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Teacher candidates' non-cognitive skills and programme choices

Hüseyin Ergen
Department of Educational Sciences (Educational Administration), Faculty of Education, Mersin University, Mersin, Türkiye
ergen@mersin.edu.tr
Serpil Karakiraz
Graduate School of Educational Sciences, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye and İznik District Directorate of National Education, İznik, Türkiye

Abstract
In the study reported on here we used a quantitative approach and aimed to describe the role of non-cognitive skills and demographic variables on teacher candidates' actual and aspired programme choices. The research sample comprised 596 teacher candidates studying at 7 teacher training departments at the Mersin University, Türkiye. Research data were obtained via the adjective-based personality scale (ABPS) developed in Türkiye by Bacanlı, İlhan and Aslan (2009). Personal information forms included a preference set to determine the aspirations of teacher candidates. Chi-square tests were implemented while exploring the relationship between aspired and enrolled programme choices and personality traits (used as a proxy for non-cognitive skills) and demographic variables. The findings show that personality traits and demographic variables had some effect on student teachers' choice of major subjects from particular programmes. However, the links and effects were not as strong and descriptive as shown in similar research in other countries. The results show a weak relationship between student teachers' aspirations, personality traits, and demographic variables. The relationships were observed mostly for pre-primary and Turkish language teacher candidates. The findings support the hypothesis that the strongest effect on students' choices of majors stems from neither their personality nor other variables; their choices probably stem from their test scores obtained in the centrally administered university entrance examination.

Keywords: big-five personality traits; major choice; non-cognitive skills; teacher training

Introduction
In Türkiye, as in many other countries, students' programme choices and admission to higher education programmes, including faculties of education, are determined by scores related to cognitive skills (CS) (Berkant & Bahadır, 2019) but researchers argue that CS alone are not sufficient to be successful in education and the labour market – some non-cognitive skills (NCS) are also required (Anger & Heineck, 2010; Heckman & Rubinstein, 2001; Walker, 2020). Recent findings from countries with a high per capita gross domestic product (GDP) show evidence of rising returns to NCS (Edin, Fredriksson, Nybom & Öckert, 2022), however, research on the effect of NCS on students' choice of majors is scarce.

Education is one of the bases of development (Hanushek, Piopiunik & Wiederhold, 2019). To achieve quality education, it is important to understand which individuals want to become teachers, why they aspire to this profession, and whether they possess the necessary skills for teaching.

Although national documents indicate which non-cognitive skills student teachers should possess (Seferoğlu, 2004), practices that measure or predict NCS in candidate selection are quite new in most education systems.

In Türkiye, like in other Western countries, the choice of teacher training differs somewhat with regard to choosing majors. Literature suggests that student teachers differ from other students with regard to choice of majors in that they are motivated more by intrinsic factors such as interest in the profession. Extrinsic factors such as labour market outcomes are second in line (Eren, 2015; McLean, Taylor & Jimenez, 2019). Teachers entering the teaching profession in Türkiye are selected in a two-stage selection procedure. Firstly, candidates enter a centrally arranged written examination in which scores are obtained from multiple-choice questions related to general ability, culture, teaching formation, and field of teaching. Those who pass with a certain score are interviewed on their personal choices and CS. Questions like, Introduce yourself, Why do you want to be a teacher?, How do you measure student achievement?, et cetera are asked during such interviews, but a personality test is not administered. It might be argued that NCS should be determined in more sophisticated ways.

In this study we examined student teachers' programme choices and their aspirations in relation to their NCS proxied by their personality traits quantified through a big-five personality inventory. The hypothesis in this study was: Cognitive skills and demographic variables affect actual and aspired programme choices of teacher candidates in Türkiye. In the study NCS were proxied by personality traits. Personality traits imply some qualifications for persons who practice the teaching profession. However, although NCS may be useful or necessary for practitioners of the profession, candidates may ignore them when they evaluate their own capacity to be teachers. A model was developed to understand the contribution of these traits to teacher candidates' actual and aspired programme choices. In this model, the impact of candidates' actual programme choices and aspirations on each other were analysed. The sample was selected in one of the developing regions of Türkiye, a developing country.

Literature Review and Conceptual Framework

Skills and higher education (HE) demand

In this section, the concept "skills" and its relation with HE demand is reviewed. Secondly, sections concerning the reviews of NCS and personality traits which were assumed as a proxy to NCS are provided.

The concept, "skill", has two dimensions; cognitive skills (CS) and non-cognitive skills (NCS). CS are academic and technical skills that can be measured by standard exams. NCS are soft skills like perseverance, motivation, time preference, risk-taking behaviour, self-esteem, self-control, which cannot be measured easily. Still, studies show significant relationships between NCS and wage, school attendance, success at school, adolescent pregnancy, smoking habits, and delinquency (Anger & Heineck, 2010; Cunha & Heckman, 2007; Delaney, Harmon & Ryan, 2013; Heckman & Rubistein, 2001; Jacob, 2002; Krueger & Schkade, 2008; Somer & Goldberg, 1999).

Programme choice might be the most important decision made by students as this choice has an impact on school life, courses, social life, future expectations, the probability of employment, income, promotion, and other rewards (Humburg, 2013). Determinants of programme choice can be categorised into four groups (Bartolj & Polanec, 2012; Caner & Okten, 2010; Cavas, Cakiroglu, Cavas & Ertepinar, 2011; Delaney et al., 2013; Ergen, 2013; García-Valiñas, Muñiz-Pérez & Suárez-Pandiello, 2012; Jacob, 2002; Leppel, Williams & Waldauer, 2001; Wiswall & Zafar, 2015):

1) Individual factors: gender, race, ethnicity, return expectation, financial resources, CS and NCS, personality traits, risk aversion, academic scores, studying habits, political orientation, religious orientation;
2) Parental factors: income, education levels, family structure, employment status;
3) Social factors: role models, prestigious professions in society;
4) Factors related to the programme: quality of education, workload, employment opportunities, promotion and reward opportunities, social activities, guidance and publicity, return expectation, type of participation in the labour market, non-monetary preferences, probability of graduation.

