ANALYSIS OF PERSONALITY TRAITS AMONG PSYCHOLOGICAL TYPES

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Abstract: The main aim of the study was to verify relationship of personality traits and psychological types, based on C.G. Jung's theory and on the five-factor personality theory. NEO five factor personality inventory and Golden profile of personality were completed by 291 university students of psychology, mathematics and informatics. Results of EFA confirmed five factors of personality traits and type preferences. Comparison of eight psychological types showed expected differences in personality traits. Results indicated a development potential for TF and SN function preferences and also showed the importance of introverted/extraverted attitude when speaking about Jungian psychological types.

Keywords: psychological type; personality trait; extraversion; NEO; GPOP.

1 Introduction

When speaking about psychological types, C. G. Jung (1921/1990) differentiates them according to attitudes (extraverted or introverted) and functions (rational and irrational). There are two kinds of rational (thinking and feeling) and two kinds of irrational (intuition and sensation) functions in his theory. Altogether eight psychological types: four extraverted and four introverted. Besides the theory (Jung 1921/1990) type's characteristics are described mainly by empirical resources (Čakrt, 2010; Dunning, 2001; Dunning, 2010; Quenk, 2002). In general the theory focuses on a description of extraverted and introverted types or on a description of normal and neurotic expression of psychological functions. Thanks to the most known tool for type's assessment, Myers-Briggs Type Indicator ®MBTI, it is applied in various areas of practice: teaching (Lawrence, 1982), stress manifestation of healthy population (Quenk, 2002), carrier counselling (Čakrt, 2010; Dunning, 2001; Dunning, 2010), managerial development (Čakrt, 2009), team development (Benton, 2017) or self-development (Newman, 2016). Jungian psychological types are not validated by cluster analysis; consequently we cannot understand them in terms of psychological types identified by cluster analysis. Even though that theory of psychological types (Jung, 1921/1990) is not empirically verified by cluster analysis, MBTI questionnaire is widely spread in personnel area (Hoffman, 2002; Furnham, 2008) especially for purposes of individual and team development (Bailey, 2017) and it is considered as the most popular personality assessment in the world. It is used mainly for development purposes, because types are considered not to be stable personality characteristics. On the other side, personality traits of the five factor theory are considered as characteristics consistent over time and conditioned by temperament, „dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings, and actions"(McCrae & Costa, 2006, s. 25). They are measured by self- or objective assessment.

Relationship between five-factor personality traits and Jungian psychological type's preferences was verified by number of correlation studies (Furnham, 1996; Furnham, Crump, Batey, & Chamorro-Premuzic, 2009; Furnham, Dissou, Sloan, & Chamorro-Premuzic, 2007; Furnham, Moutafi, & Crump, 2003; Tobacyk, Livingston, & Robbins, 2008). Regarding the mentioned studies, R. McCrae and P. Costa (2006) also found out relationship between dimensions of NEO-PI and MBTI preferences: extraversion & extraversion, openness & intuition, agreeableness & feeling, and conscientiousness & judging. The MBTI as the most spread diagnostic tool of Jungian psychological types (Hoffman, 2002), does not contain alternative preference to neuroticism dimension. Recently some other tools do have it. Golden profile of personality GPOP (Golden, 2005) identifies tense/calm preference in addition. Besides eight Jungian psychological types, this tool can measure also stress level of assessed person. J. Golden (2005) compared GPOP type's preferences to the five-factor personality traits (stated in Table 1) and confirmed their overlapping, same did some other researchers (Kösegiová, 2009; Lisá, Letovancová, Pavlíková, 2011).

