THE IMPACT OF CONGRUENCE ON STUDENT ACADEMIC PERFORMANCE: ASSESSMENT OF HOLLAND THEORY IN NON-WESTERN CULTURE

Ammar Hussain¹, Sadiq Hussain², Zaigham Ali³

¹Department of Business Management, Karakoram International University, Gilgit-Baltistan, Pakistan; ²Tenured Associate Professor, Department of Behavioral Sciences, Karakoram International University, Gilgit-Baltistan, Pakistan; ³Assistant Professor, Department of Business Management, Karakoram International University, Gilgit-Baltistan, Pakistan.

Email: ¹dr.ammar@kiu.edu.pk, ²sadiq.hussain@kiu.edu.pk, ³zaigham.ali@kiu.edu.pk

Article History: Received on 15th April 2021, Revised on 27th April 2021, Published on 1st May 2021

Abstract

Purpose of the study: The current study was conducted to investigate Holland’s circular order model of interest, congruence between career interest and career aspiration, and congruence impact on students' academic performance in an indigenous context.

Methodology: Data have collected from 669 (356 boys & 313 girls) students studying in grade 10th from 16 high schools, 8 boys school (4 government & 4 private sectors), and 8 girls school (4 government & 4 private sector)-from significant towns of Gilgit division, Pakistan. Career interest was measured using the Urdu version of Career Key (Jones, 2010), students’ obtained marks measured academic achievement in the last examination, and career aspirations were assessed by asking about aspirated future careers from students. A randomized test of hypothesized order (Hubert & Arabie, 1987) was applied to determine the circular model, congruence was measured using Holland’s (1963) first-letter agreement, and academic achievement of congruent, incongruent, and ambivalent groups of students was compared using one-way analysis of variance.

Main Findings: The study's findings revealed that the results did not support Holland’s circular order model of interest. The congruence hypothesis was partially funded, and the impact of congruence on academic achievement was fully supported in the present study. Gender differences were found in some career interests as well as in aspired occupations. The findings are discussed in a cultural context.

Applications of this study: The results of the study are applicable and valuable for the educational institutes. In the present study, we have evaluated three assumptions of Holland’s theory: circular order model of interest structure, congruence between career aspiration and career interest, and impact of congruence on students' academic achievement.

Novelty: In Pakistan, career success and relevant domains are least explored by researchers. However, it is imperative to provide academic and career counselling services to ensure academic and career success and satisfaction. Therefore, the current study was conducted to assess Holland's model of interest, congruence between career aspiration and interest, and its impact on student's academic achievement in Pakistan.

Keywords: Career Aspirations, Career Interest, Academic Achievement, Gender, Indigenous Context.

INTRODUCTION

Holland’s theory (1994, 1997) of vocational personalities and work environments categories individuals into six types; Realistic, Investigative, Artistic, Social, Enterprise, and Conventional (RIASEC) appears as a distinctive theory in the field of counselling psychology, especially in the area of interest assessment (Nauta, 2010). Cross-cultural researches have been conducting to investigate the applicability of Holland’s theory from an international perspective, and some scholars claimed that it had been the most widely studied career theory (Brown & Lent, 2005; Spokane & Cruza-Guet, 2005). Researchers warrant caution for practitioners in using recommendations and interventions based on such theories without proper validating their use in countries, which are different culturally and economically from the societies where those theories have been developed and tested and feel the importance of researching to understand their applicability (Glossenberg et al., 2019).

The first assumption of Holland’s theory is interest structure, also known as Holland’s Hexagonal Model (figure, 1) or RIASEC calculus (Nauta, 2010) that is contiguous scales have a higher level of associations as compared to noncontiguous scales (Armstrong et al., 2003; Armstrong & Rounds, 2008; Darcy & Tracey, 2007). According to this model, adjacent scales have more psychological similarities (beliefs, values, abilities, interests, & preferred activities), alternative scales have a moderate level of similarity, and scales positioned opposite have the slightest similarity (Kiani, 2011). For example, in the RIASEC structure, the Realistic and Investigative types are more similar in terms of their interest, skills, attitudes, and values compared to Realistic and Social types. Additionally, Realistic and Artistic types are moderately similar in terms of their abilities, skills, preferences, and attitudes. A vast pool of researchers (Armstrong & Rounds, 2008; Elosua, 2007; Gupta et al., 2008; Hedrih, 2008; Tracey & Robbins, 2005; Liu et al., 2020; Chu, Creed, & Conlon, 2021) has been devoted to testing the model, and most of them have found supporting evidence across gender, race and ethnicity, and socioeconomic status (Armstrong et al., 2003; Darcy & Tracey, 2007; Rounds & Tracey, 1993;
Ryan et al., 1996; Swanson & Gore, 2000). However, the model's fit in different nationalities is under debate (Armstrong & Rounds, 2008; Darcy & Tracey, 2007; Hussain et al., 2014; Morgan & de Bruin, 2017; Sung et al., 2016; Xu, & Li, 2020; Ding, Wang, Houriieh, & Yu, 2020).

