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An Application of Holland's Theory to Career Interests and Selected Careers of Automotive Technology Students

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Abstract

This study investigated whether postsecondary automotive technology students' interests were congruent with their chosen career pathways. One hundred eighty-six students from three institutions completed Holland's Self-Directed Search assessment. Realistic was the predominant Holland code followed by Enterprising for the participants within this study. A majority of participants had a medium level of congruence between their interests and career choices as measured by the C-index. The findings may be useful for educators, counselors, and career development professionals interested in diversifying instruction and professional development strategies to promote future career success.

Keywords: postsecondary career and technical education, automotive technology students, Self-Directed Search assessment, Holland's theory of vocational personalities and environment

Introduction

Background and Problem

In 2019, there were 756,600 automotive service and repair technicians employed in the United States (U.S.) as follows: automobile dealerships and independent repair facilities (60%); self-employment (13%); and automobile parts, accessories, and tire stores (8%) (U.S. Bureau of Labor Statistics, 2020a). Recently, these areas of automotive technology have experienced turnover among the technicians, with more younger technicians leaving the field. Half of the entry-level automotive technicians hired by dealerships and independent repair facilities left within two years (Adler, 2018). The technicians could be going to another dealership, independent shop, or accepting a non-automotive job (Automotive News, 2016). Leaving the field completely, rather than retiring or accepting work with competing employers, is an industry concern (Adler, 2018; National Automobile Dealers Association, 2017).

There can be many antecedents in the turnover of early entrants. As Al Mamun and Hasan (2017) indicated, factors affecting turnover rates are managerial factors, income, benefits, peer influences, and alternative opportunities. Studies regarding determinants of turnover have focused on specific factors (Russell, 2013), so Russell (2013) proposed that academics explore factors considering both individual differences and contextual variables. Based on Russell's suggestion, Strahan (2017) emphasized the congruence between individuals' vocational interests and job environments in the issue of turnover. As the person-environment fit theory highlights, when individuals have attributes (e.g., skills, traits) that are aligned to the job, they are more

likely to be satisfied and retained (Strahan, 2017; van Vianen, 2018). Similarly, Holland's (1985) theory asserted that congruence between an individual's vocational interests and the work environment will result in job satisfaction and retention.

In this regard, to explore the aforementioned workforce issue in the automotive technology field more deeply, it is important to delve into the congruence of individual interests and environments based on this theory. This study focuses on understanding whether postsecondary automotive technology students' interests are congruent with their chosen career pathways. Many employers recommend that prospective employees obtain a certificate or associate degree from a postsecondary institution, typically community and technical colleges[1] (U.S. Bureau of Labor Statistics, 2020b). Understanding whether the students' interests are congruent with their chosen career pathways will provide insight on what interventions are needed within education to ensure students are enrolled within appropriate career and technical education (CTE) programs, which promote future career success and employee retention as learners transition to the world-of-work. Also, the findings will be helpful for educators, counselors, and career development professionals interested in diversifying instruction and professional development strategies for automotive technology students.

Purpose and Research Questions

The purpose of the study was to examine the distribution of personality and environmental types within postsecondary automotive technology students. One of the goals was to compare the similarity of person and environment measures resulting in the classification of an individual as congruent or incongruent. The study also investigated whether students' interests were congruent with their chosen career pathway of automotive technology. Understanding this may provide new knowledge about what interventions are needed in education to ensure students are appropriately matched with a particular postsecondary program, which promotes future career success and employee retention upon entry into the profession. Therefore, this study addressed the following two research questions:

1. What are the vocational interests of postsecondary automotive technology students?
2. Are the interests of postsecondary automotive technology students aligned with the career pathways they have chosen?

