

The place of dysfunctional and functional impulsivity in the personality structure

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Abstract: According to Dickman (1990) two types of impulsivity can be distinguished based on the speed and accuracy of information processing: functional and dysfunctional impulsivity. Dysfunctional impulsivity reflects acting without thinking about an outcome and is similar to the concept of impulsiveness correlating with psychoticism. On the other hand functional impulsivity represents acting quickly with positive consequences. Functional impulsivity was more strongly positively correlated to extraversion scales than to other impulsiveness scales or sensation seeking scales, which put the real nature of this trait under question.

Key words: functional impulsivity, dysfunctional impulsivity, cognitive processing speed, extraversion, psychoticism, sensation seeking, personality traits

Mesto funkcionalne in disfunkcionalne impulzivnosti v strukturi osebnosti

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Povzetek: Po Dickmanu (1990) lahko glede na hitrost in natančnost procesiranja informacij ločimo dve vrsti impulzivnosti: funkcionalno in nefunkcionalno. Slednja odraža delovanje brez razmišljanja o izidu delovanja in je podobna konceptu impulzivnosti, ki tesno korelira s psihotičizmom. Funkcionalna impulzivnost pa predstavlja hitro delovanje s pozitivnimi posledicami in se kaže kot bolj močno pozitivno korelirana z lestvicami ekstravertnosti kot z drugimi lestvicami impulzivnosti ali iskanja dražljajev. Ugotovljeno postavlja pod vprašaj resnično naravo te osebnostne poteze.

Ključne besede: funkcionalna impulzivnost, nefunkcionalna impulzivnost, hitrost procesiranja informacij, ekstravertnost, psihotičizem, iskanje dražljajev, osebnost

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Impulsiveness is a personality trait that has been described by numerous different definitions, sometimes even contradictory as for example speed of response, risk taking, acting without thinking, nonplanning, lack of impulse control etc (McCrown, Johnson & Shure, 1993). Most of impulsiveness definitions include negative consequences of impulsive behaviour with one exception, Dickman's functional impulsivity.

When investigating the relationship between impulsiveness, speed of information processing and errors on the relative importance of speed and accuracy, Dickman (1985; Dickman in Meyer, 1988) found out that there exist two impulsiveness traits that are differently related to cognitive functioning. He defined impulsiveness as the tendency to deliberate less than most people of equal ability before taking action. The consequences of this lack of deliberation should be negative but not always. On the basis of experiments he developed a theory of dysfunctional and functional impulsivity. The dysfunctional impulsivity causes people to respond quickly and inaccurately when this style of responding brings difficulties while functional impulsivity describes quick and inaccurate responding when this style brings optimal results. Dysfunctional impulsivity is similar to already known concepts of impulsiveness narrow (acting without thinking), while functional impulsivity is a new concept that could be responsible for the individual differences in the speed of the way the basic cognitive processes are carried out (Brunas-Wagstaff, Bergquist, Morgan & Wagstaff, 1996; Brunas-Wagstaff, Bergquist & Wagstaff, 1994). Dickman (1990) created a questionnaire for measuring these two types of impulsiveness. The functional impulsivity scale contains the items that involve the use of fast response style in solving social and cognitive problems when the consequences of this approach are positive (for example 'I am good at taking advantage of unexpected opportunities, where you have to do something immediately or lose your chance' 'People have admired me because I can think quickly'). On the other hand dysfunctional impulsivity scale involves classical impulsiveness items where individuals report acting without thinking and the problems that this style brings (for example 'I will often say whatever comes into my head without thinking first' 'Often I do not spend enough time thinking over the situation before I act.'). The two scales show low positive or a lack of correlation (Claes, Vertommen & Braspenning, 2000; Dickman, 1990).