Both CS (DesJardins & Bell, 2006; Lovenheim & Reynolds, 2011; Naylor & Smith, 2004) and NCS (Checchi, Fiorio & Leonardi, 2014; Filippin & Paccagnella, 2012) are strong determinants of HE demand and choice of major (Jacob, 2002). However, imperfect assessment of one's own skills puts investment in HE at risk (Ergen, 2013; García-Valiñas et al., 2012; Porter & Umbach, 2006). Traditional economic theories explain an individual's socio-economic success with higher CS (Anger & Heineck, 2010; Komarraju, Ramsey & Rinella, 2013; Schmitt, Keeney, Oswald, Pleskac, Billington, Sinha & Zorzie, 2009). Heckman, Stixrud and Urzua (2006), who discovered the intersection of economics and psychology, argue that NCS are at least as effective as CS on an individual's socio-economic success. Similarly, Van Loo and Toolsema (2005) suggest that almost all of the key skills which increase productivity and are welcomed by modern economies are NCS, like problem-solving skills, independence, verbal presentation/speaking skills, accuracy/attentiveness, and entrepreneurship/creativity.

Non-cognitive skills

NCS are skills that are difficult to define, demarcate and measure, and, unlike CS, NCS cannot be easily determined and scored through standard examinations. However, they increase productivity and affect socio-economic success (Heckman et al., 2006). Some NCS observed in the literature review were motivation, self-perception, self-control, study habits (Ransdell, Hawkins & Adams, 2001b), locus of control (Bowles, Gintis & Osborne, 2001), proactive thinking, introversion-extroversion (Hong, Horng, Lin & Chanlin, 2008), taste, preferences, risk-taking behaviour (Krueger & Schkade, 2008), locus of control and reciprocity (Anger & Heineck, 2010), assertiveness and competitiveness (Morton, 2011), self-productivity (Helmers & Patnam, 2011), tendency of violence and quarrelling (Howard, 2011), self-confidence (Filippin & Paccagnella, 2012), future orientedness (Delaney et al., 2013), empathy and ethical decision-making (Perkins, Burton, Dray & Elcock, 2013), autonomy (Humburg, 2013), creativity, self-efficiency, innovativeness, and persistence (Huber, Sloof & Van Praag, 2014).

Different approaches are used to measure NCS. The scholastic aptitude test (SAT) is used to measure CS for enrolment at universities in the United States of America (USA). In some states, in addition to CS, NCS are taken into account. In addition to other criteria, Harvard University evaluates compassion, curiosity, gratitude, grit, growth, mindset, perspective-taking, purpose, and self-control traits for admission (Wettje, Anderson & Weissbourd, 2020). The admission announcement of the University of Denver starts with "You are more than your grades", and requires applicants to complete a form in which the focus is on NCS (2020:para. 1). The number of countries and universities taking NCS into account has been growing steadily (Kulatunga-Moruzi & Norman, 2002).

A growing number of studies shows that NCS strongly impact individual's academic, economic, social, psychological, and physical well-being (Almlund, Duckworth, Heckman & Kautz, 2011; Borghans, Duckworth, Heckman & Ter Weel, 2008; Bowles et al., 2001; Lundborg, Nystedt & Rooth, 2014). Regarding academic success, research shows significant relationships between positive NCS like

motivation, conscientiousness, empathy, ethical decision-making (Perkins et al., 2013), eagerness, diligence and tidiness (Cornwell, Mustard & Van Parys, 2013), locus of control, self-respect and professional ethics (Mendolia & Walker, 2014), openness to experience and conscientiousness (Almlund et al., 2011), self-discipline and studying habits (Duckworth & Seligman; 2005), self-efficacy, effort, pro-social behaviour and resilience (Rosen, Glennie, Dalton, Lennon & Bozick, 2010), school attendance, enrolment choice, academic success, successful graduation and willingness for education after graduation. NCS are not only important for general success; some studies show that NCS are among significant field-specific skills. For example, self-efficacy, self-concept, concern and self-belief have an impact on success in mathematics and English (Morony, Kleitman, Lee & Stankov, 2013; Stankov, Lee, Luo & Hogan, 2012) and the perseverance trait is a strong predictor of reading achievement, even for students who attend low-functioning schools in South Africa (Hofmeyr, 2021a).

Research also focuses on the consequences of programme choice and NCS relations. NCS were found to be more important than CS for academic success and graduation probability of female students in poor neighbourhoods, non-traditional students and minorities (Al-Sheeb, Hamouda & Abdella, 2019; Ardila, 2001; Borghans, Ter Weel & Weinberg, 2014; Lundberg, 2013; Ransdell, Hawkins & Adams, 2001a). King (2006) argues that due the importance of the NCS, they should be taken into account for admission to school, provision of financial aid, choice of programmes and courses, content development, and even design of the campus in order for universities to improve the functionality and quality of higher education. De Bruin (2007) also shows that certain personality traits act as predictors of readiness for self-directed learning, and HE institutions should facilitate environments in which these traits can be developed. NCS can also explain labour market outcomes like choice of profession, probability of admission to a profession, promotion, increase of income, increase in productivity, and inequalities that can't be explained by gender or race (Bowles et al., 2001; Fortin, 2008; Heckman & Rubinstein, 2001; Helmers & Patnam, 2011; Kuhn & Weinberger, 2005; Morton, 2011; Postlewaite & Silverman, 2006; Taylor, 2005; Weinberger, 2014).