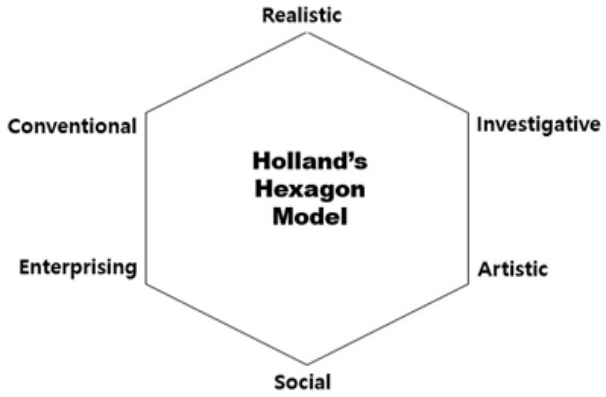
[1] Many community and technical colleges organize courses around 16 career clusters comprising 79 career pathways with academic, career, and technical courses and training preparation (Advance CTE, 2020). These career clusters include the following: agriculture, food, and natural resources; architecture and construction; arts, A/V technology and communications; business management and administration; education and training; finance; government and public administration; health science; hospitality and tourism; human services; information technology; law, public safety, corrections and security; manufacturing; marketing; science, technology, engineering, and mathematics; and transportation, distribution, and logistics. Automotive service technology is considered part of the transportation, distribution, and logistics career cluster along with the following technologies: aviation maintenance; collision damage and repair; diesel equipment; marine service; motorcycle service; and power equipment (Advance CTE, 2020). Approximately 38,829 students completed automotive technology programs at community or technical colleges across the United States in 2016 (Settle & Young, 2018).

Theoretical Framework

Person-environment fit theory assumes people try to find environments that match their characteristics and have a need to fit into the environments (van Vianen, 2018). Person-vocation fit, one of the various fit concepts, means the congruence between individual vocational interests and vocational characteristics (Holland, 1985; van Vianen, 2018). Holland (1985) argued individuals are drawn to work environments in which they can present their interests in the theory of vocational personality types. The theory was developed to understand and predict the individual's choice including fields of study, occupations, or jobs (Holland, 1997).

The theoretical foundation of this study was grounded within Holland's theory of vocational personalities and environment. John Holland's theory of vocational personalities and environments is considered as one of the most effective career development models to date (Gottfredson & Johnstun, 2009; Nauta, 2010). This theory revealed personalities and occupational environments can be classified into six different categories, including: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). As such, individuals often search for an environment in which to express their interest, abilities, and values (Holland, 1985) (see Figure 1), and the work environments can be classified by their "resemblance to a combination of the RIASEC types" (Nauta, 2010, p. 11).

Figure 1. Holland's Hexagon (Holland, 1985)



The six different types featured in Holland's model include the following (Holland, 1997):

- Realistic (R) for people who have mechanical and athletic abilities, enjoy working outdoors and like to work with tools and machines. The R type prefers to work with things.
- Investigative (I) for people who use mathematical and scientific abilities, enjoy working alone and like to solve problems. The I type favors working data.
- Artistic (A) for people who enjoy creating original work and have a good imagination. The A type enjoys working with ideas and things.

- Social (S) for people who are interested in human relationships and like to help others. The S type likes to work with people.
- Enterprising (E) for people who have leadership and speaking abilities and like to be influential. The E type likes to work with people and data.
- Conventional (C) for people who have organizational skills and arithmetic abilities. The C type enjoys working data.

In general, it has been proposed that a person tends to pursue the personality type they most resemble, and environments encourage the values of the environmental model it most resembles (Gottfredson & Johnstun, 2009). For example, a Realistic environment will attract and retain Realistic personalities (Gottfredson & Johnstun, 2009). An assessment utilized to identify a person's personality and environmental type is the Self-Directed Search (SDS), which seeks to identify a three-letter code in order to match the personality and environment (Holland, 1994). Holland's theory (1985) was utilized as the theoretical framework in this research, given the study sought to investigate the distribution of personality and environmental types within a subgroup of postsecondary students and examined whether their interests, as identified on the SDS, were congruent with their chosen career pathways.

Related Literature

The use of career interest inventories exposes people to various careers and provide information about oneself (Smith & Wood, 2018). Career interest inventories may be administered through campus resources (e.g., counseling, advising, or career services), classes, or as part of orientation programs at community and technical colleges. These inventories are typically free for students (Ohler & Levinson, 2012). Students can take inventories by themselves, but it is often recommended that educators, counselors, and career development practitioners meet with students to explain the self-exploration assessment, interpret the results, and discuss academic choices (Miller & Woycheck, 2003; Ohler & Levinson, 2012).