Different authors studied the correlation patterns between each type of impulsivity and other personality traits. Functional impulsivity was more closely associated with enthusiasm, adventurousness, activity while dysfunctional impulsivity showed stronger relationship to disorderliness and impulsiveness narrow (Claes et al, 2000; Dickman, 1990). Both scales were positively associated with psychoticism and extraversion (Brunas-Wagstaff, Bergquist, Richardson & Connors, 1994).

In our research we were interested in the relationship of functional and dysfunctional impulsivity to other impulsiveness and sensation seeking scales and the place of these two traits in two contemporary personality systems – the Eysenck's personality theory and the Big five model.

Method

Participants

431 adolescents participated in the study, 261 females and 166 males (average age = 17,5 years, $SD = 1,5$).

Instruments

The following questionnaires were used:

- *Eysenck impulsiveness questionnaire* (I_7) consists of 54 items to be answered in a yes/no format. It was developed in 1977 by H.J. Eysenck and S.B.G. Eysenck (Eysenck & Eysenck, 1977) to measure impulsiveness narrow (I_7-I , 19 items), Venturesomeness (I_7-V , 16 items) and Empathy (I_7-E , 19 items).
- *Dickman impulsivity inventory* (DII) was developed by Dickman in 1990 to measure two types of impulsivity, functional impulsivity (DII-F) and dysfunctional impulsivity (DII-D). It consists of 23 items to be answered with true/false format (11 items for DII-F and 12 items for DII-D, Dickman, 1990).
- *Barratt impulsiveness scale version-11* (BIS-11) is a 30 items self-report questionnaire developed in 1995 (Patton, Stanford and Barratt, 1995) to measure impulsivity. The questions are answered on a 4-point answering scale (1-rarely/never, 2-sometimes, 3-often, 4- almost always). BIS-11 can be used as a whole scale or divided into three subscales but because of rather poor metric characteristics for the subscales in Slovenian translation only the result for the whole scale was used. This questionnaire correlates with measures of impulsiveness narrow and is treated as similar to impulsiveness narrow scales.
- *Zuckerman sensation seeking scale version V* (SSS-V), was developed in 1978 (Zuckerman, Eysenck & Eysenck, 1978) and consist of 40 items, 10 for each subscale, namely Thrill and adventure seeking (TAS), Experience seeking (ES), Boredom susceptibility (BS) and Disinhibition (DiS). The items are arranged in the forced-choice form between two alternative responses to minimize the factor of social desirability.
- *Eysenck's Personality Questionnaire – revised* (EPQ-R) was translated in Slovene language 1978 and revised in 1997 (Eysenck & Eysenck, 1997). It measures three dimensions of personality – extraversion (E; 23 items), neuroticism (N; 24 items) and psychoticism (P; 32 items). Items should be answered in a yes/no format.
- Caprara, Barbaranelli, Borgogni and Perugini (1993) developed an Italian version of *Big Five Questionnaire* (BFQ) that was adapted and translated into Slovene language in 1997 and revised in 2002 (Caprara et al. 2002). The questionnaire

measures five main dimensions – energy (En), agreeableness (A), conscientiousness (C), emotional stability (ES) and openness (O), and ten subdimensions two for each dimension - activity (ACT) and dominance (DOM) for En, cooperation (COP) and kindness (KIN) for A, accuracy (ACC) and perseverance (PER) for C, emotion control (ECO) and impulse control (ICO) for ES, openness to culture (OCU) and openness to experiences (OEX) for O. Every subdimension contains 12 items to be answered in 5-point answering scale (5-totally true for me, 4-mostly true for me, 3-partly true, partly not true, 2-mostly not true for me, 1-totally not true for me).

Procedure

DII and BIS-11 first had to be translated into Slovenian and some BIS-11 items adapted for adolescent population. The technique of double backtranslation was used. Adolescents were recruited on a voluntary bases and anonymity was guaranteed. The instruments expressed satisfactory psychometric properties (Zdravec, 2003). They filled out instruments in groups of 35 in six sessions. Between the first and the last session maximum time passed was four months.

