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Disintegration: A reconceptualization of psychosis proneness as a personality trait separate from the Big Five

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ABSTRACT

A nine-facet hierarchical taxonomy of "Disintegration", a trait-like disposition that causes variations in psychotic-like behavior, is proposed, along with the scales to assess it. Strong correlations were demonstrated in students (n = 466) between lower-level dimensions, independent of the assessment method. Disintegration lay beyond the Five-Factor Model (FFM) space. This finding was replicated across informant types (self, mother, and father), samples (students and a national representative sample, n = 1001), and units of analyses (facets and items). The most frequent approach to preserve the FFM taxonomy of both normal and non-normal personality variants – mapping psychotic-like phenomena onto the Openness domain – found little support in our data. Disintegration was normally distributed in the general population.

1. Introduction

There is compelling empirical evidence supporting the existence of a continuous distribution of psychotic-like experiences in the general population. For example, studies on nonclinical populations, using either structured clinical interviews or self-report measures, have demonstrated that psychotic experiences and beliefs are common in such samples (Barret & Etheridge, 1992; Johns & van Os, 2001). Factor analytic studies have found dimensions of variably labeled subclinical psychotic phenotypes to be parallel to those found in schizophrenia (Mata et al., 2003). A summary of the additional empirical evidence on continual variations of psychotic-like phenomena can be found in Hanssen, Krabbendam, Vollema, Delespaul, and Van Os (2006), while equally persuasive arguments based on quantitative genetic research, can be found in Ronald (2015). Moreover, there were several attempts to conceptualize dispositional roots of psychotic-like phenomena as a personality trait (e.g., Claridge, 1997; Eysenck & Eysenck, 1976; Watson, Clark, & Chmielewski, 2008). If the domain[2] is indeed best conceptualized as a continuum, i.e., a universal, trait-like structure one of the first concerns is to locate its position within personality space, in other words to investigate its relations with the basic personality traits.

It has been persuasively argued that normal and abnormal personality variations may be represented by a single structural model (O'Connor, 2005; Widiger, 2011). What remains to be determined is which of these structural models most adequately account for both types of variations. Although some studies (Markon, Krueger, & Watson, 2005), have found support for the Big Five model (John, Naumann, & Soto, 2008) meta-analytic findings about the structure of personality disorders indicate that abnormal personality possesses a four-factor structure, similar to the four factors from the Big Five: Neuroticism (N), Extraversion (E), Agreeableness (A), and Conscientiousness (C) (O'Connor & Dyce, 1998). Some recent evidence suggests that abnormal personality processes are best captured by factors that most closely resemble the aforementioned four factors, but with the addition of a novel fifth factor, Psychoticism (Krueger, Derringer, Markon, Watson, &

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[2] Labeling the domain may depend on whether one wants to highlight the predominant behavioral content (e.g., Psychosis Proneness, Psychoticism, Schizotypy), to emphasize a layman's description of the given behavior (e.g., Peculiarity, Oddity), or the process contributing to the manifest behavior (e.g., Disintegration, Apophenia).

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Skodol, 2012), instead of Openness (O) factor from the Big Five model. One of the most intriguing questions is whether the original Big Five model is sufficient to account for both normal and abnormal personality variations. Those favoring the view that the Big Five model can explain both normal and abnormal personality variations conceptualize psychotic-like phenomena as the manifestation of a high level of Openness (DeYoung, Grazioplene, & Peterson, 2012; Widiger, 2011).

Furthermore, the content and the optimal number of components of this domain remain yet to be determined. There has been an increasing number of its subcomponents being identified, from 2 suggested by Kay, Fiszbein, and Opler (1987), to 12 proposed by van Kampen (2006), with almost all possible factor solutions in-between also proposed. Recently, some researchers have argued that the boundaries of this domain have been too narrowly defined (Andresen, 2000; Markon, 2010). The purpose of the current study is two-fold, (1) to contribute to the proper conceptualization of the domain (by identyfing its content, boundaries, and trait-like characteristics), and (2) to investigate whether this new conceptualization represents a domain not already represented by the Big Five traits (defined here by the Five-Factor Model, FFM, Costa & McCrae, 1992).