The SDS, a widely used interest inventory (Gottfredson & Johnstun, 2009; Watkins et al., 1994), was developed to deliver understanding of career development and choice to clients (Bullock-Yowell & Mathis, 2014; Rayman & Atanasoff, 1999). The SDS has been administered as a career intervention in academic classrooms (Micceri & Phelps, 2002), counseling sessions (Uffelman et al., 2004), group test administrations (Brown & Ryan Krane, 2000; Whiston et al., 2003), or as a stand-alone intervention (Behrens & Nauta, 2014; Dozier et al., 2015; Holland, 1972). Researchers have explored use of the SDS with populations, such as middle school students (Osborn & Reardon, 2006), high school students (Barak & Cohen, 2002), students attending 4-year institutions (Behrens & Nauta, 2014; Dozier et al., 2015; Mau et al., 1997; Smart et al., 2000), and adults (Gottfredson, 2002; Rayman & Atanasoff, 1999). Limited literature exists about use of career interest inventories, including SDS, at community and technical colleges. Thus, the related literature focused on research using the SDS in university settings (Behrens & Nauta, 2014; Dozier et al., 2015; Mau et al., 1997), the relationship between personality type and career choice (Kimongo Kemboi et al., 2016; Tang, 2009), and the environmental aspects of Holland's theory (Smart et al., 2000; Smart et al., 2009; Smart &

Thompson, 2001). In addition, several studies focusing on automotive technology students as the population were also reviewed (Threeton et al., 2013; Threeton & Walter, 2009a; 2009b).

Generally, SDS can be an essential tool in helping students think about their career development and future aspirations (Bullock-Yowell & Mathis, 2014). The SDS has been used with university students to explore alternative careers (Behrens & Nauta, 2014; Dozier et al., 2015; Mau et al., 1997) and daydreams (Miller et al., 2004). High school and college students list more alternatives to careers they are considering immediately after taking the SDS than do students who did not take the SDS (Mau et al., 1997). Behrens and Nauta (2014) found completion of the SDS as a stand-alone intervention led to an increase in the number of career alternatives being considered four weeks later among undergraduate students from a large, public university in the Midwest as compared to a no-treatment control group. Similarly, Dozier et al. (2015) found educational psychology students who completed the SDS: R Internet and read the report participated in more career behaviors and considered more occupational alternatives over the following three weeks than control group members. Another study explored expressed occupational daydreams and scores on the SDS among undergraduate psychology majors at a medium-sized southern university (Miller et al., 2004). Results found a moderate degree of similarity between scores on the SDS and daydreams (Miller et al., 2004).

Further, researchers using Holland's theory have found a relationship between personality type and career choice (Kimongo Kemboi et al., 2016; Tang, 2009). Kimongo Kemtoi et al. (2016) examined whether there was a significant relationship between personality type and career choices of 399 first-year undergraduates at five different programs at a university in Kenya. Using the Students' Personality Questionnaire, which was adapted from the SDS, Kimongo Kemtoi et al. found there was a significant relationship between personality type and career choices of undergraduates. They also determined 73.2% of students were satisfied with their course of study. Another study looked at the relationship between vocational interests and career choices of 165 Chinese college students (Tang, 2009). A majority of participants (65.3%) had a medium level of congruence between their career choice and interests, with 14.7% falling in the high level of congruence. Few participants chose an occupation aligned with their interests, but this is supported by how Asians may prioritize family expectations of careers over individual choice (Tang, 2009). The findings support the appropriateness of Holland's typology in explaining interests of Chinese college students but the intercorrelations among the six types are not in the same pattern as Holland predicted (1997). Collectively, these studies outline a critical role for personality type in the career choice of students.

The environmental aspects of Holland's theory, such as college campuses and fields of study, are less well understood than the personality aspects (Gottfredson & Holland, 1996). The RIASEC theory began in higher education before focusing on occupations (Gottfredson & Holland, 1996). Holland studied the institutional characteristics of the environment using documents, such as college catalogs (Gottfredson & Richards, 1999). Environments contribute to students' learning and development through the efforts of faculty members who require, reward, and reinforce students for their acquisition of interests of the dominant personality types (Holland, 1997).