Results

Intercorrelations of impulsiveness, sensation seeking scales, EPQ and BFQ scales

From the Table 1 we can see that DII-F is most strongly positively correlated to ACT (0,60), E (0,48), I₇-V (0,46) and TAS (0,47). DII-D is most strongly positively associated with I₇-I (0,66), BIS (0,62), P (0,46) and negatively with ACC (-0,51).

Factor analysis of impulsiveness, sensation seeking scales, EPQ and BFQ scales

In the factor analysis on the basis of the scree test, eigen values and content of the factors six factors were extracted, explaining almost 70 percent of variance (Table 2).

Because of the different number of scales representing different personality traits, the last four factors explain relatively little variance, but are nevertheless important. It can be seen that the EPQ and BFQ structure were replicated perfectly. The first factor presents the narrow impulsiveness scales, ES, DiS, BS, P, -ACC and -PER. These scales have already proven to be a part of the same latent dimension

Table 1: Pearson correlation coefficients for impulsiveness, sensation seeking, EPQ and BFQ scales (for both genders) – see text for the explanation of abbreviations.

	DII-F	I ₇ -P	TAS	ES	DIS	BS	I ₇ -I	DII-D	BIS	ACT	DOM	COP	KIN	ACC	PER	ECO	ICO	OCU	OEX	E	P		
I ₇ -P	.46																						
TAS	.47	.75																					
ES	.24	.28	.34																				
DIS	.20	.36	.36	.33																			
BS	.21	.33	.26	.25	.53																		
I ₇ -I	.09	.16	.10	.21	.27	.33																	
DII-D	.21	.18	.16	.18	.26	.32	.66																
BIS	.07	.09	.05	.25	.34	.31	.55	.62															
ACT	.60	.39	.50	.37	.14	.18	.11	.20	.01														
DOM	.44	.38	.28	.11	.09	.19	-.03	.00	-.18	.52													
COP	.15	.06	.13	.21	.02	-.10	-.01	-.07	-.11	.36	.08												
KIN	.26	.11	.08	.21	-.01	-.15	-.07	-.04	-.02	.33	.02	.52											
ACC	-.26	-.17	-.18	-.29	-.29	-.31	-.42	-.51	-.56	-.08	.16	-.01	-.08										
PER	.17	.05	.05	.03	-.25	-.13	-.39	-.33	-.45	.30	.41	.23	.18	.46									
ECO	.39	.35	.24	.09	.03	.02	-.25	-.10	-.12	.32	.29	.07	.31	-.08	.23								
ICO	.16	.25	.12	.07	-.13	-.13	-.31	-.23	-.30	.15	.14	.06	.29	.10	.24	.61							
OCU	.19	.20	.26	.17	-.07	.02	-.08	-.16	-.25	.30	.26	.16	.04	.19	.31	.15	.27						
OEX	.30	.30	.36	.28	.01	.08	-.04	-.04	-.16	.44	.28	.33	.19	.13	.40	.14	.13	.53					
E	.48	.36	.34	.23	.28	.17	.16	.15	.15	.53	.33	.29	.28	-.19	.04	.33	.06	.01	.09				
P	.10	.23	.15	.29	.31	.46	.40	.46	.48	.00	.04	-.25	-.32	-.26	-.24	-.08	-.14	-.01	.02	.02			
N	-.34	-.29	-.23	-.07	.03	.00	.33	.17	.18	-.25	-.26	-.01	-.22	.01	-.24	-.70	-.52	-.15	-.16	-.23	.14		

Boldfaced coefficients – significance of correlation < 0,01 (two-way test).

Table 2: Factor analysis (maximum likelihood) of impulsiveness, sensation seeking, EPQ and BFQ scales for both genders (varimax rotation) – see text for the explanation of abbreviations.