Big-five/five factors personality traits model

Research by Borghans et al. (2008) has been the most cited research about economic and social returns of CS and NCS. This research claims that the big-five factors/five factors model (extraversion, agreeableness, conscientiousness, neuroticism, openness to experience) developed by Goldberg (1992) covers most NCS.

Personality is the sum of the individual's way of thinking, acting, feeling and behaving and the characteristics that distinguish the individual from other individuals (D'Souza & Saelee, 2014). Individuals' behaviour in different situations is explained by their continuous, interpersonal, emotional, motivational and experience-based interaction styles (McCrae & Costa, 1989). Resources of personality traits are discussed within a framework of biological, genetic, social and cultural factors in addition to personal experiences (D'Souza & Saelee, 2014; Merdan, 2013). Borghans et al. (2008) argue that individuals' personality traits are in a relationship with economics in terms of preferences because CS affect personality and personality affects CS. Individuals choose schools and professions according to both CS and personality traits to maximise their benefit/profit as rational actors. Personality inventories have been developed to measure personality traits. Big-five factors are adjective-based personality trait approximations. The big-five model, which is the most popular measurement and classification tool of personality traits has various versions, and each version has similar dimensions (Borghans et al., 2008; D'Souza & Saelee, 2014).

The history of studies to measure personality traits dates back to the 1930s. From an analysis of Webster's *New International Dictionary*, Allport and Odbert (1936) found 17,953 words describing personality traits which they reduced to 4,504 adjectives. Cattell (1946) grouped these adjectives as synonyms and antonyms and applied factor analysis. As a result of the factor analysis, 16 basic personality trait adjectives emerged. Goldberg grouped these adjectives into five dimensions and named them the big-five model (BFM): openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN). These dimensions cover a wide range of individuals' emotional, interpersonal, experiential, attitudinal, and motivational characteristics (Costa & McCrae, 1992). According to Brunello and Schlotter (2011), the big five factors and opposites thereof are openness vs. closedness to experience, conscientiousness vs. lack of direction, extraversion vs. introversion, agreeableness vs. antagonism and neuroticism vs. emotional stability.

Based on BFM, Costa and McCrae (1992) developed the revised NEO personality inventory (NEO PI-R – neuroticism, extraversion, openness to experience, conscientiousness, agreeableness) which consists of six sub-adjectives for each dimension (see Table 1).

Table 1 Adjectives and sub-adjectives of NEO-PI-R

Dimension	Adjectives	Opposite adjectives
Extraversion vs introversion	Sociable, energetic, adventurous, enthusiastic, sincere, assertive	Introvert, silent[6], shy, cold[1], indistinct, calm, cheerless, unobtrusive, ineffective, dull[3]
Agreeableness vs antagonism	Truthfulness, honesty, altruism, docility, moderation, warm-heartedness	Mercifulness, selfish[6], sceptical, stubborn, competitive[2], indifferent, arrogant, rebellious, ruthless, intolerant[3]
Conscientiousness vs lack of direction	Skilfulness, cautiousness, regularity, diligence, success-orientedness, self-disciplined	Lazy, indifferent, uncaring[6] undisciplined[5], irresponsible, unambitious, careless, reckless[3]
Neuroticism vs emotional stability	Anxiety, irritation, depression, individual awareness, capriciousness, vulnerability	Nervous, angry, anxious[6], timid[2], inconsistent, pessimistic, restless[3]
Openness vs closedness to experience	Curiosity, imagination, aesthetic perception, enthusiasm and non-traditional and being versatile	Narrow-minded[6], conservative, traditional, hard-minded and closed to innovations and new relationships[3,4]

Note. Compiled by the authors from following open sources: 1) Somer, Korkmaz and Tatar (2002); 2) Yelboğa (2006); 3) Bacanlı et al. (2009); 4) Doğan (2013); 5) Merdan (2013); 6) D'Souza and Saelee (2014).

NEO-PI-R is the most preferred personality measurement instrument today (Borghans et al., 2008; D'Souza & Saelee, 2014). It has been successfully adapted into Dutch, German, Italian, Spanish, Slovak, Hebrew, Hungarian, Chinese, Filipino, Finnish, Polish and Russian, and validity and reliability studies show positive results. Similarly, Somer and Goldberg (1999) adapted NEO-PI-R into Turkish (Somer et al., 2002). This inventory consists of 187 items. A different 40-item adjective-based personality inventory in Turkish was developed by Bacanlı et al. (2009).

For teachers, studies show a significant relationship between discipline style and personality traits (Uğurlu, 2012); scoring technique and conscientiousness and openness to experience (Kopliman, 2007); motivation and job satisfaction and conscientiousness and openness to experience traits (Deniz, 2008; Oktay, 2007). Perera, Granziera and McIlveen (2018) identified four personality profiles (rigid, ordinary, well-adjusted and excitable) among teachers based on big-five data and show that personality traits have an impact on teaching self-efficacy, work engagement, and job satisfaction. Kim, Jörg and Klassen (2019) conducted a meta-analysis on the big-five personality domains and teachers' job effectiveness and burn-out and found that other than agreeableness, four traits have a positive impact on teachers' effectiveness and emotional stability, while extraversion and conscientiousness are negatively associated with burnout. Khalilzadeh and Khodi (2021) found another important impact of teachers' personality traits on students. Studies show that teachers' conscientiousness has a positive impact on students' intrinsic motivation and knowledge, but extraversion has a negative impact. Research evidence supports the significant impact of teachers' personality traits on teachers, students, and the education system. So, seeking favourable personality traits for effective teachers will enhance the quality of the selection process for teacher candidates and may prevent them from declining returns.