Table 1. *Conceptual Overlap of GPOP and NEO scales (Golden, 2005, p. 20)*

GPOP scale	Overlapping NEO Scale
Extraverting & Introverting (EI)	Extraversion
Sensing & Intuiting (SN)	Openness to experience
Thinking & Feeling (TF)	Agreeableness
Judging & Perceiving (JP)	Conscientiousness
Tense & Calm (TeC)	Emotional stability

The main aim of this study is to verify relationship of personality traits and psychological types, based on C.G. Jung's theory and on the five-factor personality theory. We expect the relationship between type's preferences and personality traits. Regarding the theory and empirical resources we expect differences among types in the personality traits.

2 Methods

The sample consisted of 291 participants, 33% men and 67 % women; age range from 18 up to 36 years (AM=22.58; SD=3.83). University students of psychology, mathematics and informatics were primary clients of university carrier counselling project and their research participation was voluntary based. Ten students could not be described by any psychological type because of their low difference between extraversion and introversion preference; hence, they were excluded from the analysis. Frequencies of the students' types are described in the table 2.

Table 2. *Frequencies of types in the research sample*

Psychological types	N	%
Extraverted feeling types (EF)	16	5,5
Extraverted intuition types (EN)	15	5,2
Extraverted sensation types (ES)	67	23
Extraverted thinking types (ET)	8	2,7
Introverted feeling types (IF)	70	24
Introverted intuition types (IN)	38	13,1
Introverted sensation types (IS)	17	5,8
Introverted thinking types (IT)	50	17,2
Total	281	96,6
Missing	10	3,4
Total	291	100,0

The Golden profile of personality GPOP questionnaire is based on Jungian theory (Golden, 2005; Lisá, Letovancová, & Pavlíková, 2011). It comprises of 116 questions with bipolar scales from 1 to 7 that measure five couples of preferences: extraverting & introverting (EI), sensing & intuiting (SN), thinking & feeling (TF), judging & perceiving (JP), tense & calm (TeC). Four couples of preferences make the global type (EI, SN, TF, JP). Tense & calm is not included in 4-letters type shortening, and it is important for feedback. Internal consistency of preferences in the research group attained average value α=0.77, within the range from α=0.71 up to α=0.84. GPOP types' preferences are measured by continuous variable that helps to measure more precisely varying levels of Jungian attitude and function preferences (see Arnau, Green, Rosen, Gleaves, & Melancon, 2003).

NEO the five factor personality inventory NEO-FFI represents a shortened version of the five factor personality theory

questionnaire (Ruisel & Halama, 2007) that measures five main personality traits: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The dimensions represent the sum of answers for 12 questions using ratings from 1 to 5. Internal consistency of the dimensions in the research group attained average value α=0.78, ranging from α=0.67 to α=0.85.

Data were analyzed by SPSS Statistics 19. Statistical characteristics and procedures: mean, median, standard deviation, skewness, kurtosis, Pearson´s correlation analysis, exploratory factor analysis (extraction maximum likelihood, rotation Promax), Kruskal-Wallis test including pairwise multiple comparisons, statistical and practical significance.

3 Results

Descriptive of dimensions included into analysis are included in a table 3. Expected significant correlations were confirmed (table 4): strong effect size between extraversion and EI, neuroticism and TeC; medium effect size between agreeableness and TF, conscientiousness and JP and small effect size between openness to experience and SN. Kaiser-Meyer-Olkin measure of sampling adequacy reached value of KMO = 0.623. Exploratory factor analysis (EFA) and Maximum Likelihood with Promax rotation showed five factor solution. Five factors together explained of 69% variance (table 5) and were saturated by following dimensions: factor 1 – extraversion and EI, factor 2 – neuroticism and TeC, factor 3 – agreeableness and TF, factor 4 – conscientiousness and JP, and factor 5 – openness to experience and SN. As the correlation analysis already suggested, factor 1 and 2 correlate.