The environment can also be categorized into the same six types, and people tend to choose the environments (e.g., field of study & place of employment/occupation) that fit with their personality (Holland, 1997). For example, realistic personality and realistic environment would prove highly congruent in terms of skills and abilities, rewards and incentives, and the overall environment and personality demands. The fit of people's personality and environment is called congruence. It received empirical support and was found to have a modest predictive power (Nauta, 2010). The theories of congruence between person and environment have emphasized matching people to a work environment that best fits their personality and interest. In this area, the most widely used framework of person-environment fit is Holland's theory of vocational personalities and work environments (Spokane & Cruza-Guet, 2005; Swanson & Gore, 2000). Studies from different cultures reported mixed findings. e.g., a moderate degree of congruence between students' aspiration and their interests was found in Pakistan (Kiani, 2011), China (Tang, 2009), and Germany (Ertl & Hartmann, 2019). Some researchers reported a positive relationship between interest and career aspiration, e.g., in Switzerland by Hirschi (2010) and in Kosovo by Jemini-Gashi and Berxulli (2017). Ertl and Hartmann (2019) reported that students' sex was a significant factor in predicting their congruence and showed higher levels of congruence where they were under-represented, particularly female students in STEM-L. Apart from that, the essential point identified by Ertl and Hartmann (2019) about congruence is the use of congruence indices to assess the concept (e.g., Holland's (1963) first-letter agreement, Healy and Morton (1983) two-letter agreement, Zener and Schmuelle (1976) Z-S index, M-Index by Iachan, 1984, etc.). Different indices revealed different congruence results, i.e., the level of congruence reported using different indices ranged from $r = 0.05$ to $r = 0.98$ (Camp & Chartrand, 1992; Brown & Gore, 1994; Young et al., 1998). Congruence indices suffered from both conceptual and methodological limitations (Nye et al., 2018). Recently, Glosenberg et al. (2019) have studied the global validity of vocational interest and trends in person-vocation reasonable assumption. The circular model fits well in high economic development areas and people with more education, particularly in individualistic and higher-income countries. Findings necessitated the importance of additional research work to understand the relevance of the circular order model in countries that differ culturally and economically from those societies where such theories have been developed and tested.

The third assumption of Holland's theory set to test in this study was the impact of congruence on academic achievement. Suppose the level of congruence is high-match between personality and environment that leads to higher academic and career success and satisfaction (Bai & Liao, 2018; Hussain et al., 2015; Nye et al., 2017), career maturity, career certainty (Jemini-Gashi & Berxulli, 2017), and mastery-approach and performance-approach among high school students (Sawitri & Creed, 2015). Some researchers reported inconsistent findings, i.e., students' congruence was found to be a poor predictor of their significant academic satisfaction and performance (Young et al., 2016) and nonsignificant predictor of their career planning, career decidedness, occupational self-efficacy, and career engagement (Jaenschki et al., 2016). IT professionals' congruence was not significantly associated with their occupational satisfaction (Carpenter et al., 2018). Engineers with high and low congruence did not differ in work satisfaction. However, the low initial congruence group reported higher congruence in their second job, but the high initial congruence group unexpectedly reported lower congruence in their second job (Earl et al., 2019). Nye et al. (2017) have conducted a meta-analysis to address the discrepancies in the congruence hypothesis, concluded that interest congruence was a better predictor of performance than interest scores alone.

Vocational aspirations and vocational interest, the degree of agreement between them, and its impacts on students' academic achievement are well-studied academic and career counselling domains in the west and other developed nations. However, in Pakistan, this is a relatively less explored area. However, it is essential to provide academic and career counselling services to ensure academic and career success and satisfaction. Therefore, the current study was conducted to assess Holland's model of interest, congruence between career aspiration and interest, and its impact on student's academic achievement in Pakistan.

**Research Objectives**

The current study was conducted to investigate Holland's circular order model of interest, congruence between career interest and career aspiration, and congruence impact on students' academic performance in an indigenous context.

**H$_1$:** Holland's model structure of interest will be present in a Non-Western Pakistani cultural context.

**H$_2$:** There is positive congruence between career aspiration and career interest in Non-Western Pakistani cultural context.

**H$_3$:** There is a positive impact of congruence on academic achievement of students in Non-Western Pakistani cultural context.

**H$_4$:** There exist significant gender differences in career aspirations among students in Non-Western Pakistani cultural context.
METHODOLOGY

Participants
To conduct the present study, we have recruited a total of 669 (356 boys & 313 girls) students studying in grade 10th from 16 high schools-8 boys (4 government & 4 private sectors) and 8 girls (4 government & 4 private sectors)-from significant towns of Gilgit division, Pakistan. Students’ age was ranged from 13 to 19 years with a standard deviation of 15.72. The purposive sampling technique was used with the inclusion criteria of; only those students who study in class 10 and regular students.

Measures
The Urdu version of Career Key (CKU) by Jones (2010); CKU was used to assess students' career interests. According to Holland's theoretical postulation, this is an empirically validated test in Pakistan (Hussain et al., 2014) that measures individuals’ personality. The CKU categorized participants into six personality types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC).

Career Aspiration: Demographic sheet along with two questions about the career aspiration of students were administered. The first question was "what career do you intend to adopt in the future?" and "if you have more than one career choice, please write them in order of preference".

Academic Achievement: Students’ obtained board marks in the last examination were recorded to measure their academic achievement.

Procedure
The data were collected from 16 schools from significant towns of the Gilgit division (Gilgit, Ghizer, Hunza, & Nagar districts), Pakistan. After obtaining formal consent from school authorities, CKU and a demographic information sheet were administered to students in a class setting. Students’ marks in the last board examination were obtained from the school administration. Researchers ensure their presence in class during the assessment to facilitate participants. Statistical Package for Social Sciences (SPSS. ver. 20) was used to analyze collected data.

Ethical Considerations
The American Psychological Association (APA) followed ethical principles and a code of conduct in the whole research. Moreover, the researchers also followed recommendations provided by the Bio-Ethics Committee of the Karakoram International University during each research step. Dual informed consent was obtained from both the institutions and from the participants. Only those participants were selected who have willingly participated in this study. No harm was caused for participants in this research.

Statistical Analysis
The Pearson correlation analysis was used to assess all intercorrelations for all scales of CKU, and a randomized test of hypothesized order (Hubert & Arabie, 1987) was applied to test Holland's circular order model. Congruence was measured using Holland's (1963) first-letter agreement. We have created three groups of students based on the results of the first-letter agreement; first, congruent group, students whose career interests and career aspirations match. Second, the incongruent group, those students whose career interests and career aspirations were not matched, and the third, ambivalent group, consisting of students who scored high on more than one type. To compare their academic
achievement, we have applied a one-way analysis of variance (ANOVA). To assess gender differences in career interests, career aspirations, and academic achievement, we have applied an independent sample t-test.