Methodology

Model

This research was a descriptive study aimed at determining whether significant relationships existed between CS, NCS, demographic variables and enrolled and aspired programme choices of student teachers at the Faculty of Education at the Mersin University in Türkiye. Programme choice was the dependent variable while CS, NCS, family background and individual variables were the independent variables.

The following equations were designed to be used to investigate these relationships:

$$PC_i = a_0 + a_1 IC_i + a_2 FB_i + a_3 CS_i + a_4 NCS_i + a_5 PA_i + \varepsilon_i$$

$$PA_i = a_0 + a_1 IC_i + a_2 FB_i + a_3 CS_i + a_4 NCS_i + a_5 PC_i + \varepsilon_i$$

(Model 1)

(PC: currently enrolled programme, PA: aspired programme choice, IC: individual characteristics, FB: family background, CS: cognitive skills, and NCS: non-cognitive skills). Within the scope of this research, enrolled programme refers to the programme for which the candidates were enrolled at the time and aspired programme choice (APC) refers to options that candidate teachers may aspire to study. The answers to the following question were used to determine their aspirations (of which only one choice could be selected): "If you have had enough opportunities (e.g. scholarship, loan, additional income, family approval, private course, additional course, guidance, etc.) which of the following would you have chosen?"

APC1. To study the same programme at the Mersin University,

APC2. To study a programme at the Mersin University but other than in the Faculty of Education,

APC3. To study another programme in the Faculty of Education at the Mersin University,
APC4. To study the same programme at a private university,
APC5. To study abroad,
APC6. To study the same programme at another university,
APC7. To study a programme in other than a faculty of education at another university,
APC8. To study the same programme in a faculty of education at another university,
APC9. To study another programme at a private university,
APC10. I would not have enrolled in HE.

Sample

The research sample consisted of 596 teacher candidates (297 first- and 299 fourth-year students) from the Faculty of Education at the Mersin University in the 2015 to 2016 academic year (Table 2). According to Borghans et al. (2008), NCS are more open to development and change compared to CS in life span. Accordingly, NCS of the first and fourth years registered in the same programme may differ. That is why participants were chosen from different years. Participants from seven different programmes participated in the study: science teaching (SCI), mathematics teaching (MAT), primary school teaching (PRI), pre-primary school teaching (PRE), guidance and psychological counselling (COU), English language teaching (ELT), Turkish language teaching (TUR). Cochran's Q formula was used to determine the minimum number of participants in each programme (Table 3).

Table 2 Basic characteristics of the sample

Variables	Categories	*f*	*n*
Gender	Female	417	596
	Male	179	
High school	Anatolian high school	256	593
	Teacher training high school	102	
	Other high school	235	
Grade	Freshmen	297	596
	Senior	299	
Settlement	Urban	259	596
	Rural	337	
Maternal education	University and higher	38	596
	Secondary education	146	
	Primary and junior secondary	270	
	Below primary	142	
Paternal education	University and higher	100	596
	Secondary education	200	
	Primary and junior secondary	241	
	Below primary	55	
Maternal employment	Employed	88	596
	Retired	56	
	Not-employed	452	
Paternal employment	Employed	245	596
	Retired	194	
	Not-employed	157	
Family income	20,000 Turkish lira (TL) and below	318	584
	Between 20,000 and 50,000 TL	265	
	50,000 TL and above	1	

Table 3 Distribution of enrolled students according to aspired programmes

	1	2	3	4	5	6	7	8	9	10	Total
SCI	4	3	8	2	14	6	14	3	10	3	67
MAT	23	1	2	0	7	7	19	2	12	1	74
PRI	18	5	5	0	17	3	6	2	6	7	69
PRE	32	4	9	3	26	25	17	5	10	8	139
COU	15	2	0	3	17	23	12	2	1	1	76
ELT	17	0	0	5	45	14	6	4	4	3	98
TUR	11	4	2	0	15	10	18	1	7	3	71
Total	120	19	26	13	141	88	92	19	50	26	594

Note. Numbers 1 to 10 each refer to a question in the Model section above.

Studying abroad (*n* = 141) was the most preferred option for students from all programmes. The second option was studying the same programme at the Mersin University (*n* = 120) and the third option was studying a programme in other than a faculty of education at another university (*n* = 92). These findings imply that if students had enough opportunities (e.g. scholarship, loan, additional income, family approval, private course, additional course, guidance, etc.), their choices

would have been different from their current choices.

Data Collection

The adjective-based personality scale (ABPS) was used to collect data about personality traits. ABPS was adapted from Goldberg's personality traits taxonomy by Bacanlı et al. (2009). Goldberg's five-factor personality traits taxonomy is the best known and accepted taxonomy in the literature (Bacanlı et al., 2009). Bacanlı et al. (2009) used direct oblimin rotations and principal component analysis methods to determine the factor structure of the test. The sociotrophy scale, reaction to conflicts scale, negative-positive emotion scale and trait anxiety inventory have been used to determine the concurrent validity of the scale. The test-re-test method (2-week interval) was used to evaluate reliability and Cronbach's alpha coefficient (between .73 and .89) was used to determine the internal consistency of the factors. The psychometric properties of the ABPS were found to be satisfactory and could be used to evaluate personality traits in undergraduate or graduate samples (Bacanlı et al., 2009).

In addition to NCS, data about other variables were collected using an information form that we had developed. The information form consists of two parts. The first part includes questions about demographic variables, family background and academic achievement. In the second part, a 10-choice question was used to determine the participants' aspired programme choices. For ethical procedures, we had permission from the developers of ABPS and the university. The data collection process took 2 months in the spring of 2016. Data were collected on a voluntary and availability basis.