Research has shifted from institutional-level environments to disciplinary sub-environments within institutions (Smart et al., 2009). There is evidence that academic departments socialize students in different ways (Smart et al., 2000). Smart and Thompson (2001) examined the emphasis that faculty in certain environments place on alternative student competencies in their classes. For example, investigative faculty members who have consistent environmental profiles use more experiential learning activities than peers in inconsistent investigative environments (Smart & Thompson, 2001). Smart et al. (2009) found faculty in four academic environments who have a consistent environment should resemble their environment more than peers whose environmental profile is inconsistent. Students' learning patterns not only vary by the academic environments in Holland's theory, but also by the environmental consistency level of those environments among a sample of college seniors (Smart, 2010). These findings are important as they contribute to the socialization process of students and the development of interests in these academic departments. However, this research does not align with CTE settings and only looked at Investigative, Artistic, Social, and Enterprising academic environments rather than all six environments present in Holland's theory (Smart, 2010; Smart & Thompson, 2001; Smart et al., 2009). In programs, such as automotive technology, students may have an opportunity to experience the environment at an earlier level than a postsecondary setting.

Overall, limited literature exists on the career development needs of students and graduates in CTE settings (Packard et al., 2012), who contribute to innovation, health care, infrastructure, and growth of the U.S. economy (Gordon, 2014). However, three studies were identified about postsecondary automobile technology students and the relationship between personality type and learning style (Threeton et al., 2013; Threeton & Walter, 2009a; 2009b). One study examined the relationship between personality type and learning style with postsecondary automotive technology students in one northern U.S. state using the SDS and Learning Style Inventory (LSI) (Threeton et al., 2013). Realistic (84.1%) was the dominant personality type of the postsecondary automotive technology students using the SDS while accommodating was the learning style most represented using the LSI. There was a significant relationship between the Realistic personality type and the accommodating learning style with 37.8% of the participants (Threeton et al., 2013). Another study identified the preference for learning styles using the LSI among postsecondary automotive technology students (Threeton & Walter, 2009b). All learning styles were represented with accommodating being the most highly represented (39.8%) followed by converging (22.7%), diverging (21%), and assimilating (16.5%). The studies highlight the research conducted to understand the personality and learning styles of postsecondary automotive technology students but investigating the SDS patterns warrants further investigation to better support the career development of these students.

Methods

The researchers used survey research to answer the research questions. The SDS, a career interest inventory, was used to obtain data about the vocational interests of postsecondary automotive technology, the target data of interest for this study. The SDS is appropriate for this study because the inventory contains questions about aspirations, activities, skills, and interests in different jobs (Holland, 1994) and is based on Holland's (1985) theory of vocational personalities and environments.

Target Population and Sampling

This study was aimed at postsecondary automotive technology students in a 31-county central region of an eastern U.S. state. Individuals who were 1) first-or second-year students enrolled in a postsecondary automotive technology program, 2) learning to repair automobiles, trucks, and other vehicle repairs, and 3) 18 years of age or older were eligible to participate in the study.

At the outset of the study, there were three postsecondary colleges in the central region of an eastern U.S. state providing automotive technology programs. Based on the enrollment records of these institutions, there were a total of 295 students enrolled in these automotive technology programs. A minimum sample size for the 295 was 168 with a 95% confidence level and 5% margin of error according to Isaac and Michael (1997).

Instrumentation

The instrumentation utilized in this study included two questionnaires. The first questionnaire asked the background information of participants. It included questions, such as age, gender, career choice, work experience, completion status of the secondary automotive technology course in high-school, and overall school (college) satisfaction. The other questionnaire was the SDS (the Form R, 4^{TH} edition, Adult version) (Holland, 1994), a commercial instrument. The 228 items self-reported inventory consists of five sections, such as occupational daydreams, activities, competencies, occupational preferences, and self-estimates. The participants identified their own three-letter Summary Code, which examines interests and provides information about their educational and occupational matches.

Content validity, concurrent validity, and predictive validity were assessed with a diverse group of individuals. The findings indicated sufficiently high validity of the SDS instrument (Holland et al., 1994). Also, according to Holland et al. (1994), internal consistency coefficients ranged between .90 and .94. The Cronbach's alpha scores for six types in this study were from .64 to .89 (R=.75, I=.64, A=.89, S=.78, E=.84, C=.81). Also, test-retest reliability correlations for the summary scales ranged from 0.76 to 0.89 (Holland et al., 1994).

