Relationship between Satisfaction with Major, Academic Performance and Congruence

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Congruence is measured as a comparison between one's score on an interest inventory and one's chosen major in this study. 589 college students come from 11 majors of 3 universities in Beijing are measured by Vocational Interest Inventory of China (VIIC) developed by National Education Examinations Authority (NEEA). Data of satisfaction with major and academic performance are also collected. We explore the relationship between satisfaction with major and congruence index, as well as academic performance and congruence index. The results are as following: 1. Congruence between interest and major has positive influence on satisfaction with major. High congruent students have more satisfaction with major than others. 2. Congruence between interest and major also has positive influence on academic performance. High congruent students get better score than others. And 3. Satisfaction with major has partial mediation on the relationship between congruence and academic performance. Congruence between interest and major is very important, results we got will benefit for individual's career development and school counseling.

Congruence in psychology means that there is a good fit, or correspondence, between one's needs, wishes, and preferences on the one hand and situation, rewards, and gratification on the other hand (Spokane, 2000). Similarly, Tinsley (2000) defined congruence as the relation between desires and supplies. One of the most prominent of the person-environment fit theories is Holland's theory of vocational personality and career choice. Specifically, Holland's theory predicts, "vocational satisfaction, stability, and achievement depend on the congruence between one's personality and the environment in which one works" (Holland, 1985, p.10). While vocational counselling largely relies on the assumed veracity of this hypothesis, reviews and meta-analysis of the congruence-satisfaction or congruence-performance literature provide mixed support for Holland's congruence construct. Spokane (1985), for example, reviewed 63 studies on person-environment congruence as related to a range of factors and concluded, "on balance, congruence is associated with performance, satisfaction and stability"(p.329). Conversely, Assouline and Meir (1987) conducted a

meta-analysis on the congruence literature incorporating 21 studies that specifically examined the congruence-satisfaction hypothesis and concluded there was little or no relation between congruence and satisfaction. More recently, Tranberg, Slane, and Ekeberg (1993) conducted a meta-analysis specifically examining only the congruence-satisfaction hypothesis. Congruence was positively correlated with satisfaction in 17 of the 27 studies identified in their research. Thus a clear consensus regarding the congruence-satisfaction hypothesis does not exist.

Congruence also can be defined as the match between interest and college major choice. But effects of interest-major congruence have not frequently been researched in recent studies. Though Henry (1989) found congruent students had higher cumulative GPA's and higher GPA's than incongruent students using first-letter agreement, physician samples only represented one of the six basic Holland types.

This study sought to explore the effects of interest-major congruence in college with a large and representative sample. Vocational Interest Inventory of China (VIIC) developed by National Education Examinations Authority (NEEA) was used, because seven interest type was found to measure for Chinese students with VIIC, not six as Holland personality type. Our aim is to investigate the congruence-satisfaction relation and congruence-performance relation, issues on the effects of congruence maybe benefit for individual's career development and school counseling.

METHOD

Participants

Participants were 589 full-time undergraduates of 11 different majors from Peking University, China Agriculture University, and Beijing University of Chemical Technology separately. There were 310 males and 279 females.

Instruments

a. *Vocational Interest (VI).* Interest types were measured using Vocational Interest Inventory of China (VIIC) developed by National Education Examinations Authority (NEEA), a 140-item 6-point scale, with higher scores indicating like to do activities listed better, measure specifically designed to estimate an individual's resemblance to each of the seven vocational types of Vocational Interest Type of China (VITC). Zhang, Feng, and Yuan (2004) reported internal consistency estimates for VIIC summary scales ranging from 0.89 to 0.92。Perceived congruence was a

single Likert-type items asked participants to indicate on a 9-point scale their perceived level of fit between their major and interest. Perceived congruence was the criterion to select congruent sample (Cutrona etc., 1994).

b. *Inventory of Satisfaction with Major*. The Inventory of Satisfaction with Major developed by NEEA measured satisfaction. 19 Likert-type items asked participants to indicate degree of congruency on a 4-point scale.

c. GPA (grade point average). The average of GPA for last three years was used as academic performance.

RESULTS

Congruence Measures

Firstly, raw scores were transformed to z scores to distribute subjects across seven-interest type. Secondly, self-rated congruent students were selected by using perceived congruence as the criterion (perceived congruence ≥5). Last, this measure used the three most salient codes by ranking-order means to calculate major codes after means and standard deviations across 7 interest types were computed using the selected sample. Major codes, as well as the means and standard deviations for all 7-interest types of 11 majors are presented in Table 1.