Data Analysis

In Model 1, currently enrolled programme and aspired programme choices (PC and PA) are defined as dependent variables. PC takes the value (1) when the analysed programme corresponds with the programme in which the student is enrolled; otherwise, it takes the value (0). Likewise, PA takes value (1) when the aspired programme choice coincides with the option to the question shown in the Model section, and vice versa.

Independent variables of the model are scores of the personality trait test, which has five dimensions (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism), and variables related to education and family background (grade, day/evening shift, settlement, gender, parental education level, parental employment status, and high school graduated from). Although some questions were prepared to obtain university entrance examination (ÖSS) scores, ranks and undergraduate achievement scores (GPAs), participants did not carefully answer these questions – perhaps due to the so-called Lake Wobegon effect (Maxwell & Lopus, 1994); that is, they may have overestimated their academic performance or avoided accurate reporting to maintain a positive self-image. This left the model without any variables which approximates CS. PC and PA are also interchangeably entered in equations as independent variables.

Model 1 was originally planned to be analysed using logistic regression during the research design phase. However, due to inadequate CS data, estimation results yielded uninterpretable goodness-of-fit statistics. Therefore, Model 1 could not be approved empirically with the help of collected data, but it could still serve as a guide for correlation analysis. Because independent variables were categorical (0-1), parametric tests like *t*-test or analysis of variance (ANOVA) could not be performed. In order to test the relationships between programme choices and dependent variables, Pearson chi-square (χ^2) tests were carried out independently.

Independent variables of Model 1 were further categorised for the sake of data analysis. The scores of the five factors that determine personality traits were obtained using a 7-point scale. Obtained scores were converted into three categories to create a meaningful category for the test. The score ranges are as follows: 1 = 1 to 3, 2 = 3 to 5, 3 = 5 to 7.

Data collected using the personal information form were quantified by allocating numerical values to categories. A numerical value of 1 to 7 was defined for each teacher training programme for the enrolled programme variable (PC). For example; 1 represents SCI programme and 7 represents TUR programme (see the Sample section above). The aspired programme variable (PA) was digitised by assigning values from 1 to 10 respectively for each option shown in the Model section. For the years variable, value 1 represents first and value 2 represents fourth years. For shift of education, value 1 represents students enrolled in daytime education, and value 2 represents students enrolled in evening education. For the gender variable, value 1 is for female and 2 is for male students. For the family settlement variable, 1 represents urban and 0 represents rural settlement areas. Regarding the educational status of the parents, 1 represents high school or HE and 0 represents lower than high school. For the parental employment status variable, 1 is for employed parents (public or private sector) and 0 is for non-employed or retired parents. For the variable for the type of high school graduate, value 1 shows that the student completed a selective (science and Anatolian) high school, and 0 if otherwise. The variable related to annual income is categorised numerically as well. Annual income categories are: 20,000 Turkish lira and below, between 20,000 TL and 50,000 TL, 50,000 TL and above. University entrance score, score type,

ranking and GPA are numerical variables. However, enough data to analyse the effect of these variables on programme choice could not be collected using the data collection instrument. Results of the χ^2 tests conducted to determine the relationship between the dependent and independent variables are presented in the findings section.

Results

Arithmetic mean and standard deviation values were computed from the data collected from teachers via the ABPS scale and are provided in Table 4.

Table 4 Mean and standard deviation values of big-five factor scores

Factor	Extraversion			Agreeableness			Conscientiousness			Neuroticism			Openness		
	n	$\bar{x}$	*SS*	*n*	$\bar{x}$	*SS*	*n*	$\bar{x}$	*SS*	*n*	$\bar{x}$	*SS*	*n*	$\bar{x}$	*SS*
Gender															
F	417	2.60	.58	417	2.56	.60	417	2.64	.59	417	2.49	.60	417	2.68	.60
M	179	2.55	.64	179	2.48	.69	179	2.54	.68	179	2.42	.64	179	2.60	.69
Shift															
D	491	2.57	.61	491	2.53	.63	491	2.60	.63	491	2.45	.61	491	2.65	.63
E	105	2.68	.54	105	2.57	.61	105	2.64	.61	105	2.56	.63	105	2.68	.60
Grade															
1	297	2.57	.60	297	2.51	.64	297	2.60	.62	297	2.43	.61	297	2.68	.59
4	299	2.60	.60	299	2.56	.62	299	2.62	.63	299	2.51	.61	299	2.63	.66
Settlement															
Urban	492	2.60	.59	492	2.57	.60	492	2.63	.61	492	2.48	.61	492	2.70	.59
Rural	104	2.53	.65	104	2.39	.72	104	2.52	.69	104	2.44	.62	104	2.47	.77
Maternal education (H: high school and above; L: below high school)															
H	412	2.58	.61	412	2.52	.64	412	2.61	.61	412	2.44	.62	412	2.64	.64
L	184	2.61	.58	184	2.56	.61	184	2.61	.65	184	2.53	.59	184	2.70	.59
Paternal education (H: high school and above; L: below high school)															
H	297	2.56	.61	297	2.49	.67	297	2.60	.62	297	2.42	.65	297	2.60	.67
L	298	2.61	.59	298	2.68	.58	298	2.62	.63	298	2.53	.57	298	2.71	.58
Maternal employment (E: employed; N: non-employed)															
E	135	2.38	.70	135	2.45	.66	135	2.55	.65	135	2.41	.63	135	2.52	.73
N	461	2.65	.55	461	2.56	.62	461	2.63	.62	461	2.49	.61	461	2.70	.59
Paternal employment (E: employed; N: non-employed)															
E	337	2.56	.61	337	2.53	.63	337	2.60	.64	337	2.46	.60	337	2.66	.62
N	259	2.62	.58	259	2.55	.64	259	2.62	.60	259	2.49	.63	259	2.65	.64
High school (A: Anatolian high school; O; other)															
O	337	2.57	.60	337	2.49	.65	337	2.60	.62	337	2.43	.62	337	2.64	.64
A	259	2.61	.59	259	2.60	.60	259	2.62	.63	259	2.52	.59	259	2.67	.61
Annual income (L: below 20,000 TL; H: above 20,000 TL)															
L	320	2.57	.60	320	2.48	.67	320	2.59	.65	320	2.40	.64	320	2.61	.66
H	264	2.62	.58	264	2.62	.57	264	2.65	.57	264	2.57	.55	264	2.72	.57