Data Collection

Data were collected from three postsecondary institutions in the central region of eastern U.S. state providing automotive technology programs. The study acquired approval from the institutional review board to use human subjects before the initiation of the study. Faculty members from the participating institutions randomly selected the automotive technology classes and 195 potential survey respondents sought for this study. In order to collect the data, there were 16 sessions conducted that ran for 90 minutes of each class time. The researcher explained to the students that the participation in this study was voluntary and provided confidentiality assurances before obtaining informed consent from each participant. After completing the background information questionnaire first, the participants completed the SDS instrument. A total of 193 students (65.4% of the target population) participated in this data collection. Seven

incomplete questionnaires were removed, and 186 questionnaires were finally retained for a usable response rate of 96.4%.

Data Analysis

Data were analyzed using SPSS version 25.0 and Excel. Descriptive statistics, such as counts and frequencies, were used to describe the background and vocational interests of the postsecondary automotive technology participants. Means and standard deviations were also used to describe the vocational interests of the participants. Correlation analysis was implemented to determine relationships between each type. The congruence scores between Holland codes of participant's interests and their career choices were calculated using the dichotomous first-letter agreement (Holland, 1963), first-letter agreement (Holland, 1973), and C-index (Brown & Gore, 1994).

The SDS yields scores for six RIASEC types. The highest three scores of the combined scores of 'Activities' and 'Occupations' were used as the summary code of participants' interests, based upon the suggestions of the SDS manual (Holland, 1985). Career choices indicated by the participants were coded (three-letter code) based on *The Occupations Finder* (Holland, 1994). The code for automobile service-station mechanics is listed as RIC in *The Occupations Finder* (Holland, 1994). In addition, three congruence indexes were calculated to examine the levels of congruence between career choice and interests. Congruence refers to personality type and environment that has similar characteristics (Holland, 1997). For first-letter agreements, the SDS Summary Codes of the participants were matched to occupations presented in the Occupational Information Network (O*NET) database (National Center for O*NET Development, 2020). O*NET indicated RIC is the primary code of automotive specialty technicians, and RI is the primary code for automotive master mechanics.

Dichotomous First-letter Agreement (Holland, 1963)

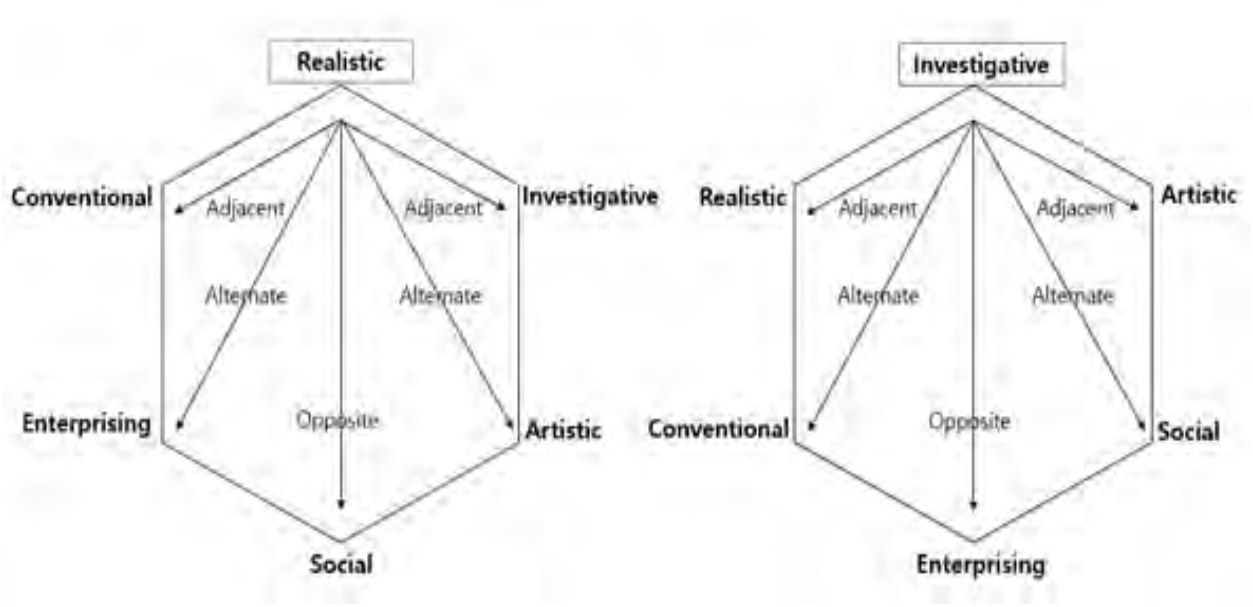
To examine the dichotomous first-letter agreement, congruence scores of 0 or 1 were assigned. This is based on the comparisons of the first letter of the participants' code and primary codes of automotive service technicians and mechanics, which include automotive master mechanics and automotive specialty technicians. If the letters were identical, a score of 1 was assigned. If they were not identical, a score of 0 was assigned. When ties occurred (four cases), researchers chose 'R' as a first-letter. According to the SDS booklet (Holland, 1994) and Murray and Hall (2001), men often score higher on Realistic, and women score higher on Social or Artistic. Given that all participants in this study are male students except for three female students and their major is automotive technology, which is male-dominated, the first letter 'R' was selected when the scores were the same.