RESULT

As shown in figure 1, all intercorrelations for all scales of CKU were statistically significant. A close examination of the correlation matrix indicated that the general pattern coincides with Holland's theoretical expectation; there are some notable exceptions. For example, the correlation between R and I is less than the correlation between R and C, the correlation between I and A is less than the correlation between A and all other subscales, and the correlation between A and S is less than the correlation between A and next to the adjacent scales Figure 2.

![Hexagonal Model of Intercorrelations for RIASEC of CKU](image)

Figure 2: Hexagonal Model of Intercorrelations for RIASEC of CKU (N=669)

Note: Correlations from left to the right overall sample, boys and girls for Holland's hexagonal model.

We then evaluated Holland's circular order model using the randomized test of hypothesized order by Hubert and Arabie (1987). Holland's circular order model proclaimed that adjacent types of RIASEC are more similar than more distant types. For example, Realistic and Investigative types are expected to be more similar than Realistic and Artistic types. Similarly, Artistic and Social types are expected to be more similar than Artistic and Enterprising types. Test results indicated that out of 72, 41 (general sample), 43 (boys), and 37 (girls) order predictions were consistent with theoretical expectations. The significance levels for all samples were not significant. It revealed that the structure-of-interest of the studied sample do not support Holland's circular order model (Table 1).

| Sample   | N     | Number of Predictions | Predictions Met | Tie | CI    | p   |
|----------|-------|-----------------------|-----------------|-----|-------|-----|
| Overall  | 669   | 72                    | 41              | 6   | .22   | .11 |
| Boys     | 356   | 72                    | 43              | 2   | .22   | .13 |
| Girls    | 313   | 72                    | 37              | 4   | .08   | .35 |

We also evaluated the degree of congruence between students’ career aspiration and their career interests assessed by CKU. The students whose probable career choice is a doctor; their dominant summary code is Investigative. It is consistent with Holland's theoretical expectation. The students who aspired to be a lawyer; their dominant summary code is Social. It is aligned with Holland's theoretical classification. The students whose career aspiration is an army; their dominant summary code is Social. It indicated a high degree of incongruence because its dominant summary code should be Realistic. For the students who want to be a lawyer, their dominant summary code is also Social. This is also incongruent because the dominant summary code of those who want to be a lawyer should be Enterprising. The students whose career aspiration is an engineer; their dominant summary code is Investigative. It is in accordance with the
theoretical expectations. The dominant summary codes for the aspired careers; air pilot, police, business, nurse, politician, superior central service (CSS), journalist, athlete, banker, singer, agriculture, CA, dress designer, forest officer, and insurance clerk, are incongruent. The dominant summary codes for the desired careers; artist, scientist, astronomer, psychologist, and social worker are congruent with Holland’s theoretical expectation.

Table 2: Frequencies of RIASEC highest summary codes based on students’ vocational aspiration (N = 664)

| Career            | R   | I   | A   | S   | E   | C   | Tie  |
|-------------------|-----|-----|-----|-----|-----|-----|------|
| Doctor (n = 181)  | 2   | 74  | 21  | 41  | 6   | 10  | 27   |
| Teacher (n = 122) | 2   | 25  | 10  | 51  | 7   | 7   | 20   |
| Army (n = 85)     | 7   | 16  | 7   | 18  | 9   | 10  | 18   |
| Lawyers (n = 66)  | 0   | 8   | 9   | 18  | 5   | 6   | 20   |
| Engineer (n = 60) | 3   | 29  | 6   | 4   | 5   | 3   | 10   |
| Pilot (n = 22)    | 2   | 3   | 5   | 6   | 1   | 1   | 4    |
| Police (n = 20)   | 1   | 5   | 3   | 3   | 1   | 3   | 4    |
| Business (n = 17) | 0   | 3   | 1   | 1   | 2   | 4   | 6    |
| Nurse (n = 15)    | 0   | 2   | 3   | 2   | 3   | 1   | 4    |
| Artist (n = 13)   | 0   | 1   | 7   | 3   | 0   | 0   | 2    |
| Politician (n = 13)| 0  | 4   | 2   | 4   | 0   | 1   | 2    |
| CSS (n = 13)      | 1   | 5   | 3   | 0   | 3   | 0   | 1    |
| Journalist (n = 7)| 1   | 3   | 1   | 1   | 0   | 1   | 0    |
| Scientist (n = 7) | 0   | 4   | 1   | 0   | 0   | 0   | 2    |
| Athlete (n = 4)   | 0   | 0   | 1   | 1   | 0   | 0   | 2    |
| Banker (n = 4)    | 0   | 1   | 0   | 0   | 0   | 1   | 2    |
| Singer (n = 4)    | 0   | 1   | 1   | 1   | 0   | 1   | 0    |
| Agriculture (n = 2)| 0  | 0   | 0   | 1   | 0   | 0   | 1    |
| CA (n = 2)        | 0   | 2   | 0   | 0   | 0   | 0   | 0    |
| Dress Designer (n = 2)| 0 | 1   | 0   | 0   | 0   | 0   | 1    |
| Astronomer (n = 1)| 0   | 1   | 0   | 0   | 0   | 0   | 0    |
| Forest Officer (n = 1)| 0 | 1   | 0   | 0   | 0   | 0   | 0    |
| Insurance Clerk (n = 1)| 0 | 0   | 0   | 0   | 0   | 0   | 1    |
| Psychologist (n = 1)| 0  | 1   | 0   | 0   | 0   | 0   | 0    |
| Social Worker (n = 1)| 0 | 0   | 0   | 1   | 0   | 0   | 0    |
| Total             | 19  | 190 | 81  | 156 | 42  | 49  | 127  |

Only five students didn’t express their career aspirations.

To assess the role of congruence between career aspiration and career interest in students’ academic achievement, we have created three groups: congruent, incongruent, and ambivalent groups. One-way analysis of variance indicated that students’ congruence significantly influenced their academic achievement, but the effect size is weak (Table 3). Post-hoc analysis revealed that congruent group reported highest level of academic achievement when compared with incongruent group (MD = 2.8, p = .01) and ambivalent group (MD = 3.0, p = .03). However, no difference was found between incongruent and ambivalent groups (MD = .29, p = .8).