	F1	F2	F3	F4	F5	F6
DOM	-,09	,13	,73	,09	,24	-,11
DII-F	,22	,27	,53	,28	,14	,19
ACT	,14	,11	,63	,27	,31	,36
E	,22	,17	,52	,21	-,11	,33
PER	-,48	,13	,35	-,07	,41	,09
ACC	-,68	-,11	,07	-,14	,21	-,15
I ₇ -I	,70	-,30	,08	,02	-,01	,01
DII-D	,74	-,17	,14	,06	-,07	,00
BIS	,79	-,08	-,07	,00	-,16	,01
ES	,39	,06	,08	,20	,31	,21
DiS	,42	-,02	,11	,32	-,05	-,02
BS	,47	,00	,21	,14	,12	-,23
P	,60	-,05	,03	,06	,16	-,41
COP	-,07	-,06	,12	,03	,23	,67
KIN	-,01	,26	,07	-,01	,05	,72
ECO	-,03	,84	,25	,10	,02	,11
ICO	-,20	,69	-,02	,04	,17	,09
N	,13	-,74	-,19	-,13	-,04	-,04
OCU	-,14	,12	,10	,11	,63	,01
OEX	-,04	,05	,16	,16	,73	,19
I ₇ -V	,23	,27	,27	,64	,20	-,04
TAS	,14	,10	,20	,93	,23	,06
λ	4,96	4,38	1,82	1,75	1,19	1,03
λ^2	22,5	19,9	8,3	8,0	5,4	4,7

that could be named by Zuckerman's expression Impulsive *Unsocialised Sensation Seeking* (P-impUSS) or Eysenck's psychoticism. Second factor contains neuroticism scales with much lower secondary loading of I₇-I. Third factor 'extraversion' integrates extraversion scales with DII-F and lower secondary loading of PER. Forth factor belongs to the venturesomeness scales I₇-V and TAS, the scales not joining the extraversion or psychoticism factor because of great similarity of the two scales. Fifth factor is the openness factor with secondary loadings of ES and PER and the last factor is agreeableness with secondary loading of ACT, E and -P.

Structural modelling of the functional and dysfunctional impulsivity relationship to extraversion and psychoticism

When trying to clarify the place of the two impulsivity traits in the personality system the structural equation modelling approach was used (by means of LISREL 8; Jöreskog & Sörbom, 1993). The main question to be answered was the relationship of DII-F and DII-D to extraversion and psychoticism since the theoretical implications and the results of factor analysis gave indices that the two traits were mostly defined by E and P. Eysenck (1993) and Zuckerman (1993) placed the impulsiveness narrow (DII-D) under P but disagreed on the sensation seeking and venturesomeness position. Eysenck put the two to E and Zuckerman to P.

Many different theory-driven models were tested and only the last one is shown and described. DII-D scale showed stable position in the impulsiveness narrow construct while DII-F was primarily put together with all sensation seeking scales and later with venturesomeness scales that separated from the rest of the sensation seeking scales. But none of the models showed appropriate fitting and on the basis of factor analysis and correlation pattern DII-F was placed together with extraversion scales and not impulsiveness or sensation seeking scales that was expected according to theory and the label of the trait. Only the last modified model is shown (Figure 1, Table 3). Because of the under representation of psychoticism scales in the research the P scale had to be divided in two equal parts (PSH1, PSH2). This step allowed psychoticism dimension to form a separate construct which otherwise with only one scale would not be possible. The first reference model (M0), to which all other models were compared, was a structural null model in which all covariances between latent variables were set to zero (no paths were presupposed between constructs in the structural model). The last, best fitted model presumed five endogenous constructs. ACT, DOM, E and DII-F formed the first construct labelled activity/sociability (A/S), I₇-V and TAS second named venturesomeness (VENT), ES, DiS and BS the third construct of sensation seeking narrow (SS_N), I₇-I, BIS and DII-D the impulsiveness narrow construct (IMP_N) and PSH1 and PSH2 the fifth psychoticism narrow factor (P_N). The first two constructs would reflect the exogenous extraversion construct (EKS) and the last the exogenous psychoticism construct (PSH), while the SS_N would reflect both exogenous constructs. This model (M1) showed good potential but needed further refinement. In the M2 the errors of measurement between ACT and DOM variables were released (according to the modification indices suggested by LISREL). In the next step (M3) the path between IMP_N and EKS was allowed speaking in favour of the old dual nature of extraversion (Eysenck & Eysenck, 1963). In the M4 another path between P_N and BIS was made possible and in M5 the path between DOM and IMP_N. M7 is only small alteration of the M6 with realising of the errors of measurement between PSH1 - PSH2. The last modification was the path between I₇-V and SS_N. The models were evaluated using several indicators.