1.1. Previous evidence on the relationship between the FFM and psychotic-like phenomena

The results of two meta-analytic studies suggested basic independence of psychotic-like phenomena from the FFM. Samuel and Widiger (2008) found that estimated correlations between schizotypal personality disorder and N, E, O, A, and C, were 0.38, −0.28, 0.09, −0.17, and −0.14, respectively, while Saulsman and Page (2004) found somewhat different correlations (i.e., 0.36, −0.28, −0.01, −0.23, and −0.13). More recent studies have reported similar findings (Ashton & Lee, 2012; Ashton, Lee, de Vries, Hendrickse, & Born, 2012; Watson et al., 2008). Watson et al. (2008) concluded that the schizotypy factor they extracted (and labeled Oddity) reflected a trait-like disposition outside of the FFM.

In the majority of aforementioned studies, small or non-significant correlations between schizotypy and O were found (while the same studies reported correlations ranging from 0.30 to 0.40 between schizotypy and N). Despite this fact, there is a persistent effort among some scholars to conceptualize schizotypy-like phenomena as extreme levels of O.

There are several reasons that at first glance this approach might seem appropriate. First, extreme O has some "flavor" of schizotypy, leading researchers to equate them and postulate a possible common mechanism responsible for both phenomena, such as experiential permeability (Piedmont, Sherman, & Sherman, 2012).

Second, as previously discussed, the O factor extracted in the domain of normal variations appears to lack representation within abnormal personality variations. Likewise, the schizotypy/psychoticism factor, extracted in the domain of abnormal personality variations seems to lack adequate representation within normal personality variations, i.e. FFM (Watson et al., 2008). The attempt to equate the only two "unpaired" entities recovered from normal and maladaptive personality variations (Piedmont, Sherman, Sherman, Dy-Liacco, & Williams, 2009) appears to be a reasonable strategy. Thus, a typical proposal articulates positive symptoms of schizotypy (i.e., perceptual and cognitive distortions) as high O (Widiger, 2011), and negative phenomena (i.e., social and physical anhedonia) as low O (Kwapil, Barrantes-Vidal, & Silvia, 2008).

Third, the low correlations between the O factor and indices of schizotypy might be attributed to the way the O factor is assessed within the NEO Personality Inventory - Revised (NEO PI-R, Costa & McCrae, 1992) which does not include items capturing extreme levels of the O factor. Haigler and Widiger (2001) proposed that if such items had been included in the NEO PI-R, the expected correlations would have been more similar to expected levels as supported by some evidence in their study. Other studies have found that by including "bridging" instruments which contain extreme O items, such as the Experiential Permeability Inventory, higher correlations between schizotypy and the O factor were detected (EPI; Piedmont et al., 2009, 2012).

The lack of a strong and consistent relationship between the O factor and schizotypy might also be due to the heterogeneity of schizotypy-like constructs (Chmielewski & Watson, 2008; Mason, Claridge, & Williams, 1997; van der Gaag et al., 2006). The opposite relationships between positive and negative schizotypy symptoms and the O factor have been repeatedly demonstrated (Chmielewski & Watson, 2008; Kwapil et al., 2008; Ross, Lutz, & Bailley, 2002), with the former being positively related to O, and the latter negatively. It has also been argued that when the assessment of schizotypy includes both positive and negative components, a correlation with O was not found, i.e., these opposite relationships appear to nullify each other (Piedmont et al., 2012; Ross et al., 2002). Moreover, an alternative explanation might be that the O domain, as operationalized in the NEO PI-R inventory, is overly broad, blending two distinct subfactors – Pure Openness (PO), which is positively related to psychotic-like phenomena, and Pure Intellect (PI), which is negatively related. These two aspects appear at the level of NEO PI-R O facet scales (i.e., Fantasy, Aesthetics, and Emotions as indices of PO; Actions, Ideas, and Values as indices of PI), and produce zero correlations with psychosis measures when the total O score is used (Chmielewski, Bagby, Markon, Ring, & Ryder, 2014).