Table 3: Comparison of academic achievement among congruent, incongruent, and ambivalent groups (N = 664)

| Sources          | SS   | Df  | MS  | F   | Effect size |
|------------------|------|-----|-----|-----|-------------|
| Between Groups   | 1122.1| 2   | 561.0| 3.43* | .1          |
| Within Groups    | 107774.0| 661 | 163.2|      |             |
| Total            | 108896.2| 663 |      |      |             |

Note. *p < .05.

Gender differences in career interests were also assessed. As shown in table 4, girls reported higher levels of Investigative, Artistic, Social, and enterprise interest than boys. The effect size for Investigative and Enterprising types is small, while it is medium for Artistic and Social types (Table 4).

Table 4: Gender differences in each type of CKU for general sample (N = 669)

| Scale        | Boys (n=356) M(SD) | Girls (n=313) M(SD) | t (667) | LL | UL | Cohen’s d |
|--------------|--------------------|---------------------|---------|----|----|------------|
| Realistic    | 8.74(3.0)          | 9.17(3.1)           | 1.7     | .09 | .04 | .13        |
| Investigative| 11.57(4.4)         | 13.27(3.9)          | 5.12**  | 2.3 | 1.0 | .44        |
| Artistic     | 8.25(4.4)          | 10.92(4.6)          | 7.5**   | 3.3 | 1.9 | .58        |
| Social       | 11.52(3.1)         | 13.42(3.1)          | 7.7**   | 2.3 | 1.4 | .60        |
Results of the circumplex model did not support the structure of interest in the present study. Our results are consistent with previous findings reported from the same social context, where students’ hexagonal structure of interest did not support Holland’s theoretical expectations (Hussan et al., 2014). However, researchers reported supporting evidence to Holland’s interest structure from other non-western cultures. For example, Yilmaz (2017) found supporting results to Holland’s personality types in Turkey. Morgan et al. (2015) found that in South Africa, university students’ interest structure supported the tight circular order model. In China, research findings supported the hexagonal structure of interest and endorsed two additional assumptions of Holland’s theory: congruence and calculation (Yul & Alvi, 1996). Supporting evidence to Holland’s interest structure was also reported from European countries. For example, Belgium (Fonteyne et al., 2017), Germany (Blankenburg et al., 2016), Iceland (Einarsdottir et al., 2002), and Serbia and Bulgaria (Hedrih et al., 2016).

Nevertheless, Morgan and de Bruin (2017) reported some mixed findings from African countries, i.e. slight disordering in personality types for the Eastern African region and correct ordering of the personality types for Southern and Western African regions. In China, the interest structure of students among interest types was partially consistent with Holland’s theory (Sung et al., 2016). Another study in China found that the circumplex model was not supported, while the circular order model was supported irrespective of culture and gender (Yang & Hui, 2005). Another study conducted in South Africa found that the circular order model and multidimensional scaling analysis, which suggested poor fit, indicated the structure of interest might not be valid for South Africa. According to Khan et al. (1990), students’ structure of interest in Pakistan was not identical with the US context. Farh et al. (1998) found similar results for students in Hong Kong. Based on the American college testing database, Darcy and Tracy (2007) found differences in conclusions, i.e.

**Table 5:** Gender differences in career aspiration (N = 664)

| Career aspiration          | Boys | Girls | Total |
|---------------------------|------|-------|-------|
| Doctor                    | 71   | 110   | 181   |
| Teacher                   | 49   | 73    | 122   |
| Army                      | 77   | 8     | 85    |
| Engineers                 | 20   | 46    | 66    |
| Pilot                     | 11   | 11    | 22    |
| Police                    | 19   | 1     | 20    |
| Business                  | 16   | 1     | 17    |
| Nurse                     | 0    | 15    | 15    |
| Artist                    | 6    | 7     | 13    |
| Politician                | 11   | 2     | 13    |
| CSS                       | 7    | 6     | 13    |
| Journalist                | 2    | 5     | 7     |
| Scientist                 | 5    | 2     | 7     |
| Athlete                   | 2    | 2     | 4     |
| Banker                    | 3    | 1     | 4     |
| Singer                    | 3    | 1     | 4     |
| Agriculture               | 2    | 0     | 2     |
| CA                        | 2    | 0     | 2     |
| Dress Designer            | 0    | 2     | 2     |
| Astronomer                | 0    | 1     | 1     |
| Forest Officer            | 1    | 0     | 1     |
| Insurance Clerk           | 1    | 0     | 1     |
| Psychologist              | 0    | 1     | 1     |
| Social Worker             | 1    | 0     | 1     |

**Note.** CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit. **p < .01.

As shown in Table 5, the aspired careers for girls were doctor, teacher, lawyer, nurse, artist, journalist, dress designer, astronomer, and psychologist. Boys’ aspired careers were army, engineer, police, business, politician, CSS, scientist, banker, singer, agriculture, CA, forest officer, insurance clerk, and social worker. For air pilots and athletes, both boys and girls preferred equally (Table 5).

**DISCUSSION**

In the present study, we have evaluated three assumptions of Holland’s theory: circular order model of interest structure, congruence between career aspiration and career interest, and impact of congruence on students’ academic achievement.

The findings supported Holland’s theoretical expectations (Hussan et al., 2014). Researchers reported supporting evidence to Holland’s interest structure from other non-western cultures. For example, Yilmaz (2017) found supporting results to Holland’s personality types in Turkey. Morgan et al. (2015) found that in South Africa, university students’ interest structure supported the tight circular order model. In China, research findings supported the hexagonal structure of interest and endorsed two additional assumptions of Holland’s theory: congruence and calculus (Yul & Alvi, 1996). Supporting evidence to Holland’s interest structure was also reported from European countries. For example, Belgium (Fonteyne et al., 2017), Germany (Blankenburg et al., 2016), Iceland (Einarsdottir et al., 2002), and Serbia and Bulgaria (Hedrih et al., 2016).