Table 3: The fitting of the structural models of the relationship between impulsiveness, sensation seeking, extraversion and psychoticism.

	χ^2	df	χ^2/df	p	$RMSEA$	$NNFI$	ip_n	$AGFI$	ip_a
M0	988,43	91	10,86						
M1	139,30	71	1,96	0,0000	0,079	0,89	0,66	0,83	0,60
M2	125,37	70	1,79	0,0000	0,072	0,90	0,66	0,84	0,60
M3	116,30	69	1,68	0,0003	0,067	0,91	0,66	0,85	0,59
M4	108,27	68	1,59	0,0014	0,062	0,92	0,66	0,86	0,59
M5	105,02	67	1,57	0,0021	0,061	0,93	0,65	0,86	0,58
M6	98,14	66	1,49	0,0063	0,056	0,95	0,65	0,87	0,58
M7	89,41	65	1,38	0,0240	0,049	0,96	0,65	0,88	0,57
M8	82,02	64	1,28	0,0640	0,043	0,97	0,64	0,88	0,57

χ^2 – Chi-square test; df – degrees of freedom; χ^2/df – chi-square/degrees of freedom ratio; p – chi-square significance; $RMSEA$, $NNFI$, $AGFI$ – the model fit index; ip_n , ip_a – parsimony index

One of them was the chi-square test associated with maximum likelihood estimation of parameters. These chi-square values are usually evaluated in relation to their corresponding degrees of freedom. The lower the chi-square/df ratio the better the model fit, with ratios below 2 indicating a satisfactory, but not very good model fit and ratios below 1 indicating a very good model fit. Other used indicators were RMSEA (good model fit below 0,05), NNFI and AGFI (good model fit with values closer to 1; Bentler, 1989; Bollen, 1989; Brown & Cudeck, 1992). In the evaluating of the models all but the last model M8 were rejected.

Since the model needed some unpredicted corrections we can not presume absolute validity of the model but the placement of DII-F and DII-D can be evaluated. DII-D belongs to the impulsiveness narrow construct which mainly reflects psychoticism dimension and in lesser part extraversion. The DII-F scale has more in common with extraversion scales than with impulsiveness or sensation seeking. This causes doubt in the appropriate name for this trait. Further more the results confirm Eysenck's and Zuckerman's assumptions with sensation seeking narrow construct reflecting extraversion and psychoticism and venturesomeness reflecting extraversion.

Discussion

As expected from low reported correlations between DII-F and DII-D, the two scales differ in their correlations to other impulsiveness and sensation seeking scales as in their correlations to other personality dimensions.