There are several reasons that psychotic-like phenomena should not be conceptualized as being part of the Openness factor. First, although high O and Disintegration may at first glance appear to reflect similar phenomena, this may not be the case. Rather, while O reflects receptivity to new experiences (i.e., experiential permeability), which, on its positive pole, can result in preoccupation with fantasy, daydreaming, and absorption, an entirely different mechanism might be reflected in psychotic-like, schizotypal, apophenic[3] tendencies, such as disturbances in internal representations of contextual information (Cohen & Servan-Schreiber, 1992; Philips & Silverstein, 2003). Although it is possible that both are necessary ingredients of certain phenomena, such as enhanced awareness, eccentricity, and creativity, it does not imply that they are the same.

Second, a linear continuum assumes inverse relations between its poles. Conceptualization of positive symptoms of schizotypy as the positive pole of O, and negative symptoms as the negative pole of O (Piedmont et al., 2009), leads to the expectation of high negative correlations between positive and negative symptoms. This contradicts empirical evidence of substantive positive correlations between the two (Bailey, West, Widiger, & Freiman, 1993; Ross et al., 2002). Thus, it seems that attempts to organize positive and negative symptoms of schizotypy around the construct of the O factor (Piedmont et al., 2012) may produce more confusion than clarification.

Third and the most important, the results interpreted as evidence supporting the conceptual unification of O and Disintegration, are not persuasive. Even after including more extreme items of O in the NEO PI-R inventory, correlations between O and three measures of schizotypy remained comparatively low, at 0.28, 0.24, and 0.33, as reported by Haigler and Widiger (2001). Furthermore, meta-analytic findings (Samuel & Widiger, 2008) did not show expected stronger correlations of Schizotypal Personality Disorder with PO than with PI facets (i.e., the highest correlation was 0.14, and the remaining below 0.10). In Study 1 of DeYoung et al. (2012), correlations between two measures of apophenia with facets of O were about 0.20, and the loadings of these two

[3] Seeing patterns or connections in random, causally unrelated data

measures on O were around 0.30, demonstrating that indices of apophenia could *not* be easily fitted within the O factor. Their suggestion that apophenia could be fitted within the sixth, PO factor extracted in their Study 2 did not seem plausible. Namely, their factor analysis in Study 2 was lacking primary indices of apophenia (such as Unusual Perceptual Experiences), while being replete with measures of Absorption – known to be a primary indicator of O, as reported by the authors.

De Fruyt et al. (2013) found a six-factor solution with a separate broad Psychoticism factor, based on the joint factor analysis of facets of the NEO PI-3 (McCrae, Costa, & Martin, 2005), and Personality Inventory for DSM-5 (PID-5) (Krueger et al., 2012) in a non-clinical sample. The authors remarked that the factor analysis showed "bifurcation between Openness and Psychoticism scales" and that "the findings of the six-factor solution are intriguing" (p. 303). In spite of this finding, they concluded that their results "are much in line with those arguing that the FFM is a model accommodating traits to describe general *and* disordered personality" (De Fruyt et al., 2013, p. 303).

Slightly higher than usual correlations between O and schizotypy were obtained with the Structured Interview for the Assessment of the FFM (SIFFM; Samuel & Widiger, 2008; Trull, Widiger, & Burr, 2001). However, correlations of the SIFFM with other traits also seemed to be higher, especially with N (0.53, compared to 0.31 with O; Trull et al., 2001). In addition, when another non-self-report measure was used to assess personality traits (SCID-II, Structured Clinical Interview for DSM-IV Personality Disorders, First, Gibbon, Spitzer, Williams, & Benjamin, 1997), the results were similar to those typically obtained using the self-report version of the NEO PI-R inventory (Samuel & Widiger, 2008). This suggests that the higher correlation between SIFFM O and schizotypy might reflect some specificities of the instrument rather than inherent constructive limitations of NEO PI-R O or general limitations of self-report measures to capture the relationship.