Nevertheless, Morgan and de Bruin (2017) reported some mixed findings from African countries, i.e. slight disordering in personality types for the Eastern African region and correct ordering of the personality types for Southern and Western African regions. In China, the interest structure of students among interest types was partially consistent with Holland’s theory (Sung et al., 2016). Another study in China found that the circumplex model was not supported, while the circular order model was supported irrespective of culture and gender (Yang & Hui, 2005). Another study conducted in South Africa found that the circular order model and multidimensional scaling analysis, which suggested poor fit, indicated the structure of interest might not be valid for South Africa. According to Khan et al. (1990), students’ structure of interest in Pakistan was not identical with the US context. Farh et al. (1998) found similar results for students in Hong Kong. Based on the American college testing database, Darcy and Tracy (2007) found differences in conclusions, i.e.
circular order, multidimensional scaling, and unidimensional scaling, were supported. In conclusion, despite its hallmark importance in career counselling, Holland's interest structure is not fully supported across studies and cultures.

Results of the second assumption-congruence between career aspiration and career interest-were moderately consistent with the theoretical expectation. The congruence between career aspiration and career interest was found for the aspirated careers of a doctor, teacher, engineer, artist, scientist, astronomer, psychologist, and social worker. Incongruence between career aspiration and career interest was found for the aspirated careers of; the army, lawyer, air pilot, police, business, nurse, politician, CSS, journalist, athlete, banker, singer, agriculture, CA, dress designer, forest officer, and insurance clerk. Kiani (2011) reported consistent findings from Pakistan where students' aspirated careers of doctor and teacher were congruent with their career interest and aimed careers of army and lawyer were incongruent with their career interest. Another study conducted in Pakistan found that there was a good level of congruence for students of fine arts, social sciences, and engineering and medicine, less congruence for students of administrative sciences, and almost no congruence for commerce students indicated some support for the concept of congruence aligned with findings of the present study (Khan et al., 1990).

The congruence hypothesis was also supported by research findings reported from different socio-cultural contexts (Volodina et al., 2015; Yul & Alvi, 1996). However, in the present study, incongruence was also found in some occupations. It is not easy to establish any firm assumption behind such findings, but the role of specific factors cannot be ignored completely. For example, in the socio-cultural structure of Pakistan, an occupation mirrors the socio-economic status of the individual, so that human capital variables more influence an individual's occupational choice compared to the individual characteristics (Nasir, 2005). Additionally, Hussain et al. (2014) argued that several socio-economic factors tend to influence the young generation's aspirated careers, i.e. Pakistan is a developing country lacking diverse opportunities. As a result, career choice is directed by the convenience and availability of the opportunity instead of an individual's dispositional characteristics, interest, and aptitude. Farh et al. (1998) also highlighted the importance of socio-cultural fabric in determining students' interest structure coined by Holland. They found that students in Hong Kong with more strong Chinese traditional values performed less consistently with Holland's model than students with weaker traditional values. Following the fundamental essence of the social cognitive career theory (SCCT; Lent et al., 1994), Byars-Winston and Fouad (2008) reported the importance of parental involvement in undergraduate college students' career goals. According to Ertl and Hartmann (2019), there are multiple factors in choosing those aspiring occupations, which do not fit with one's interest, e.g., sex type, the prestige of occupation, and an associated outcome like the job. Young et al. (2016) reported job security as an essential factor influencing students' career optimism and career planning ability.

Furthermore, the previous meta-analysis reported consistent and theoretically meaningful relationships between personality traits and personal values but not generally large, revealing that both traits and values are two separate constructs (Parks-Leduc et al., 2015). Nye et al. (2018) has questioned the conceptual and methodological operationalization of congruence indices. Therefore, we conclude that due to the socio-economic fabric of the research region, different operational definitions and indices of congruence and differences in theoretical constructs, career interest, and choice were not neatly fit with the theoretical expectation proposed by Holland.

Findings of the third assumption-impact of congruence on academic achievement-was consistent with the theoretical expectation, i.e. congruent group scored the highest level of academic achievement compared to incongruent and ambivalent groups. Our results validated previous meta-analysis findings; interest-congruence was a stronger predictor of performance outcomes than interest scores alone (Nye et al., 2017). Similarly, congruent groups scored higher on academic achievement than incongruent groups in the same region (Hussain, Ali, & Ansar-ud-Din, 2015). The positive impact of congruence on career outcomes, including academic achievement and timely degree completion, was reported by several studies (Allen & Robbins, 2010; Gitonga et al., 2013; Tracey & Robbins, 2006; Ukwueze et al., 2014) supporting findings of the present study.

Gender differences in career interest were observed in the present study, i.e. girls reported a higher level of Investigative, Artistic, and Social interest than boys, partially replicating previous findings reported from the same social context where girls' scored higher on Artistic and Social. Boys scored higher on Investigative, Enterprising, and Conventional (Khan et al., 1990), while another study reported that girls scored higher on Artistic while boys scored higher on Realistic, Enterprising, and Conventional (Hussain et al., 2014). According to Morris (2016) and Dierks et al. (2016), women scored higher on Artistic and Social interests than men supported our findings.

In the present study, the aspired careers for girls were doctor, teacher, lawyer, nurse, artist, journalist, dress designer, astronomer, and psychologist. Boys' aspirated careers were army, engineer, police, business, politician, CSS, scientist, banker, singer, agriculture, CA, forest officer, insurance clerk, and social worker. Our findings are consistent with the result of a previous study conducted in Pakistan. The most aspired occupations by boys were engineer, armed forces, business, and scientist, while their most minor preferred occupations were nurse, artist, flight attendant, and beautician. Girls' most aspired occupations were medicine, lecturer, and psychologist, while their least aspired occupations were police, contractor, and clerk. The study further revealed that boys and girls aspired more for those compatible with their gender within the Pakistani cultural context (Aziz & Kamal, 2012). Other studies in Pakistan found that boys' most
preferred occupations were army officers and engineers, while girls’ most aspired occupations were doctor, teacher, and lawyer, who fully supported our findings (Kiani, 2011; Riaz, 1995). According to Riaz (1995), the underlying reasons for gender-based preference for occupations are altruistic and social, while reasons for disliking occupations are ethical and personal. Wong (2015) also argued that gender and ethnic identifies work in multifaceted ways to determine students’ career ambitions. Another study in Pakistan found that parents’ profession, mass media, and personal choice influenced students’ career selection (Saleem et al., 2014), hints, we cannot say that only cultural factors influenced students’ career aspiration.