DII-D showed the highest correlations to I_7 -I and BIS. We can even say that they measure the same personality trait – impulsiveness narrow. The impulsiveness narrow trait is a trait that according to Eysenck (1993) and Zuckerman (1993) belongs to the psychoticism dimension which explains strong positive correlations between DII-D and P. DII-D is defined as acting without thinking producing many

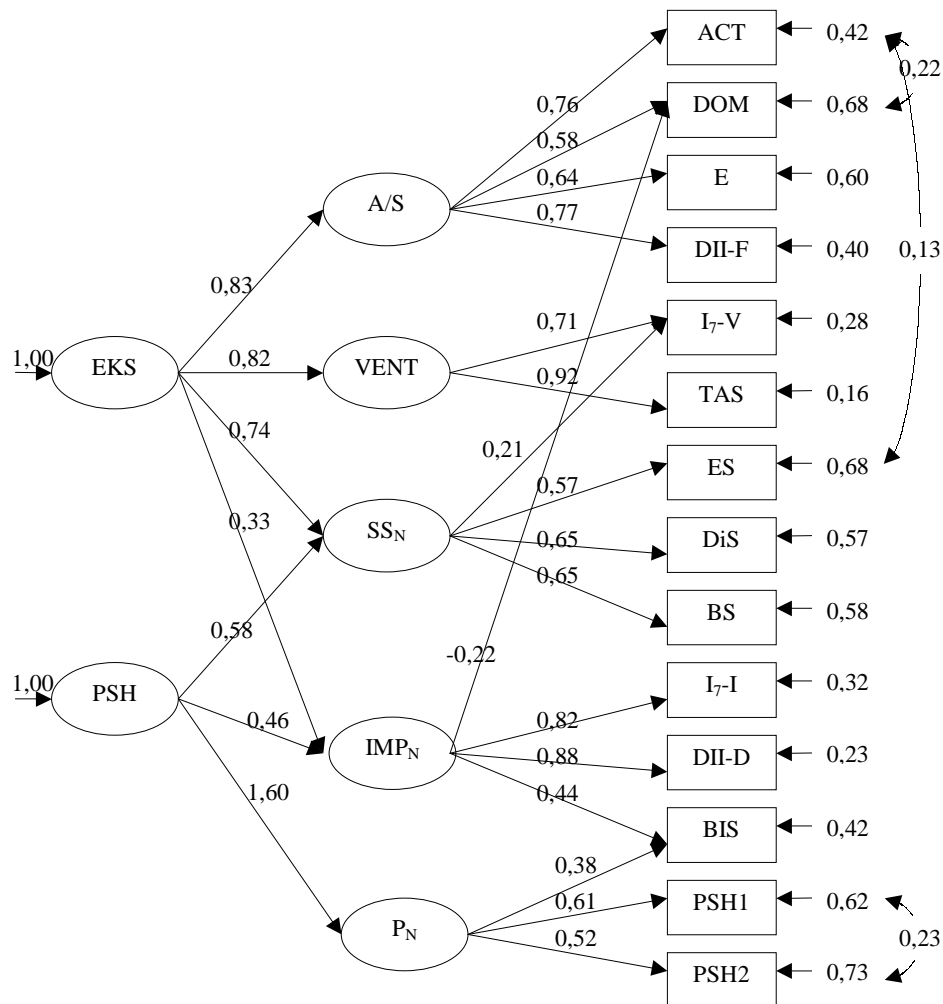


Figure 1: Structural model (M8) of the relationship between impulsiveness, sensation seeking, extraversion and psychoticism (A/S – activity/sociability, VENT – venturesomeness, SS_N – sensation seeking narrow, IMP_N – impulsiveness narrow, P_N – psychoticism narrow, EKS – extraversion, PSH – psychoticism).

errors so negative correlations between DII-D and ACC are in place. ACC and PER are parts of the same dimension namely conscientiousness which is not a strong side of impulsive people. Lack of perseverance might be associated with boredom susceptibility of people with high DII-D which is the only sensation seeking scale worth mentioning in the connection to DII-D. Lack of correlations between narrow impulsiveness scales, especially DII-D, is surprising as Zuckerman places both traits under psychoticism.