Table 4 indicates that the arithmetic mean and standard deviation values obtained from the sample are relatively similar. With a few exceptions, ABPS scores do not exhibit statistically significant differences across the independent variables. The arithmetic means and standard deviation scores of ABPS sub-dimensions (extraversion, agreeableness, conscientiousness, neuroticism, openness to experience) point out that the scores of the sample indicate the mean value. The ABPS scores are used as a substitute for the NCS of the sample. The ABPS sub-dimension scores in addition to the demographic and academic variables are considered variables that affect the candidates' programme choices.

Findings of χ^2 Analysis According to Enrolled Programme

In this section, responses to the following questions are presented: "Is there a relationship between teacher candidates' enrolled programme choices (EPC) and their NCS (personality traits)" and "Is there a relationship between students' EPC and variables related to their individual, educational and family background?" The test results for science teaching (SCI), mathematics teaching (MAT), primary school teaching (PRI), pre-primary school teaching (PRE), guidance and psychological counselling (COU), English language teaching (ELT), and Turkish language teaching (TUR) are presented in Table 5.

Table 5 Results of χ^2 tests indicating a significant relationship with enrolled programme choice (EPC)

Variables	SCI	MAT	PRI	PRE	COU	ELT	TUR
Extraversion							
Agreeableness				*		*	
Conscientiousness							*
Neuroticism				*			*
Openness							
Gender				*	*		*
Settlement (rural/urban)	*			*			*
Maternal education		*			*		*
Paternal education				*	*		*
Maternal employment				*			
Paternal employment							
High school				*			
APC1	*	*					
APC2						*	
APC3	*				*	*	
APC4						*	
APC5		*				*	
APC6			*		*		
APC7		*				*	*
APC8							
APC9	*	*			*		
APC10			*				

Note. (*) shows a significant relationship between two variables obtained as a result of the χ^2 test.

Table 5 shows a significant relationship between EPC and the independent variables. There was a significant relationship between being enrolled in the SCI programme and family settlement, APC1, APC3 and APC9. The implication is that this programme was chosen by students from urban areas. A significant relationship was found between programme choices of students enrolled in the MAT programme, the maternal education variable, and APC1, APC5, APC7, APC9. The implication is that students whose maternal education was high school and above, choose the MAT programme. For the PRI programme, there was a significant relationship with APC6 and APC10. There was a significant relationship between being enrolled in the PRE programme and the agreeableness (62%) and neuroticism (54%) traits. So, it can be said these personality traits might affect the programme choice of the preschool teacher students. Also, there was a significant relationship between the programme choice of students and paternal education (51%), maternal employment (77%), gender and high school type. According to the findings, the PRE programme was chosen mostly by females who graduated from vocational school. A significant relationship was found between programme choice of students enrolled in the COU programme and three variables: gender (70%), maternal (70%) and paternal education (50%). Accordingly, this programme is preferred by females whose maternal education was lower than high school and whose paternal education was high school and above. Also, there was a significant relationship between being enrolled in the COU programme and APC3, APC6, APC9. There is a significant relationship between being enrolled in the ELT programme and the agreeableness trait (62%). Except for these, no significant relationship was found related to other personality traits and other variables. Significant

relationships between being enrolled in the ELT programme and APC2, APC3, APC4, APC 5, APC7 were found. Moreover, according to the APBS scores, significant relationships existed between being enrolled in the TUR programme and conscientiousness (70%), neuroticism (54%), gender (70%), family settlement (83%), maternal education (70%), and paternal education (51%). These percentages mean that the TUR programme was preferred by females with high scores for the conscientiousness and neuroticism dimensions. Also, this programme was preferred by females whose maternal education was lower than high school and whose paternal education was high school and above. Finally, there was a significant relationship between choosing the TUR programme and APC7 (16%).

Relationship with the APC options means that if students would have had enough opportunities they would have preferred one of the APC options. The most preferred options for the study group (n = 596) were APC5 (n = 141), APC1 (n = 120), and APC7 (92). Students would prefer studying abroad, studying the same programme at the same university or studying a programme other than in a faculty of education at another university.

Findings of the χ^2 Analysis According to Aspired Programme Choice

In this section, responses to the questions, "Is there a significant relationship between students' aspired programme choice and personality traits?" and "Is there a relationship between students' aspired programme choice and variables related to their individual, educational and family background?", are presented. An option set with 10 options was used to determine which option would have been chosen by students if they had been given enough opportunities. Students' choices were used to determine the relationship between aspired programme choice and enrolled programme, personality traits and other variables.