**CONCLUSION**

To conclude, Holland’s circular order model of interest was not supported, but the congruence hypothesis was partially supported, and the impact of congruence on academic achievement was fully supported in the present study. Therefore, we recommend organizing awareness programs for parents, teachers, and career counsellors to consider the importance of students’ interest in their selection of the field of study so that students will perform better during their academic and later in professional life.

**LIMITATIONS AND STUDY FORWARD**

As this study was confined to a specific geographic location, it is suggested to consider other segments of society and a much bigger sample size to generalize the study results. A good number of participants had never been to a university to work. Based on the analysis and interpretation of results, we cannot say that only cultural factors influenced students’ career aspiration.

**ACKNOWLEDGEMENT**

We would like to thank all the independent reviewers of HSSR who conducted a feasibility study of our research work.

**AUTHORS CONTRIBUTION**

Ammar Hussain worked on the drafting of the article, Sadiq Hussain and Zaigham Ali collected the data. All authors worked collectively on the analysis and interpretation of results.

**REFERENCES**

1. Allen, J., & Robbins, S. (2010). Effects of interest-major congruence, motivation, and academic performance on timely degree attainment. *Journal of Counseling Psychology, 57*(1), 23-35. https://doi.org/10.1037/a0017267
2. Armstrong, P. I., & Rounds, J. B. (2008). Vocational psychology and individual differences. In S. D. Brown & R. W. Lent (Eds.), *Handbook of counseling psychology* (4th ed., pp. 375–391). New York, NY: Wiley.
3. Armstrong, P. I., Hubert, L., & Rounds, J. (2003). Circular unidimensional scaling: A new look at group differences in interest structure. *Journal of Counseling Psychology, 50*, 297–308. https://doi.org/10.1037/0022-0167.50.3.297
4. Aziz, S., & Kamal, A. (2012). Gender role attitudes and occupational aspirations of Pakistani adolescents. *FWU Journal of Social Sciences*, 6(1).
5. Bai, L., & Liao, H. Y. (2018). The relation between interest congruence and college major satisfaction: Evidence from the basic interest majors. *Journal of Career Assessment*. https://doi.org/10.1177/1069072718793966
6. Blankenburg, J. S., Hoffler, T. N., & Parchmann, I. (2016). Fostering today what is needed tomorrow: Investigating students’ interest in sciences. *Sciences Education, 100*(2), 364-391. https://doi.org/10.1002/sce.21204
7. Brown, D., & Lent, R. W. (Eds.). (2005). *Career development and counseling: Putting theory and research to work*. New York, NY: Wiley.
8. Brown, S. D., & Gore, P. A. J. (1994). An evaluation of interest congruence indices: Distribution characteristics and measurement properties. *Journal of Vocational Behavior, 45*, 310–327. https://doi.org/10.1006/jvbe.1994.1038
9. Byars-Winston, A. M., & Fouad, N. A. (2008). Math and sciences social cognitive variables in college students: Contribution of contextual factors in predicting goals. *Journal of Career Assessment, 16*(4), 425-440. https://doi.org/10.1177/1069072708318901
10. Camp, C. C., & Charrtrand, J. M. (1992). A comparison and evaluation of interest congruence indices. *Journal of Vocational Behavior, 41*, 162–182.
11. Carpenter, D., Young, D. K., McLeod, A., & Maasberg, M. (2018). IT Career counseling: Are occupational congruence and the job characteristics model effective at predicting IT job satisfaction? *Journal of Information Systems Education, 29*(4), 225-238.
12. Chu, M. L., Creed, P. A., & Conlon, E. G. (2021). Work–Study Boundary Congruence, Contextual Supports, and Proactivity in University Students Who Work: A Moderated-Mediation Model. *Journal of Career Development, 48*(2), 166-181. https://doi.org/10.1177/0894845319830253
13. Darcy, M. U. A., & Tracey, T. J. G. (2007). Circumplex structure of Holland's RIASEC interests across gender and time. *Journal of Counseling Psychology, 54*(1), 17–31. https://doi.org/10.1037/0022-0167.54.1.17
Dierks, P. O., Hoffler, T. N., Blankenburg, J. S., Peters, H., & Parchmann, I. (2016). Interest in sciences: a RIASEC-based analysis of students' interests. International Journal of Sciences Education, 38(2), 238-258. https://doi.org/10.1080/09500693.2016.1138337

Ding, Y., Wang, Q., Houtrieh, N., & Yu, Q. (2020). Vocational Personality Types in College Engineering Students in Relation to Academic Achievement. Journal of Employment Counseling, 57(1), 27-47. https://doi.org/10.1002/joc.12136

Earl, J., Iskandar, F., & Elizondo, F. (2019). Take a job, any job: exploring the importance of matched interests to career path and work satisfaction. Journal of Employment Counseling, 56(1), 33-45. https://doi.org/10.1002/joc.12101

Einarsdottir, S., Rounds, J., Egitstottir, S., & Gerstein, L. H. (2002). The structure of vocational interest in Iceland: Examining Holland's and Gati's RIASEC models. European Journal of Psychological Assessment, 18(1), 85-95. https://doi.org/10.1027//1015-5759.18.1.85

Elosua, P. (2007). Assessing vocational interests in the Basque Country using paired comparison design. Journal of Vocational Behavior, 71, 135–145. https://doi.org/10.1016/j.jvb.2007.04.001

Ertl, B., & Hartmann, F. G. (2019). The interest profiles and interest congruence of male and female students in STEM and Non-STEM fields. Frontiers in Psychology. https://doi.org/10.3389/fpsyg.2019.00897

Farh, J., Leong, F. T. L., & Law, K. S. (1998). Cross-cultural validity of Holland's model in Hong Kong. Journal of Vocational Behavior, 52, 425-440. https://doi.org/10.1006/jvbe.1997.1631

Fonteyne, L., Wille, B., Duyck, W., & Fruyt, F. (2017). Exploring vocational and academic field of study: development and validation of the Flemish SIMON interest inventory (SIMON-I). International Journal for Educational and Vocational Guidance, 17(2), 233-262. https://doi.org/10.1007/s10775-016-9327-9

Gitonga, C. M., Kigen, E., Wangeri, T., & Orodro, J. A. (2013). Is congruence a predictor of satisfaction with the choice of degree program among university students in Kenya. Journal of Education and Practice, 4(17), 108-115.