Table 3. *Descriptive characteristics of GPOP preferences and NEO-FFI traits*

	M	Me	SD	Skewness	Kurtosis
EI	-13,01	-17	45,83	0,29	-0,69
SN	3,59	2	32,69	-0,03	0,24
TF	-10,91	-15	47,29	0,28	-0,74
JP	-22,83	-25	42,68	0,37	-0,57
TEC	-7,99	-8	13,36	0,29	0,72
Neuroticism	21,52	21	8,86	0,06	-0,55
Extraversion	30,30	31	7,81	-0,53	0,25
Openness to Experience	29,03	29	6,96	0,02	-0,47
Agreeableness	30,40	30	6,63	-0,52	0,88
Conscientiousness	32,19	33	7,76	-0,35	-0,26

Table 4. *Correlations between the personality variables (NEO-FFI and GPOP dimensions)*

	1	2	3	4	5	6	7	8	9	10
1. Neuroticism	1,00									
2. Extraversion	-,446	1,00								
3. Openness	,006	,058	1,00							
4. Agreeableness	-,188	,299	,162	1,00						
5. Conscientiousness	-,219	,243	-,105	,065	1,00					
6. EI	-,351	,679	,010	,080	,143	1,00				
7. SN	-,255	,350	-,294	,062	,240	,635	1,00			
8. TF	-,198	-,141	-,199	-,501	,059	-,044	,099	1,00		
9. JP	,074	-,165	-,174	-,005	,489	-,179	,117	,083	1,00	
10. TEC	,707	-,601	-,023	-,141	-,207	-,501	-,281	-,112	,129	1,00

Table 5. *Pattern and structure coefficients of the variables in the Promax rotated factor solution, and correlations between the factors*

	Pattern coefficients					Structure coefficients (factor loadings)				
Variables	1	2	3	4	5	1	2	3	4	5
EI	,859	,021	-,069	-,076	,176	,878	-,412	,110	-,001	,405
Extraversion	,754	-,168	,105	,075	-,158	,821	-,544	,311	,110	,084
Neuroticism	,055	,908	-,012	,020	-,048	-,413	,885	-,086	-,138	-,156
TEC	-,302	,678	,064	,013	,073	-,604	,810	-,079	-,098	-,111
Agreeableness	-,133	-,169	1,004	,004	,042	,194	-,210	,987	,061	-,056
TF	-,227	-,344	-,527	,010	,172	-,128	-,204	-,559	,077	,204
Conscientiousness	,168	-,042	-,032	,859	-,043	,213	-,258	,038	,864	,193
JP	-,247	,089	,034	,614	,166	-,206	,083	-,029	,622	,210
SN	,334	,025	,051	,009	,857	,575	-,269	,053	,202	,945
Openness to Experience	,145	,021	,124	-,083	-,383	,051	,004	,185	-,156	-,373
% of Variance						18,23	14,41	18,89	11,58	6,08

	Factor Correlation				
	1	2	3	4	5
Factor 1	1,00				
Factor 2	-,498	1,00			
Factor 3	,231	-,101	1,00		
Factor 4	,050	-,165	,027	1,00	
Factor 5	,281	-,141	-,084	,210	1,00

When analyzing trait differences among types we included into analysis a psychological type as an independent nominal variable and NEO trait as a dependent continuous variable. The results were analyzed by Kruskal-Wallis test owing to non-proportional representation of research subjects in types. Table 6 contains mean rank values of NEO traits according to eight psychological types. The results of the Kruskal-Wallis analysis (table 7) confirm differences in psychological traits among types. Each psychological type identified by GPOP questionnaire differed from another in its score of NEO traits. Differences in openness to experience [K-W(7)=16.18] and in agreeableness [K-W(7)=21.68] reached small effect size ($r<0.3$). Differences in neuroticism [K-W(7)=40.50] and conscientiousness [K-W(7)=47.11] reached medium effect size ($r>0.3$ and $r<0.5$). Differences in extraversion [K-W(7)=93.75] reached large effect size ($r>0.5$).