Table 6 Results of the χ^2 tests indicating a significant relationship with aspired programme choice (APC)

Variables	1	2	3	4	5	6	7	8	9	10
Extraversion										
Agreeableness								*		
Conscientiousness		*								
Neuroticism						*				*
Openness										
Grade (1–4)						*	*			
Shift (1–2)										
Gender										
Settlement (rural/urban)										
Maternal education										
Paternal education										
Maternal employment			*							
Paternal employment										
High school										
SCI	*		*						*	
MAT	*				*		*		*	
PRI		*				*				*
PRE										
COU			*			*			*	
ELT		*	*	*	*		*			
TUR							*			

Note. (*) shows a significant relationship between two variables obtained as a result of χ^2 test.

Table 6 presents the variables that indicated a significant relationship with aspired programme choices (APC). Significant relationships were found between APC1 (to study the same programme at the Mersin University) and being enrolled in the SCI and MAT programmes; secondly, between APC2 (to study a programme at the Mersin University other than in the Faculty of Education) and conscientiousness, and being enrolled in the ELT and PRI programme; thirdly, APC3 (to study another programme in the Faculty of Education at the Mersin University) and maternal education and being enrolled in the SCI, ELT and COU programmes. In the fourth instance, a significant relationship was found between APC4 (to study the same programme at a private university) and being enrolled in ELT; and in the fifth instance, between APC5 (to study abroad) and being enrolled in the MAT and ELT programmes. A significant relationship was found between APC6 (to study the same programme at another university) and neuroticism, being a first- or fourth-year student, being enrolled in primary school teaching and the counselling and guidance programme. Furthermore, a significant relationship was found between APC7 (to study a programme in other than a faculty of education at another university) and grade, being enrolled in the MAT, TUR and ELT programmes, as well as between APC8 (to study the same programme at a faculty of education at another

university) and agreeableness. Significant relationships were also found between APC9 (to study another programme at a private university) and being enrolled in the SCI, MAT and COU programmes as well as between APC10 (I would not have enrolled in HE) and neuroticism and being enrolled in the PRI programme.

Discussion

The literature review reveals that the factors that affected HE students' choice of majors, of which the relative importance of NCS is one, have been researched in previous studies. Research findings related to South Africa were also addressed.

Socio-demographic variables like gender, family background, annual income, parental settlement, parental education, parental employment, cost of education and variables related to NCS had an effect on students' programme choices (Aliyev, 2008; Bartolj & Polanec, 2012; Beggs, Bantham & Taylor, 2008; Borghans et al., 2008; DesJardins & Bell, 2006; Ergen, 2013; Prakasam & Mukesh, 2019). Studies about demographic variables which effected or related to future teachers' occupation and programme choices show that the teaching occupation is preferred by students from lower-middle class families whose parental education is high school or lower than high school. Also, studies show that numerical programmes like mathematics and physics are preferred by males while pre-school, primary school and language teaching programmes are preferred by females (Akbayır, 2002; Ergen, 2013; Leppel et al., 2001; Sovansophal & Shimizu, 2019).

According to Heckman et al. (2006) CS and NCS can equally explain skills acquisition, market productivity and many different forms of behaviour. NCS are thus as important as CS in many ways. Personality traits are proxies of NCS. Studies related to personality traits, basically the big-five personality traits, show a significant relationship between personality traits and programme choice. Getzels and Jackson (1963) state that there is a surprising amount of diversity in teachers' personality traits when analysed according to gender, level of teaching service, and area of specialisation. Sayed and McDonald (2017) show that both extrinsic (future salary, bursaries, job security) and intrinsic factors (personality traits, beliefs, future goals) are important to enrol in a teacher training programme. Balsamo, Lauriola and Saggino (2012) found that extraversion and conscientiousness are predictors of programme choice of high school students. Similarly, Humburg (2013) found that extraversion, conscientiousness, neuroticism and autonomy affected students' programme choices. Even in some cases, NCS were more effective than cognitive abilities such as mathematical ability, linguistic ability and problem-solving ability in programme choice. Mendolia and Walker (2014) show that students with higher scores on internal locus of control, self-esteem, business ethics and conscientiousness are more likely to choose mathematics and science programmes while students with higher scores on openness to experience and creativity are more likely to choose linguistic programmes. Another study shows that the ELT programme is mostly chosen by students who describe themselves as agreeable and open to experience (Vural, 2019). Berkant and Bahadır (2019) show that students' personality traits, interests and abilities may have an effect on choosing HE programmes.

Some other studies show that personality traits are not just important for the teaching profession. Genç, Kaya and Genç (2007) found that personality traits like helpfulness and carefulness were more effective than academic achievement in the medical faculty. Similarly, Cavas et al. (2011) show that for engineering students, personal interest, curiosity, creativity and independence are as important as academic scores for career choice. Krueger and Schkade (2008) show that students who describe themselves as extravert prefer professions that require communication.

Morgan and De Bruin (2010) show several significant relationships between personality traits and burnout with personality explaining a sizeable degree of variance in burnout among university students in South Africa. Research in South Africa relates NCS as an important factor contributing to learning production (Hofmeyr, 2021b). This contribution might have been realised through teacher development. South Africa aims at providing quality education to all learners and ensuring a better future for all citizens for which qualified teachers are needed. According to Sayed and McDonald (2017), South Africa's teacher training system needs both top achievers and prospective teachers with personality traits like being zealous, inspired and creative to pursue studies in education. This study implies that being a top achiever in high school is not enough to becoming a good teacher. Also, Christiansen and Bertram (2019) states that teachers in South Africa might have developed more confidence in some areas. Therefore, the contribution of NCS may differ in relation to programme choices in teaching. Other research aimed to conduct a baseline study on personality traits of student teachers to assess the possible implications for an optimal person-environment fit or unfortunate misfit in the South African context shows a relationship between personality traits and enrolling in a teacher training programme. The study proves the usefulness of personality assessment in the selection of student teachers in other teacher training contexts, and the NEO-five factor inventory shows promise in this regard (Kok & Meyer, 2018).