Glosenberg, A., Tracey, T. J. G., Behrend, T. S., Blustein, D. L., & Foster, L. L. (2019). Person-vocation fit across the world of work: Evaluating the generalizability of the circular model of vocational interest and social cognitive career theory across 74 countries. Journal of Vocational Behaviors, 112, 92-108. https://doi.org/10.1016/j.jvb.2019.01.002

Gupta, S., Tracey, T. J. G., & Gore, P. A., Jr. (2008). Structural examination of RIASEC scales in high school students: Variation across ethnicity and method. Journal of Vocational Behavior, 72, 1–13. https://doi.org/10.1016/j.jvb.2007.10.013

Healy, C. C., & Mourton, D. L. (1983). Derivatives of the Self-Directed Search: Potential clinical and evaluative uses. Journal of Vocational Behavior, 23, 318–328. https://doi.org/10.1016/0001-8791(83)90045-3

Hedrih, V. (2008). Structure of vocational interests in Serbia: Evaluation of the spherical model. Journal of Vocational Behavior, 73, 13–23. https://doi.org/10.1016/j.jvb.2007.12.004

Hedrih, V., Stosic, M., Simic, I., & Ilieva, S. (2016). Evaluation of the hexagonal and spherical model of vocational interests in the young people in Serbia and Bulgaria. Psihologija, 49(2), 199-210. https://doi.org/10.2298/PSJI1602199H

Hirschi, A. (2010). Vocational interests and career goals: development and relations to personality in middle adolescents. Journal of Career Assessment, 18(3), 223-238. https://doi.org/10.1177/1069072710364789

Holland, J. L. (1963). Explorations of a theory of vocational choice and achievement: II. A four-year prediction study. Psychological Reports, 12, 547–594. https://doi.org/10.2466/prt.1963.12.2.547

Holland, J. L. (1994). Self-Directed Search. Odessa, FL: Psychological Assessment Resources, Inc.

Holland, J. L. (1997). Making vocational choices: A theory of vocational personalities and work environments (3rd ed.). Odessa, FL: Psychological Assessment Resources.

Hubert, L., & Arabie, P. (1987). Evaluating order hypotheses within proximity matrices. Psychological Bulletin, 102(1), 172-178. https://doi.org/10.1037/0033-2909.102.1.172

Hussain, S., Ali, Z., & Ansar-ud-Din, (2015). Congruence between interest and filed of study as determinant of academic achievement among university students in Gilgit-Baltistan. Business Review, 10(2), 161-169.

Hussain, S., Jones, L. K., Fouad, N., Ismail, I. M., Munaf, S., & Khan, M. A. (2014). Adaptation of the Career Key into Urdu. Pakistan Journal of Psychological Research, 29(2), 187-201.

Iachan, R. (1984). A measure of agreement for use with the Holland classification system. Journal of Vocational Behavior, 24, 133–141. https://doi.org/10.1016/0001-8791(84)90001-0

Jaensch, V. K., Hirschi, A., & Spurk, D. (2016). The relationships of vocational interest congruence, differentiation, and elevation to career preparedness among university students. Zeitschrift für Arbeits- und Organisationspsychologie, 60(2), 79-89. https://doi.org/10.1026/0932-4089/a000210

Jemini-Gashi, L., & Berxulli, D. (2017). Personality types, career choice and career certainty among high school students. International Journal of Teaching and Education, 5(1), 25-35. https://doi.org/10.20472/TE.2017.5.1.003

Jones, L. K. (2010). The career key manual. Career Key Inc.
39. Khan, S. B., Alvi, S. A., Shaukat, N., Hussain, M. A., & Baig, T. (1990). A study of the validity of Holland's theory in a Non-Western culture. Journal of Vocational Behavior, 36, 132-146. https://doi.org/10.1016/0018-7911(90)90021-S

40. Kiani, S. (2011). Vocational aspirations of high-school students. FWU Journal of Social Sciences, 5(2), 14-23.

41. Lent, R. E., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. Journal of Vocational Behavior, 45, 79-122. https://doi.org/10.1006/jvbe.1994.1027

42. Liu, Y., Hau, K. T., Liu, H., Wu, J., Wang, X., & Zheng, X. (2020). Multiplicative effect of intrinsic and extrinsic motivation on academic performance: A longitudinal study of Chinese students. Journal of Personality, 88(3), 584-595. https://doi.org/10.1111/jopz.12512

43. Morgan, B., & de Bruin, G. P. (2017). Structural validity of Holland's circumplex model of vocational personality types in Africa. Journal of Career Assessment. https://doi.org/10.1177/1069072717692747

44. Morgan, B., de Bruin, G. P., & de Bruin, K. (2015). Constructing Holland's hexagon in South Africa. Journal of Career Assessment, 23(3), 493-511. https://doi.org/10.1177/106907271547615

45. Morris, M. L. (2016). Vocational interests in the United States: Sex, age, ethnicity, and year effects. Journal of Counseling Psychology, 63(5), 604-615. https://doi.org/10.1037/cou0000164

46. Nasir, Z. M. (2005). An analysis of occupational choice in Pakistan: A multinomial approach. The Pakistan Development Review, 44(1), 57-79. https://doi.org/10.30541/v44i1pp.57-79

47. Nauta, M. M. (2010). The development, evolution, and status of Holland's theory of vocational personalities: reflections and future directions for counseling psychology. Journal of Counseling Psychology, 57(1), 11-22. https://doi.org/10.1037/a0018213