First-letter Agreement (Holland Hexagon Index) (Holland, 1973)

The RIASEC personality and work-environment types can be structured in the shape of a hexagon (Holland, 1997) (see Figure 2). To analyze the first-letter agreement, congruence scores of 1 to 4 were assigned. For instance, a Realistic person who works in a Realistic environment was assigned a congruence score of 4, while a Realistic person who works in a Social

environment was assigned a score of 1. In other words, adjacent interests of 'R' are C and I, alternate interests of 'R' are E and A, and opposite interest of 'R' is S (see Figure 1 for the RIASEC meanings). R was assigned 4, C and I were assigned 3, E and A were assigned 2, and S was assigned 1 (Figure 2). The Realistic personality or work environment is most similar to the two adjacent types (Investigative and Conventional), moderately similar to Enterprising and Artistic, and least similar to Social.

Figure 2. Holland Hexagon Index (Holland, 1973, 1997)



C-index

The C-index was developed as an extension of Holland's (1973) first-letter agreement. This index utilizes a comparison of primary, secondary, and tertiary letters in the person and environment codes. The formula is C = 3(X1) + 2(X1) + (X1). X1 were scores (3, 2, 1, and 0) assigned to each comparison based on the hexagonal positions (3 = identical, 2 = adjacent, 1 = alternative, 0 = opposite) (Brown & Gore, 1994). C-index congruence scores range from 0 to 18. Higher scores indicate higher levels of congruence. When ties occurred, all possible combinations were considered and these scores were averaged (Donohue, 2006). According to Tinsley (2000), the C-index is one of the best Holland code congruence indexes as it is sensitive to code order, and it operationalized the hexagonal model.

Results

Background of the Participants

Demographic data were collected from participants via six questions pertaining to gender, age, career choice, work experience, completion status of a secondary automotive technology course in high school, and overall school (college) satisfaction (see Table 1).

Table 1. Background of the Participants

Variables		*n*	%
Gender	Male	183	98.4
	Female	3	1.6
Age	Under 20	107	57.5
	20-24	67	24.1
	25-29	5	2.6
	Above 29	7	3.8
Pursue a career in Automotive Technology	Yes	174	93.5
	No	12	6.5
Automotive Technology work experience	None	32	17.2
	Less than 1 year	45	24.2
	1-5 years	104	55.9
	6-10 years	2	1.1
	11-15 years	0	0.0
	16 or more years	3	1.6
Completed Automotive Technology course in high school	Yes	57	30.8
	No	128	69.2
Overall satisfaction	Very satisfied	96	51.6
	Moderately satisfied	83	44.6
	Low satisfaction	6	3.2
	No satisfaction at all	1	0.5

Note. $N = 186$

Vocational Interests of Postsecondary Automotive Technology Students

The counts, frequencies, means, and standard deviations of the first letter of six Holland codes of interests for postsecondary automotive technology students are revealed in Table 2. Realistic was the predominant code (87.6%), followed by Enterprising (5.8%), and Artistic and

Social (2.2% each) for the participants within this study, but all Holland codes were represented in this sample.