Results revealed subjects from 11 majors are distributed to 7 big Interest Type (A, I, T, E, C, S, N). Environment Engineering (TNI) and Thermal Energy & Power Engineering (TNI) are both Technological Type Majors, in addition, three major-codes are same in every detail; History (ASI) and Journalism (ASC) are both Artistic Type Majors; Politics and Science of Administration (CSI) is a Conventional Type Major; Marketing (ESI) and Business Management (ECA) are both Enterprising Type Majors; Materials Chemistry (ITN) is a Investigative Type Major; Biological Engineering (NTI) and Agriculture (NIC) are both Natural Type Majors; Sociology (SAE) is a Social Type Major.

According to the research of Tawni and Jo-Ida, Interest-major congruence was measured by comparing individual's score of interest type to three-letter major codes. The individual's congruence index was based on summary z score of three-interest type on corresponding major-codes of one's major, but the weights to the three-letter of major code are 4, 2, and 1 separately. Higher scores reflect greater levels of congruence.

Table1

Z Score of 7 Vocational Interest Types and Major Codes for 11 Majors

		A	I	T	E	C	S	N
Environment Engineering	M	-0.17	0.23	0.64	0.02	0.13	0.02	0.61
TNI (n=33)	SD	0.97	1.07	1.06	0.93	1.08	1.18	0.98
History	M	0.16	0.04	-0.32	-0.33	-0.08	0.13	-0.17
ASI (n=34)	SD	0.86	0.83	0.95	1.07	0.97	1.03	0.83
Politics and Science of Administration	M	0.36	0.42	0.10	-0.01	0.50	0.45	-0.07
CSI (n=26)	SD	0.74	0.85	0.93	0.93	0.93	0.65	0.82
Marketing	M	-0.42	-0.17	-0.24	0.54	-0.31	-0.01	-0.57
ESI (n=47)	SD	1.27	1.26	1.07	0.91	1.19	1.16	1.06
Journalism	M	0.78	-0.65	-0.61	-0.67	-0.19	-0.15	-0.47
ASC (n=36)	SD	0.95	0.94	0.95	1.04	0.92	1.16	0.99
Materials Chemistry	M	-0.70	0.96	0.76	-0.45	-0.19	-0.21	0.40
ITN (n=26)	SD	0.85	0.69	0.86	1.23	0.91	1.07	0.86
Business Management	M	0.18	-0.31	-0.05	0.46	0.23	0.00	-0.23
ECA (n=49)	SD	0.91	0.91	0.75	0.78	0.97	0.77	0.79
Thermal Energy & Power Engineering	M	-0.02	0.44	0.80	0.07	0.37	0.02	0.53
TNI (n=26)	SD	0.80	0.82	1.04	0.86	0.88	0.80	1.13
Biological Engineering	M	-0.08	0.18	0.26	-0.08	0.04	0.05	0.45
NTI (n=37)	SD	0.80	0.72	0.78	0.81	0.98	0.88	0.89
Sociology	M	0.33	0.13	-0.18	0.20	0.10	0.51	-0.06
SAE (n=48)	SD	0.96	0.80	0.77	0.80	0.77	0.91	0.85
Agriculture	M	-0.06	0.43	0.28	-0.26	0.40	0.14	0.74
NIC (n=35)	SD	0.78	0.89	0.87	0.90	0.71	0.92	0.77

Note. A=Artistic Type, I=Investigative Type, T=Technological Type, E=Enterprising Type, C=Conventional Type, S=Social Type, N=Natural Type.

Satisfaction with Major

Coefficient alphas was 0.92 for the total scale of satisfaction with major (N=589), 0.70 for the Self-satisfaction, 0.75 for the Stability of Major Lessons, 0.71 for the Major-identify and Sense of Belonging, 0.80 for the Major Devotion.

Table2

Means, Standard Deviations, and Gender Difference for Satisfaction with Major

	Total		Male		Female		F	Sig.
	M	SD	M	SD	M	SD		
Self-satisfaction	2.53	0.56	2.56	0.59	2.49	0.53	1.70	0.09
Stability of Major Lessons	2.68	0.64	2.73	0.67	2.63	0.61	1.91	0.06
Major-identify and Sense of Belonging	2.70	0.52	2.72	0.56	2.67	0.47	1.27	0.21
Major Devotion	2.64	0.58	2.65	0.59	2.62	0.56	0.69	0.49
Total	2.64	0.51	2.67	0.53	2.60	0.48	1.60	0.11

No gender difference was found on the scores of satisfaction with major (F=1.60, p=0.11).