48. Nye, C. D., Prasad, J., Bradburn, J., & Elizondo, F. (2018). Improving the operationalization of interest congruence using polynomial regression. Journal of Vocational Behavior, 104, 154-169. https://doi.org/10.1016/j.jvb.2017.10.012

49. Nye, C. D., Su, R., Rounds, J., & Drasgow, F. (2017). Interest congruence and performance: Revisiting recent meta-analytic findings. Journal of Vocational Behavior, 98, 138-151. https://doi.org/10.1016/j.jvb.2016.11.002

50. Parks-Leduc, L., Feldman, G., & Bardi, A. (2015). Personality traits and personal values. Personality and Social Psychology Review, 19(1), 3-29. https://doi.org/10.1177/1088868314538548

51. Riaz, M. N. (1995). Career choices and occupational images. Pakistan Journal of Psychological Research, 10(1), 13-26.

52. Rounds, J., & Tracey, T. J. G. (1993). Prediger's dimensional representation of Holland's RIASEC circumplex. Journal of Applied Psychology, 78, 875–890. https://doi.org/10.1037/0021-9010.78.6.875

53. Ryan, J. M., Tracey, T. J. G., & Rounds, J. (1996). Generalizability of Holland's structure of vocational interests across ethnicity, gender, and socio-economic status. Journal of Counseling Psychology, 43, 330–337. https://doi.org/10.1037/0022-0167.43.3.330

54. Saleem, N., Hanan, M. A., Saleem, I., & Shamshad, R. M. (2014). Career selection: Role of parent's profession, mass media and personal choice. Bulletin of Education and Research, 36(2), 25-37.

55. Sawitri, D. R., & Creed, P. A. (2015). Perceived career congruence between adolescents and their parents as a moderator between goal orientation and career aspirations. Personality and Individual Differences, 81, 29-34. https://doi.org/10.1016/j.paid.2014.12.061

56. Spokane, A. R., & Cruza-Guet, M. C. (2005). Holland's theory of vocational personalities in work environments. In S. D. Brown & R. W. Lent (Eds.), Career development and counseling: Putting theory and research to work (pp. 24–41). Hoboken, NJ: Wiley.

57. Sung, Y., Chenge, Y., & Wu, J. (2016). Constructing a situation-based career interest assessment for junior high school students and examining their interest structure. Journal of Career Assessment, 24(2), 347-365. https://doi.org/10.1177/1069072715580419

58. Swanson, J. L., & Gore, P. A., Jr. (2000). Advances in vocational psychology theory and research. In S. D. Brown & R. W. Lent (Eds.), Handbook of counseling psychology (3rd ed., pp. 233–269). New York, NY: Wiley.

59. Tang, M. (2009). Examining the application of Holland's theory to vocational interests and choices of Chinese college students. Journal of Career Assessment, 17(1), 86-98. https://doi.org/10.1177/1069072709325743

60. Toit, R., de Bruin, G. P. (2002). The structural validity of Holland's R-I-A-S-C model of vocational personality types for young black South African men and women. Journal of Career Assessment, 10(1), 62-77. https://doi.org/10.1177/106907270101001004

61. Tracey, T. J. G., & Robbins, S. B. (2005). Stability of interests across ethnicity and gender: A longitudinal examination of grades 8 through 12. Journal of Vocational Behavior, 67, 335–364. https://doi.org/10.1016/j.jvb.2004.11.003

62. Tracey, T. J. G., & Robbins, S. B. (2006). The interest-major congruence and college success relation: A longitudinal study. Journal of Vocational Behavior, 69(1), 64-89. https://doi.org/10.1016/j.jvb.2005.11.003

63. Ukwueze, A. C., Ugwu, A. C., & Erondu, O. F. (2014). Academic achievement among radiographic students in a Nigerian university: Does program interest count? Journal of Public Health and Epidemiology, 6(3), 125-131. https://doi.org/10.5897/IPHE2013.0623
64. Volodina, A., Nagy, G., & Koller, O. (2015). Success in the first phase of the vocational career: The role of cognitive and scholastic abilities, personality factors, and vocational interest. *Journal of Vocational Behavior, 91*, 11-22. https://doi.org/10.1016/j.jvb.2015.08.009

65. Wong, B. (2015). Careers 'from' but not in 'science': Why are aspirations to be a scientist challenging for minority ethnic students? *Journal of Research in Science Teaching*, https://doi.org/10.1002/tea.21231

66. Xu, H., & Li, H. (2020). Operationalize interest congruence: A comparative examination of four approaches. *Journal of Career Assessment, 28*(4), 571-588. https://doi.org/10.1177/1069072720909825

67. Yang, W., & Hui, C. H. (2005). Cross-cultural validation of Holland's interest structure in Chinese population. *Journal of Vocational Behavior, 67*(3), 379-396. https://doi.org/10.1016/j.jvb.2004.08.003

68. Yilmaz, O. (2017). An evidence for validity for Holland's theory of personality types in Turkish culture. *Psychology Research, 7*(5), 264-273. https://doi.org/10.17265/2159-5542/2017.05.002

69. Young, D. K., Carpenter, D., & Maasberg, M. (2016). An examination of factors that influence students' IT career decision. *Journal of Computer Information System, 58*(3), 253-263. https://doi.org/10.1080/08874417.2016.1235473

70. Young, G., Tokar, D. M., & Subich, L. M. (1998). Congruence revisited: Do 11 indices differentially predict job satisfaction and is the relation moderated by person and situation variables? *Journal of Vocational Behavior, 52*, 208–223. https://doi.org/10.1006/jvbe.1997.1587

71. Yul, J., & Alvi, S. A. (1996). A study of Holland's typology in China. *Journal of Career Assessment, 4*(3), 245-252. https://doi.org/10.1177/106907279600400301

72. Zener, T., & Schnuelle, L. (1976). Effects of the self-directed search on high school students. *Journal of Counseling Psychology, 23*, 353-359. https://doi.org/10.1037/0022-0167.23.4.353