Concerning literature in Türkiye, the effect of NCS on choosing a teacher training major was not a popular issue. Some researchers claim that NCS are not an important factor. The findings of our study indicate that the relative importance of NCS is low in both the actual and intended programme choices of Turkish teacher candidates. While some research findings emphasise the importance of intrinsic motivation factors for teacher candidates (such as Eren, 2015) others put forward factors such as employability, future earnings, and family background (Bozgeyikli, Görgülü & Boğazlıyan, 2023), which might be seen as related to extrinsic motivation factors.

Conclusion

As mentioned before, more and more literature proves the impact of personality traits on the choice of profession, partner and lifestyle, and for teachers' choice of programmes. The findings in this study on the sample from the Mersin University show that the teaching profession is preferred by students who come from lower-middle income families with low parental education. But, with regard to personality traits, in contrast to literature, there was a weak and sometimes no relationship between students' personality traits and both their enrolled programmes and their aspired programme choices.

Yazici and Yazici (2010) found that the main determinants in Turkish students' programme choices were job guarantees, domain-specific interest, and return expectation. Similarly, Akyıldız (2017) found that the three most important factors determining high school students' choices are job guarantees, social security and being beneficial to humanity. Because of the student admission system in Türkiye, academic scores and test scores are more important in programme choice. That is why students make their choices according to their academic achievements. As in other countries, quotas in Türkiye are determined by the Student Selection and Placement Center. Students with higher academic scores are more likely to be enrolled in programmes to which they aspire. But it is a risk for students from lower income status, minorities, and non-traditional students. They tend to make decisions based on their academic scores rather than incur the opportunity cost of taking a gap year due to their high level of risk aversion (Caner & Okten, 2010). This situation would lead to skill-school mismatch and in the case of teachers, ineffective teachers and ineffective investments in education.

Research findings support the assumptions about the relationship between demographic variables and programme choice, but the level of relationship between personality traits and programme choice is weaker than in similar studies. As a result, it can be said that academic scores and partial socio-economic variables are more important than interest or personality traits in student teachers' programme choices. These results show the necessity of a system revision for student admission.

Overall, this study contributes to the literature by adding evidence showing that NCS are not an explanatory factor in teacher candidates' actual and aspired major choices. In particular, students do not take their personality traits into account while choosing a teacher training programme as an HE pathway. On the other hand, from 2016, when a coup attempt was executed in Türkiye, teachers have been selected through interviews in addition to a centrally executed competitive examination. One might have expected the authorities to also have considered NCS while evaluating the competency of teacher candidates. Teacher selection procedures mostly ignore NCS in both written and oral examinations. Authorities should consider that when they ignore NCS in selection, teacher candidates also ignore evaluation of their NCS in major choices. In practice, this study reveals the importance of taking NCS into consideration for teacher selection procedures.

Limitations and Future Research Directions

One of the limitations of this research is related to the model of the study. Although the model was proposed as shown in the methodology section (Model 1), collected data did not support a plausible model. This was partly due to inconsistent information gathered from subjects. Students in the Faculty of Education did not provide reliable information concerning their past and current CSs. This issue was related to the Lake Wobegon effect as students refrained from expressing their low achievement scores (Maxwell & Lopus, 1994). In order to overcome this deficiency by maintaining the objectives of the study, we followed a nonparametric analysis. However, this analysis did not provide estimated parameters justified within a model. More complex models and more reliable data covering CSs as well, are recommended to be employed by future researchers.

The sample in this study included teacher candidates enrolled at only one teacher training institute. The inclusion of students from other institutions would probably increase the generalisability of the study. Therefore, the results of the study represent the opinions of students from the Faculty of Education at the Mersin University. The Mersin University is generally preferred by students from the Mediterranean region, eastern Anatolia and the south-eastern Anatolia regions, from which the sample of the study was drawn. Socio-economic background and cultural similarities of the students have made the Mersin University a regional university (Gizir, 2010). The same research should be carried out with the same measurement instrument on different samples in order to make a comparison or generalisation.

The data in this study represent the opinions of teacher candidates before some important changes in the world and the country were experienced. No recent studies were published in relation to NCS and programme choices of teacher candidates. Türkiye, together with the rest of the world, survived the Coronavirus disease (COVID-19) pandemic. Other changes might have resulted from the earthquakes in February 2023 and economic troubles caused by high inflation. The effects of the pandemic may include a negative effect of HE students from low-income families (Aujeco, French, Ugalde Araya & Zafar, 2020). Another negative effect may be over-education (Hao & Wang, 2022). In Türkiye, like in most of Western countries, there is a strong relationship between extrinsic motivation and HE choices (Bozgeyikli et al., 2023). Concerning teacher candidates, however, career choices were positively related to their intrinsic motivation (Eren, 2015).

The sources of motivation might be an indicator of teacher candidates' personality traits. It is recommended that future research investigate whether NCS remain ineffective in influencing the major choices of teacher candidates in the aftermath of COVID-19, recent earthquakes, and ongoing economic crises. Overall, the findings suggest that decisions on higher education (HE) entrance are still primarily shaped by other factors.

The overall findings show that HE entrance examination scores and intrinsic motivation are most probably determining factors in the programme choices of teacher candidates in Türkiye.

Authors' Contributions

Both authors worked collaboratively.

Notes

i. This article emanated from the Master of Arts (M.A.) thesis by Serpil Karakiraz (née Kalkan) submitted to the Mersin University Institute of Educational Sciences under supervision of the first author.

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