Table 6. *Mean Ranks of the NEO-FFI dimensions in eight psychological types*

Mean Rank	ET	EF	EN	ES	IT	IN	IF	IS
Neuroticism	116,06	121,19	138,80	101,69	129,55	180,49	175,75	130,59
Extraversion	166,06	202,72	207,00	201,17	97,11	93,74	111,34	132,62
Openness to experience	151,94	129,00	177,40	130,94	121,36	143,55	164,78	108,82
Agreeableness	103,75	163,50	133,00	147,01	100,72	140,28	164,60	143,65

Conscientiousness	195 ,19	188 ,78	125 ,53	141 ,16	111 ,68	185 ,33	109 ,51	200 ,35

Table 7. *Kruskal Wallis Test (Grouping Variable: eight psychological types, dependent variable: the NEO-FFI dimensions)*

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Chi-Square	40,50	93,75	16,18	21,68	47,11
df	7	7	7	7	7
Asymp. Sig.	0,000	0,000	0,024	0,003	0,000
r	0,374	0,574	0,245	0,283	0,412

Pairwise multiple comparisons, nonparametric tests algorithms (table 8) enabled a detailed view on differences between psychological types in the NEO traits. We identified the most statistically significant differences in extraversion, but none in openness to experience.

Table 8. *Pairwise comparisons of types*

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Neuroticism					
ES-IF	-74,063	13,879	-5,336	0,000	0,000
ES-IN	-78,800	16,491	-4,778	0,000	0,000
Extraversion					
IN-ES	107,435	16,487	6,516	0,000	0,000
IN-EF	108,982	24,195	4,504	0,000	0,000
IN-EN	113,263	24,756	4,575	0,000	0,000
IF-ES	104,062	15,172	6,859	0,000	0,000
IF-EF	105,609	23,318	4,529	0,000	0,000
IF-EN	109,890	23,900	4,598	0,000	0,000
IS-ES	89,836	13,875	6,474	0,000	0,000
IS-EF	91,383	22,496	4,062	0,000	0,001
IS-EN	95,664	23,099	4,142	0,000	0,001
Agreeableness					
IT-IF	-63,880	15,029	-4,251	0,000	0,001
Conscientiousness					
IF-IN	75,815	16,359	4,634	0,000	0,000
IF-EF	79,267	22,497	3,523	0,000	0,012
IF-IS	-90,839	21,952	-4,138	0,000	0,001
IT-IN	-73,649	17,473	-4,215	0,000	0,001
IT-EF	77,101	23,319	3,306	0,001	0,026
IT-IS	-88,673	22,794	-3,890	0,000	0,003

IN, IT and IF reached the lowest score of extraversion. The highest extraversion score was attained by EN, EF, and ES. Introverted perceiving types IF and IT reached the lower conscientiousness level than introverted judging types IN and IS. However, conscientiousness of extraverted perceiving types EN, ES was not statistically significantly different from extraverted judging types (ET, EF). When concerning neuroticism scale, ES reached the lowest level, and IN and IF the highest level of neuroticism. ES reached significantly lower score of neuroticism, compared to the IN and IF. Statistically significant difference of agreeableness between IT and IF appeared. IT reached the lower score of agreeableness compared to the IF.

4 Discussion

The research results confirmed study hypotheses. Structure coefficients of EFA confirmed overlapping of NEO traits and GPOP preferences the way that J. Golden (2005) stated. Personality traits correlated with GPOP preferences which confirmed former research results (Furnham, 1996; Furnham et al., 2009; Furnham, et al., 2007; Furnham et al., 2003; Tobacyk et al., 2008; Kösegiová, 2009). As stated by K. Myers, N. Quenk, and L. Kirby (1995), overlapping of preferences of Jungian psychological types and dimensions of NEO shows similarities between characteristics of questionnaires based on two different theories. However, it does not mean that these characteristics are the same in the meaning of the dimensions, interpretation of the results and the application of the constructs.