Table 2. Counts, Frequencies, Means, and Standard Deviations by Holland Code

Holland Code	*n*	%	*M*	*SD*
Realistic	163	87.6	38.47	5.83
Investigative	2	1.1	21.24	7.74
Artistic	4	2.2	16.68	9.92
Social	4	2.2	20.96	8.53
Enterprising	11	5.8	24.13	9.66
Conventional	2	1.1	15.15	8.77

Note. $N = 186$

The intercorrelations among six interests' codes were discovered (Table 3). As presented by Holland's typology model (1997), there were significant relationships between each type. The overall correlation coefficients have similar patterns from Holland (1997); however, the relationships between the Social and Enterprising and Social and Conventional types were different from Holland's pattern. There was a strong relationship between Social and Enterprising (r =0.696, p=0.000). Also, there was a moderate relationship between Social and Conventional types (r =0.406, p=0.000).

Table 3. Intercorrelations Among Six Interest Types

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
R	-					
I	0.218**	-				
A	0.205**	0.333**	-			
S	0.202**	0.249**	0.344**	-		
E	0.162*	0.269**	0.278**	0.696**	-	
C	0.109	0.429**	0.216**	0.406**	0.566**	-

Note. *p ≤ 0.05. **p ≤ 0.01.

Alignment of Interests with Chosen Career Pathways

Interest codes of automotive service technicians and mechanics, which include automotive specialty technicians and automotive master mechanics, are presented by RIC and RI (National Center for O*NET Development, 2020). The congruence scores between participants' interests code and their career choices representing 'R' and 'I' code were compared and calculated.

Dichotomous First-letter Agreement

To examine the dichotomous first-letter agreement of 'R', researchers assigned a score of 1 if the participants' first code was 'R'. If their code was not 'R', a score of 0 was assigned. Identically, dichotomous first-letter agreement of 'I' was analyzed. These calculations are based only on the first letter of person and work environment code (Brown & Gore, 1994). The results showed, for 'R' code, the score for the dichotomous first-letter agreement was 163. Interestingly, the score for the dichotomous first-letter agreement of 'I' was 2, which means two out of 186 had 'I' as the first letter in their code.

Holland Hexagon Index

In using Holland Hexagon Index (HHI), first letter of person and work environment were compared and assigned the value 4 (perfect first letter 'R' and 'I' code match), 3 (adjacent code), 2 (alternate code), or 1 (opposite code). The maximum score was 744, and the minimum score was 186 in this study. The HHI scores for 'R' and 'I' were 698 and 532, respectively.

C-index

The congruence scores between interest codes and their chosen career were determined using the C-index (Brown & Gore, 1994). Compared to occupational code 'RIC' with the personality codes of participants, the mean of congruence index was 12.27 (SD=2.99). According to Brown and Gore (1994), 0 to 8 are classified into low category, 9 to 13 are classified into medium category, and 14 to 18 are classified into high category. Using code 'RIC', 15 (8.1%) were in the low range, 106 (57.0%) were in the medium range, and 65 (34.9%) were in the high range (see Table 4).

Table 4. C-index Congruence Scores Using RIC Code

Variables	Low	Medium	High	Total
Pursuing	13 (7.0%)	101 (54.3%)	60 (32.2%)	174 (93.5%)
Not pursuing	2 (1.1%)	5 (2.7%)	5 (2.7%)	12 (6.5%)
Total	15 (8.1%)	106 (57.0%)	65 (34.9%)	186 (100.0%)

Note. Variables refer to a career in automotive technology.

Conclusion and Discussion

The study was designed to compare the similarity of person and environment measures resulting in the classification of an individual as congruent or incongruent. The study also examined whether students' interests were congruent with their chosen career pathways. Descriptive analysis from the background questionnaire information provided important insight into the characteristics of the postsecondary automotive technology participants. Males were significantly overrepresented (98%), but it was representative of certificates (94%) and associate degrees (94%) awarded to men in mechanic and repair technologies/technicians at U.S. postsecondary institutions from 2015-2016 (National Center for Education Statistics, 2017). Many students (69%) did not take any high school coursework in automotive technology but were very or moderately satisfied with their institution (96%). Students were also optimistic

(93%) in pursuing an automotive technology career. A majority (83%) had worked previously in the automotive technology industry, so they had some familiarity with working conditions. Almost 96% of the students were 29 years of age or younger suggesting they have many more productive, working years ahead.

