sexes in Enterprising occupations have shown an increase in popularity. Women increasingly entered the Enterprising area in particular, and saw more than 100% increase in income in the Investigative, Social, and Enterprising areas, while men saw a decrease in income in all areas except for the Investigative area. Career counselors could use this information to explain the interaction of kinds of work, cognitive skill development, educational level, sex, and income and to help young people make more informed decisions about their career choices and trajectory. This information could also be used to better understand types of work according to Holland's theory, including trends in the workforce, the utility of vocational aspirations, and occupational stereotypes. Going forward, the achievement of occupational equality of women and men may not be in attaining equal representation in each individual occupation or in changing the trajectory of their academic and occupational interests in childhood, but in the ability for women and men to freely pursue the interests that they have in their young adulthood.

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