Identified relationships between extraversion, EI, neuroticism and TeC are similar as results of other researchers (Furnham, 1996; Furnham et al., 2007; Furnham, et al., 2003; Kösegiová, 2009). This provokes some practical questions: Do have introverted reflexivity and need for individual consideration of outer signals same behavioral manifestations as an emotional lability? Does mean manifestation of extraversion (such as making new contacts, perceived self-conscious and courage) emotional stability? Understanding the difference between introversion and neuroticism seems to be important.

Analysis of differences between types revealed several findings. Comparison of neuroticism dimension among eight psychological types showed that IN and IF reached the higher level of neuroticism than ES. Typically ES type is the most anchored in reality, while IN and IF are taken to be the most distant from reality (Čakrt, 2009; Jung, 1921/1990). Emotional stability in case of ES confirms following „They excel in areas in which they are faced with immediate problems or have to deal with changing situations. They enjoy solving problems and dealing with crises...“ (Dunning, 2001, p. 36). More detailed view could bring NEO-PI-R sub-scales where we suppose difference. Self-consciousness showed the strongest correlation with EI preference (Furnham, 1996; Furnham et al., 2003). „Individuals high in self-consciousness are more prone to the emotion of shame or embarrassment. They are particularly sensitive to ridicule and teasing, because they often feel inferior to others“(McCrae & Costa, 2006, p. 48).

Extraverted types attained higher score of extraversion than did introverted types. The lowest score of extraversion was reached by IN, about whom we can read that „...the intensification of intuition often results in an extraordinary aloofness of the individual from tangible reality; he may even become a complete enigma to his immediate circle. “ (Jung, 1921/1990, p. 401). Significantly low extraversion score of IF can explain Jung with saying „Still waters run deep“ (Jung, 1921/1990, p. 388).

Comparison of openness to experience between types did not show substantive significant differences. Several authors (Čakrt, 2010; Dunning, 2001; Dunning 2010) stated that types the most open to changes are EN, because they need changes for their lives. C. G. Jung (1921/1990, p. 367) says about EN that „It is constantly seeking fresh outlets and new possibilities in external life“. Research findings did not confirmed practical significance of differences. Possible explanation could be that openness to experience expresses also other characteristics than only tendencies to change. In order to confirm a hypothesis that EN are oriented to change, in future research we would recommend to select sub-scales of NEO-PI-R, for instance sub-scales fantasy and idea. These sub-scales correlated with SN in the past (Furnham, 1996; Furnham et al., 2003). „Openness in Fantasy refers to a vivid imagination and a tendency to develop elaborate daydreams“(McCrae & Costa, 2006, p. 49). „Open people are curious and value knowledge for its own sake. Perhaps because they are willing to think of different possibilities...“ (McCrae & Costa, 2006, p. 49).

Although we confirmed overlapping of TF with agreeableness as in some other studies (Furnham, 1996; Furnham, et al., 2007; Furnham, et al., 2003; Kösegiová, 2009), comparison of types did not clearly show agreeableness differences among feeling and thinking types. Agreeableness dimensions showed significant differences only between IT and IF types. Jung (1921/1990, p. 385, 386) described IT as follows „To outsiders he seems prickly, unapproachable, and arrogant, and sometimes soured as a result of his antisocial prejudices“. About IF Jung (1921/1990, p. 389) wrote that „Although there is a constant readiness for peaceful and harmonious co-existence, strangers are shown no touch of amiability, no gleam of responsive warmth, but are met with apparent indifference or a repelling coldness. “ In former MBTI and NEO-PI-R studies (Furnham, 1996; Furnham, et al., 2003) TF preference correlated the most with sub-scale of tender-mindedness. „Agreeable people exhibit Tender-mindedness and sentimentality, and may be an easy touch for charities and good causes“(McCrae & Costa, 2006, p.