More convincing evidence that supports a relationship between O and Psychoticism was provided by Chmielewski et al. (2014). Initially, they obtained low zero-order correlations between both PO or PI and psychotic-like indices. However, after controlling for the suppressive effect of PI variance on PO and *vice versa*, they demonstrated high correlations between the unique variances of both aspects of O and Schizotypy/Psychoticism, in the expected directions (positive correlations with PO, and negative with PI). Allowing for the possibility that these constructs could interrelate more strongly (if O were reconstructed in the direction of Absorption and Unconventionality), the authors still concluded that "... Psychoticism and Openness-to-Experience/Intellect (at least as traditionally defined in the FFM) are best viewed as distinct dimensions" (Chmielewski et al., 2014, p. 13).

1.2. Concept of Disintegration and its expected relations with the FFM

Beginning with the existing evidence for content that might constitute the domain of psychosis proneness (Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994; Krueger et al., 2012; Mata et al., 2003; van der Gaag et al., 2006; van Kampen, 2006; Watson et al., 2008), as well as theoretical considerations (Meehl, 1990), especially those articulating psychosis proneness as a fully dimensional construct, i.e., personality trait (Claridge, 1997; Eysenck & Eysenck, 1976; Momirovic, Wolf, & Dzamonja, 1993), we have attempted to empirically identify a structure and content of this disposition, we have named "Disintegration". This name was chosen because all subdimensions examined were postulated to stem from some level of disintegration of the information processing systems responsible for reality testing, which results in peculiar, incoherent and distorted cognitions, emotions, and behavior.

Through a series of factor analyses of nearly one thousand indicators/items extracted from various measures of psychotic-like phenomena, 10 clearly distinct subdimensions that converged on 1 higher-order factor (Disintegration) were extracted. These subdimensions, with sample items, are: General Executive Impairment (GEI; "On occasion, when I'm about to say something I end up saying something completely different"), Perceptual Distortions (PD; "Sometimes I can't recognize myself in a mirror"), Enhanced Awareness (EA; "Occasionally I get completely absorbed by nature or art and feel as if my consciousness was temporarily changed"), Depression (D; "I often wish I were dead and far away from everything"), Paranoia (P; "My enemies are after me"), Mania (M; "Sometimes I get so excited that I can't even fall asleep"), Flattened Affect (FA; "Sometimes I have an impression that my feelings are frozen"), Somatic Dysregulations (SOD; "Sometimes I get paralyzed for a while"), Magical Thinking (MT; "Stories about white and black magic are absurd", reverse keyed), and Social Anhedonia (SA; "Close friendships matter a lot to me", reverse keyed). An instrument – DELTA (described in Section 2.2.2.2) – was constructed by the authors of the study as a tool to further investigate the structure and the boundaries of the construct of Disintegration on the new samples, and to find out whether it can be conceptualized as a trait separate from the FFM.

Based on existing evidence and conceptual considerations, it was anticipated that the relationship between Disintegration and FFM would involve the extraction of Disintegration as a factor independent from the FFM, but somewhat pruned. Obvious candidates for pruning would be Social Anhedonia, Depression, and Enhanced Awareness. The first was found to be the primary indicator of low E in several studies (Tackett, Silberschmidt, Krueger, & Sponheim, 2008; Watson et al., 2008), the second is usually conceptualized as an indicator of N, and the third is (as a variant of Absorption) probably related to O. It might be further argued that Paranoia is low A (the negative pole of Trust), Mania – low A (the negative pole of Modesty) or high E (extreme Positive Feelings), Flattened Affect – low O (the negative pole of Emotions), and General Executive Impairment – low C (the negative pole of Deliberateness) or high N (Impulsiveness).

However, what *prima facie* appears as a "natural" dimension might not necessarily be the case. A dimension like positive-negative emotions is perhaps the best example. Although these are opposite behaviors, mutually exclusive as *states*, it is widely accepted that they are aspects of broad, stable behavioral dispositions (E and N), which are nearly orthogonal. If it is possible to demonstrate that items assumed to constitute the extremes of a dimension form separate factors, then it strengthens the evidence that they indicate independent dimensions. Such reasons make the question "Is paranoia an indicator of low A (low Trust) or of Disintegration?" *par excellence* an empirical question and not purely a semantic one.