The study examined the SDS patterns of postsecondary automotive technology students, which were Realistic followed by Enterprising and Social/Artistic. This study also investigated whether students' SDS patterns were congruent with their chosen career pathway of automotive technology. The dichotomous first-letter agreement was that 163 out of 186 students had an 'R' code. However, the congruence scores for C-index which is more sensitive to code order (Tinsley, 2000), showed a slightly different result. The congruence scores for RIC, as measured by the C-index, were found mainly in the medium range (57.0%). Upon further review, only around 34.9% of participants had scores in the high-range indicating participants were choosing an occupation that aligns with their interests. This finding indicated some participants enrolled in these automotive technology programs may not have direct alignment between their Holland codes and the career pathway they are pursuing.

While it is difficult to determine the reasons behind the scores, these findings could be noteworthy considering around 50% of entry-level automotive technicians hired by dealerships and independent repair facilities leave within two years (Adler, 2018). Obviously, this study cannot specifically correlate misalignment between the results of this study and technicians leaving the automotive service repair field in the United States. However, this study's results should be considered seriously because interest-environment congruence between individuals' interests and work environment can influence attitudes and behaviors, such as career persistence and, subsequently, their career change.

Implications for Practice and Policy

This study has some practical implications for educators, counselors, and career development professionals. Opportunities for automotive technology students to take the SDS should be considered. According to Rayman and Atanasoff (1999), the SDS has the effect of improving self-awareness of students in the process of conducting it. That is, students can perceive themselves more clearly in the process of performing, scoring, and self-interpreting it (Holland & Rayman, 1986). Also, the SDS is important because educators or counselors can decide the way of intervention (e.g., individual counseling, group counseling, self-help, lecture, etc.) based on the students' patterns.

Educators, counselors, and career development professionals also need to consider various factors in the counseling process with automotive technology students rather than solely focusing on three-letter codes. To provide appropriate interventions that are practically helpful to the students, educators and counselors should consider previous work experience and family responsibilities in addition to individuals' interests, values, and experiences.

Educators, counselors, and career development professionals can also help students become more aware of the work environments they have chosen, as work environments change rapidly. For example, technicians are currently being used to unlock vehicles or run diagnostic

system updates remotely. Therefore, it is necessary not only to provide knowledge about the environments but also to offer various activities, so students realize whether the environments are congruent with their personalities and interests. Discussing the differences in the types of work environments (e.g., dealerships; independent repair facilities; automobile parts, accessories, and tire stores) could be helpful to expose students to the realities of professions. Furthermore, alumni would be good sources of information to share their expectations prior to entering the field and compare them to the realities of the automotive technology industry.

There are also implications for policy. The tracking of labor market outcomes by community and technical colleges would be helpful to understand where students accept employment after completing coursework, certificates, or degrees. They also allow institutions to understand employment trends in their local and regional economies. Additionally, career interests begin with early access to activities and programs. Some of the participants in this study had previous participation with automotive technology programs in secondary school. Directing state and local resources to support K-8 career education may promote earlier exposure to interest and skill development.

Limitations and Future Research

There are several limitations that should be considered when reviewing the findings of this study. First, it is possible to have low level of reliability and high level of bias because this study used a purposive sampling method. Thus, the results are only applicable to the target population of this study. Second, this study is limited because survey responses were self-reported, which can result in bias in the participants' reporting of their behaviors and attitudes (Tourangeau & Smith, 1996). Third, this study is also limited by using the three-letter code. People with the same three-letter code can have different individual RIASEC scores (Arnold, 2004). That is, even though people may have the same three-letter code, their level of interests in RIASEC may vary. Finally, there is an inability to examine gender differences among postsecondary automotive technology students as the sample was largely male. Also, racial, ethnic, and cultural backgrounds were not collected from participants in this study. Considering these limitations, one must use caution when generalizing the results of the study to all U.S. postsecondary automotive technology students, although the sample is an accurate reflection of the student population where these data were collected.

Based on the findings and limitations of this study, several suggestions can be provided for future research. First, considerably more work will need to be done to explore the gender, racial, ethnic, and cultural differences in SDS scores among postsecondary automotive technology students because SDS scores can be significantly different based on those factors (Fouad & Mohler, 2004; Wakefield et al., 1975). Second, given that turnover is an industry concern (Adler, 2018), understanding the reasons technicians leave the field is another opportunity for future survey or qualitative research. Finally, this study can be replicated in specializations such as automotive collision and diesel, given the limited research about the automotive technology industry found in the literature.

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