50). Because of that we suppose that tender-mindedness could be the overlapping component of agreeableness and TF.
EFA confirmed overlapping of conscientiousness and JP in accordance with the assumption (Golden, 2005). Comparison among types showed the lowest level of conscientiousness in Introverted Perceiving types (IP), namely IT and IF. They showed significantly lower degree of conscientiousness than Judging types (IN, EF, IS). Extraverted perceiving types (EP) did not significantly differed from Judging (J) types in conscientiousness level. However, EP belong to adaptive and flexible types, and in a case of ESP "long-term planning" belongs to "the greatest challenges" (Dunning, 2001, p. 64). In a case of ENP, for instance, "following the rules" is identified as a "blind spot" (Dunning, 2001, p. 73). Planning and following the rules are considerable parts of conscientiousness. In spite of that our research results didn't confirm the lower level of conscientiousness among EP types. Correlation studies of the MBTI and NEO questionnaires (Furnham, 1996; Furnham, et al., 2003) showed the greatest connection of JP with sub-scales order and deliberation. „Order, which makes them efficient in work"(McCrae & Costa, 2006, s. 50). „Deliberation, making plans in advance and thinking carefully before acting"(McCrae & Costa, 2006, p. 50, 51). Because of stated we think that overlapping of conscientiousness and JP can mean an autonomy at defining aims and values. It could be said that EP are willing to accommodate more and cooperate or follow social rules, while IP rely more on their own rules. IT and IF reached the lowest level of conscientiousness because they can refuse the rules from either "non-logical" or "inhumane" reason. The ET together with IS reached the highest level. They are often in responsible positions where they monitor fulfilling the duties and following the rules (Čakrt, 2009).

Overlapping of Jungian preferences with the NEO dimensions has been not always shown as a significant. For example (Furnham, Jensen, & Crump, 2008) in a sample of 3000 managers did not confirm the relationship between NEO-PI-R traits and SN, JP preferences. Similarly M. Kösegiová (2009) did not confirm relationship between conscientiousness and P. As for limits to our research we consider a proportionality of the research sample and then an absence of ENTJ representatives in ET. Another limit is the fact that the research sample was made up by students, predominantly by women, while main comparison studies were comprised of men in manager positions. For further research we suggest examination of differences between types at the level of NEO-PI-R sub-scales. Sub-scales would allow more precisely define the overlapping of the NEO dimensions and the types' preferences. Furthermore, a manifestation of type preferences depends on various factors, for instance on a balance and maturity of the type (Lawrence, 1982) as well as on a degree of emotional stability and currently experiencing stress (Quenk, 2002). In further research it would be therefore interesting to monitor relationships of the personality traits and type preferences in a dependence on a degree of experiencing stress, emotional stability or age.

5 Conclusion

Personality traits differences in this study indicated that types differ in extraversion the most, then mediumly in conscientiousness and neuroticism, and weakly in agreeableness and openness to experience. If we consider biological condition of personality traits (McCrae & Costa, 2006), we could conclude that EI preferences are the most temperamentally conditioned from all type preferences and therefore less changeable over time. JP preferences should be changeable more than EI, but less than preferences of SN and TF. Weak relationship between personality traits and SN, TF indicate a developmental potential for these function preferences. Resulting from these findings we could conclude relative stability of types attitudes (EI, JP), so-called „attitude types"(Jung, 1921/1990, p. 330) and relatively changeable nucleus of the type which is made from psychological functions of SN and TF, so-called „function types"(Jung, 1921/1990, p. 330). As to tence & calm preferences authors (Bents & Blank, 2009) claim that the scale is not stabile over time which should be confirmed by next research, regarding the medium relationship with neuroticism trait.

Comparison of NEO traits among eight psychological types confirmed several propositions of the theory (Jung, 1921/1990) as well as the empirical characteristics of the types (Čakrt, 2010; Dunning, 2001). Differences in personality traits among types showed the importance of attitude (introverted or extraverted) for psychological function preferences manifestation.

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