1.3. On the importance of controlling for some common method biases

Cote and Buckley (1987) showed how method variance can either inflate or deflate observed correlations between constructs. For this reason, it is important to demonstrate both the convergent and discriminant validity of the Disintegration factor when some of these common method biases are controlled. This is important because the diversity of phenomena that characterizes the Disintegration factor may raise doubt about its unity. One of these biases may be the result of the type of assessment method used (e.g., informant or rater). Consequently, even if the evidence is found to support the correlations between self-report facets of the Disintegration factor and its separation from FFM, such a finding might be an artifact of relying on a single common informant, as reported by De Fruyt et al. (2013), as a limitation of their study. Biesanz and

West (2004), for example, using the Multitrait-Multimethod (MTMM; Campbell & Fiske, 1959) validation framework, found substantial correlations among Big Five traits within each of the informants i.e., self-report and ratings by others. However, despite these within-method correlations, their MTMM Confirmatory Factor Analysis (CFA) revealed orthogonality of the latent Big Five factors when the method of assessment was controlled for. The strength of MTMM CFA lies in the fact that it enables the evaluation of convergent and discriminant validity on the basis of true scores (i.e., free of method and measurement error influences).

In addition to demonstrating the generalizability of the Disintegration factor as being separate from FFM across assessment methods used, it is also important to demonstrate its generalizability across different samples. Furthermore, even if it is found that a separate Disintegration factor is obtained at the level of facets, the question remains whether it would be extracted at the level of items. Therefore, it is important to demonstrate the generalizability of the Disintegration factor as being separate from the FFM across the units of the analyses (facets and items). Moreover, studies have also found that intermixing vs. grouping items of different constructs can influence correlations among these constructs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In the current study, it will be important to demonstrate that the separation of the Disintegration factor from FFM is not merely an artifact of how the items were arranged, i.e., whether the DELTA items are grouped or intermixed with NEO PI-R items.

The main goal of this study is to evaluate whether proneness to psychotic-like behavior may best be conceptualized as a broad, basic personality trait that is independent of the Big Five. This will be evaluated by examining the: (a) convergence of the measures of the previously obtained lower-level dimensions on this broad behavioral disposition; (b) its separation from the factors defining the FFM (Costa & McCrae, 1992) across methods (Study 1), samples, units of the analysis and item arrangements (Study 2); and (c) the normal distribution of its scores in the general population.

2. Study 1: Multitrait-multimethod validation study of disintegration

> "*All things which exist, exist either in themselves or in something else*"
>
> [Spinoza, *Ethics*, First Part, Axiom I]

2.1. Overview

This study aimed to answer two important questions:

Question 1. Is the correlation of Disintegration facets an artifact of the assessment method (i.e., informant)? It is possible that self-assessments of the Disintegration facets are intercorrelated because of the presence of the common assessment method (i.e., self-report) rather than because of the existence of real correlations. Because the actual independence of the traits could be hidden by the artificial correlations between them – due to the influence of the assessment method – it is of ultimate importance to control for this.

Question 2. Will the convergence of the proposed Disintegration facets withstand factorization together with a number of other variables claimed to comprehensively describe personality space? It is not sufficient to show strong method-independent correlations of Disintegration facets because, despite them, the possibility that at least some of the facets primarily indicate the other Five Factors remains. If the separation of the Disintegration factor from the FFM (i.e., discriminant validity) is demonstrated independently of the method of assessment, it is a decisive step closer to the candidacy for a sixth personality trait.

2.2. Materials and methods

2.2.1. Participants and procedure

Psychology undergraduate students in the Department of Psychology at the University of Belgrade were subjects in this study. From 2006 to 2012, cohorts of students attending the course on Individual Differences in their second year of studies completed a battery of assessment measures. The sample consisted of 16% men and 84% women between the ages of 18 and 39 years ($M = 20.5$, $SD = 1.8$). The psychology undergraduates volunteered to participate in the study and signed informed consent forms before completing the NEO PI-R and the DELTA inventories. In addition, mothers and fathers of the students were asked to rate the students using these two inventories. At the end, we had 466 complete protocols (out of 647), i.e. protocols where students had provided self-report, and both parents had provided ratings.