DII-F scale showed even more surprises, correlating higher with extraversion

scales than impulsiveness or sensation seeking scales with exception of venturesomeness scales. DII-F most strongly correlates with activity (0,60) and we can say that they measure the same personality trait. ACT refers to dynamic behaviours full of energy, enthusiasm, deciding in the spur of the moment and enjoying dynamic, changing lifestyle. DII-F contains items that describe quick decision-making, fast verbalisation and enjoying in activities that require reacting quickly. We could say that content wise the ACT scales is a bit broader, including also some sociability items. Both scales are similar to the description of Eysenck's liveliness scale (Eysenck in Eysenck, 1977) he developed when started with exploring the dimensionality of impulsiveness trait. Liveliness scale included quick decision-making, moving quickly, fast verbalisation and carelessness. On the basis of the correlations between liveliness scale, other scales of impulsiveness and extraversion Eysenck decided to drop this scales from further investigations because it correlated higher with extraversion (especially sociability items) than other impulsiveness scales. In this research we confirmed higher correlations between DII-F, extraversion scales and venturesomeness than with other sensation seeking and impulsiveness scales. Eysenck (1993) believes that the label 'functional impulsivity' is according to low correlations of this scale to other impulsiveness narrow scales misleading and that more appropriate label would be 'spontaneity'. Such labelling would allow differentiation between functional and dysfunctional impulsivity. '... the existence of two independent personality traits with the same name is embarrassing and leads to complications' (Eysenck, 1993; pg. 59). In connection to the sensation seeking scales DII-F most strongly correlates with I₇-V and TAS. This correlation pattern was noticed in the previous research as well (Cleas et al, 2000; Dickman, 1990). These two traits might share with DII-F the dynamic behaviour and activity. Quick decision making is crucial in dangerous and risky situations where quick reactions may save lives. The two traits might also share openness to new experiences. Another interesting correlation is the correlation between DII-F and ECO. The control of (negative) emotions could be the key to success in cognitive tasks, bringing positive results even when acting quickly and only on the first sight impulsively. Control of emotions is important in risk taking as well and might be the link between DII-F and venturesomeness scales.

The factor analytic procedure yielded six factors, almost all expected. Because of the dominance of the impulsiveness narrow and sensation seeking scales they constituted the strongest factor together with P, -PER and -ACC. DII-D loaded on this factor as predicted. According to Zuckerman impulsiveness and sensation seeking scales belong to the psychoticism dimension but Eysenck puts venturesomeness and sensation seeking to extraversion and impulsiveness narrow to psychoticism. The exploratory approach was closer to Zuckerman's theory, with only venturesomeness scales separating into another factor. The later has already been noticed (Glicksohn & Abulafia, 1998). DII-F scales did not join the other impulsiveness and sensation seeking scales but loaded on the extraversion factor, speaking in favour of Eysenck's protests (Eysenck, 1993).

Included scales replicated EPQ and BFQ structure very well with all scales

taking the theoretically grounded place. When the big five model (re)entered the scene of personality research the question of similarity between the Big five model and Eysenck's personality theory was raised, especially regarding psychoticism. Eysenck (1992) claimed that P was the opposite side of the conscientiousness and agreeableness dimensions which was confirmed in this research as well with P loading primarily on the P-ImpUSS factor and secondary on agreeableness factor.

In answering the question of the place of DII-F and DII-D in the personality system the structural equation modelling approach was used. The results showed that DII-D belongs to impulsiveness narrow construct together with I₇-I and BIS. This construct reflects mainly psychoticism dimension and in lesser part extraversion as well. DII-F scale caused more trouble and did not join sensation seeking or venturesomeness scales. It became obvious that DII-F relates closer to extraversion scales which puts in question the appropriateness of the label impulsivity. We can not say that functional impulsivity is a new concept, since Eysenck describes similar concept of liveliness (Eysenck and Eysenck, 1977). But it might be the part of extraversion responsible for individual differences in information processing.

The model (M8) confirms Eysenck's placement of venturesomeness under extraversion and partly backs up Eysenck's and Zuckerman's assumption about sensation seeking since the construct of sensation seeking narrow reflects extraversion and psychoticism.

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