Relationship between Congruence, Satisfaction, and Academic Performance

589 participants were divided into three groups by ranking-order of congruence index. High-Congruent group (up 27%) and Low -Congruent group (down 27%) both included 159 students, other 279 students were counted in Med-Congruent group.

Table 3

Means, Standard Deviations for Satisfaction and performance among different groups

		HC		MC		LC	
		M	SD	M	SD	M	SD
Satisfaction	Self-satisfaction	2.73	0.55	2.50	0.53	2.38	0.56
with Major	Stability of Major Lessons	2.90	0.65	2.65	0.62	2.52	0.62
	Major-identify and Sense of Belonging	2.90	0.47	2.67	0.51	2.55	0.52
	Major Devotion	2.91	0.55	2.61	0.55	2.41	0.55
	Total	2.86	0.47	2.61	0.49	2.46	0.49
Academic	Male	5.79	1.86	5.26	1.95	4.59	2.20
Performance	Female	6.14	1.96	6.00	1.61	5.55	1.85

Note. HC = High-Congruent group, MC= Med-Congruent group, LC= Low-Congruent group.

Satisfaction with major scores showed differentiation among three groups by MANOVA analysis. For the total score of Satisfaction with Major, $F(2,586)=28.37$, $p<0.001$; for the score of Self-satisfaction, $F(2,586)=17.06$, $p<0.001$; for the score of Stability of Major Lessons, $F(2,586)=15.45$, $p<0.001$; for the score of Major-identify and Sense of Belonging, $F(2,586)=19.89$, $p<0.001$; for the score of Major Devotion, $F(2,586)=34.98$, $p<0.001$.

Table 4

Multiple Comparisons analysis of satisfaction with major among three groups

Group		Total		Self-satisfaction		Stability of Major Lessons		Major-identify and Sense of Belonging		Major Devotion	
		MD	SE	MD	SE	MD	SE	MD	SE	MD	SE
HC	LC	7.65***	1.03	1.40***	0.24	1.54***	0.28	1.74***	0.28	2.54***	0.31
HC	MC	4.82***	0.92	0.90***	0.22	0.98***	0.25	1.15***	0.25	1.52***	0.27
MC	LC	2.83**	0.92	0.49	0.22	0.55	0.25	0.58	0.25	1.02**	0.27

Note. MD= Mean Difference, SE= Std. Error

** $P<0.01$.

*** $P<0.001$.

Post Hoc Multiple Comparisons analysis found, High-congruent group showing more satisfaction with major than others, High-congruent group and Med-Congruent group students getting better score on academic performance than Low-Congruent group students.

Table 5

Multiple Comparisons analysis of academic performance among three groups

Group		MD	SE
HC	LC	0.81**	0.22
HC	MC	0.32	0.19
MC	LC	0.49*	0.19

Note. MD= Mean Difference, SE= Std. Error

** $P<0.01$.

* $P<0.05$.

Academic performance also showed differentiation among three groups, $F(2,578) = 7.08$, $p<0.01$. In addition, females got better scores than males on academic performance ($t = 15.26$, $p<0.001$). So Gender will be a variable that affects the strength of the relation between congruence and academic performance. Further results showed, interest-major congruence had a positive effect on academic performance, in particular for males, $F(2, 304) = 7.37$, $p<0.01$ (for females, $F(2, 271) = 2.45$, $p = 0.088$).

Mediation of Satisfaction between Congruence and Performance

Interest-major congruence can predict satisfaction with major and academic performance, whether satisfaction with major mediates the effect of congruence upon academic performance was explored. All three correlations among the three variables in question were statistically significant.

Table 6

Correlations for congruence, satisfaction with major, and academic performance

	Congruence	Academic performance
Academic performance	.188**	
Satisfaction with major	.309**	.281**

** $P<0.01$.

Path analysis showed partial mediation was identified, because the association between congruence and academic performance was significantly reduced by the inclusion of Satisfaction with major. The Sobel's z value was sufficiently large (4.896), yielding a p-value of less than .05. The direct effect was 0.111; the indirect

effect was 0.077 (0.309×0.246).

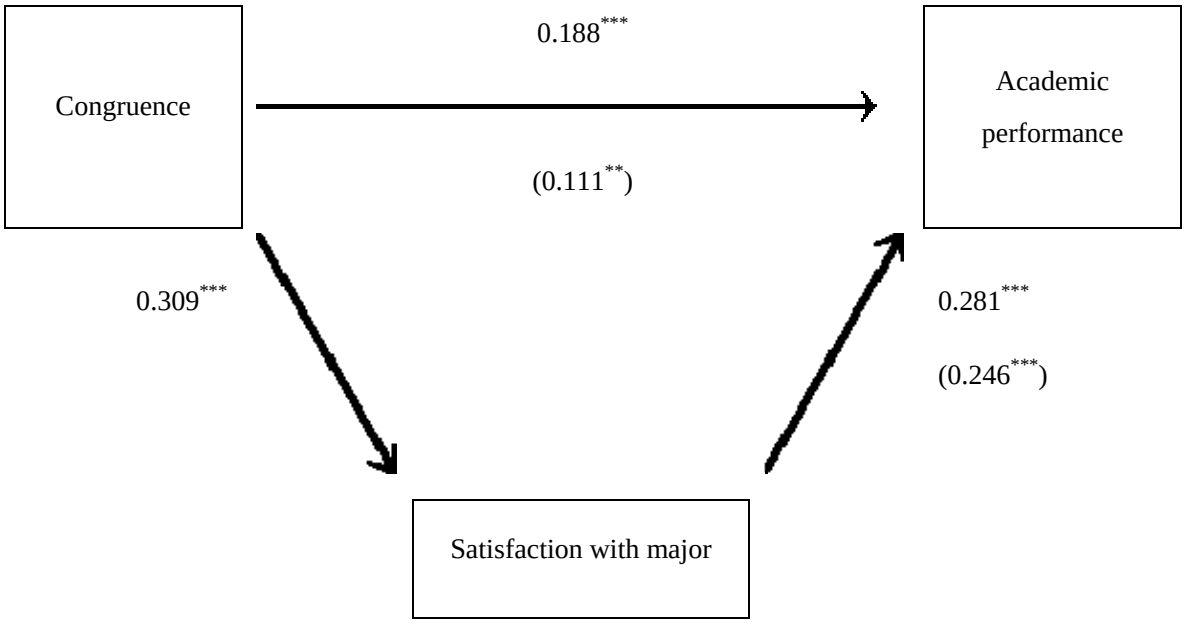

Figure 1 path analysis of mediation

DISCUSSION

The primary purpose of this study was to explore the interest type of different majors. Different majors have different interests patterns (or major codes). Major codes identified the top-three interest type on the interest inventory. Interest-major congruences measured as a comparison between one's score on the vocational interest inventory and one's chosen major, so congruence index was larger when a student chose a more interested major.

Secondary goals of the present study were to examine the relations of congruence, satisfaction with major, and academic performance. In the current study, the predictor of satisfaction with major and academic performance was both interest-major congruence. Students who chose a more interested major were more satisfied with major and got better score on academic performance. But previous tests of various congruence indices in predicting satisfaction among college students and employed adults indicate similar or even lower correlations, regardless of congruence index used (Camp & Chartrand, 1992). Why the present study suggests more support for Holland's hypotheses? First, subjects are sampled appropriately from all seven types, the distribution of males and females are also relative representative. One additional concern about the previous study relates to the use of the SDS to derive the person code. Because the SDS measures both interests and competencies, one cannot

interpret SDS codes as interest scores, alone. This is particularly problematic when trying to distinguish between person-environment fit obtained by matching the desires of the individual with what the environment supplies versus that obtained by matching the abilities of the individual with the demands of the environment. In the current study, major codes were only identified with interest type by *VIIC*.

It is unclear about the relationship between satisfaction with major and academic performance, especially they both correlated with congruence. There was a precondition that satisfaction with major maybe mediator variable (Baron & Kenny, 1986); partial mediation was identified by path analysis. In general, Students who chose a more interested major always devoted to major-learning, that mean, they maybe show greater cognitive effort, intrinsic motivation, persistence, and self-regulation in their academic performance (Schunk, 1994). In fact, some factors above are involved in satisfaction with major, students with greater interested in their major choose more challenging activities, enjoy their classes more, invest greater effort, use more learning strategies, and have higher self-efficacy about their abilities, it's not surprising they will get better score on academic performance at last. The indirect effect was 2/3 as large as the direct effect in current study. Both correlation coefficients are not larger than 0.3 though they're significant.

It is interesting to note that females have better scores than males, but no gender difference on satisfaction. Grimes (1995) found female students were more motivated and used greater effort-related and cognitive strategies than male students. This study maybe supply a confidence to that, because male students' academic performance were more influenced by interest-major congruence. Males who chose a uninterested major always get worse on academic because of less motivation. On the other hand, females always show greater cognitive effort and better self-regulation in their academic performance, regardless their interest. Hence, It is more accurate for male students that congruence is a predictor of academic performance.

Congruence was a significant predictor of satisfaction and performance in this study. Students will be successful on major-learning when their interests match the major. Hence, this study suggests a need to guidance for students seeking advice about vocational and educational matters.

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