Students were provided with feedback regarding their assessment results, but no extra course credits were given. The inventories (in the Serbian language) were administered to the participants by the first author of this article during the Individual Differences course practicum. Parents were asked to participate in the study on a voluntary basis; if they agreed, they completed the inventories at home and returned them to the principal investigator by mail.

2.2.2. Measures

2.2.2.1. NEO PI-R inventory. This is a well-established 240-item Likert-type measure of the 5 basic personality traits described in the FFM (Costa & McCrae, 1992): Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. It also measures six subordinate dimensions (facets) of each of the five traits.

2.2.2.2. DELTA inventory. This is a 114-item Likert-type measure of the 10 facets of Disintegration already described in Section 1.2. The extraction of these 10 factors was based on nearly one thousand items administered to a sample of senior high school students ($n = 2780$).[4] The broadest possible spectrum of behavioral manifestations of the disposition was included to facilitate a comprehensive charting of the domain. DELTA scales were formed by choosing the items with the highest loadings on each of the 10 factors, but in a way to preserve the variety of psychological contents of a particular factor. That is, for the items that were practically identical, differing only in the way they were phrased, the one with the highest loading was kept. Approximately half of the items were reformulated to be reverse keyed and were tested on several student samples. The exclusion of unsuccessful reverse keyed items resulted in the final 114-item version (almost one third of them being reverse keyed). An informant version of the instrument was developed by rewording the content to a third-person format to assess Disintegration by other informants. The overall number and the number of reverse keyed items in each of the subscales, as well as reliabilities of the subscales, are given in Table 1.

2.2.3. Analytic strategy

The convergent and discriminant validity of the Disintegration were tested using the Multitrait-Multimethod correlation matrix, with 10 subscales tapping postulated facets of Disintegration, and with the 30 NEO PI-R subscales, and informants (students, mothers and fathers), included as the method factors. More precisely, r_1 was calculated as the mean average correlation of DELTA subscales across the three methods (same facets, different informants); r_2 as the mean absolute correlation between DELTA and

[4] Additional details regarding this phase of the study is available upon request. The focus of the current paper is on testing the obtained personality model with new samples (reported here), including its discriminant validity from the FFM.

Table 1
Examining convergence among informants' perspectives on 10 disintegration facets: excerpt from multitrait-multimethod correlation matrix.

		Self-report								
	GEI	PD	P	D	FA	SOD	EA	MT	M	SA
GEI	(0.85)	0.54	0.48	0.55	0.40	0.55	0.39	0.34	0.33	0.45
PD	0.72	(0.89)	0.55	0.62	0.49	0.77	0.48	0.56	0.43	0.42
P	0.58	0.76	(0.84)	0.56	0.36	0.59	0.38	0.49	0.43	0.42
D	0.73	0.81	0.75	(0.89)	0.47	0.59	0.27	0.28	0.21	0.57
FA	0.73	0.78	0.74	0.81	(0.76)	0.46	0.21	0.23	0.16	0.48
SOD	0.71	0.92	0.85	0.82	0.76	(0.80)	0.48	0.54	0.46	0.42
EA	0.60	0.64	0.61	0.58	0.59	0.74	(0.83)	0.48	0.54	0.21
MT	0.42	0.65	0.65	0.49	0.51	0.64	0.56	(0.85)	0.47	0.15
M	0.57	0.69	0.77	0.56	0.70	0.78	0.76	0.59	(0.80)	0.08
SA	0.58	0.53	0.60	0.72	0.62	0.54	0.47	0.27	0.32	(0.84)
M	2.07	1.54	1.61	1.66	1.93	1.65	2.95	1.99	2.66	1.95
SD	0.61	0.62	0.50	0.66	0.62	0.56	0.93	0.80	0.74	0.68
NI	10;4	12;3	12;3	10;4	11;3	14;5	10;0	13;6	12;1	10;5
MR-SR	0.20	0.28	0.22	0.44	0.33	0.41	0.33	0.51	0.32	0.48
FR-SR	0.27	0.37	0.28	0.41	0.29	0.41	0.28	0.41	0.33	0.47
MR-FR	0.26	0.29	0.33	0.46	0.43	0.39	0.38	0.43	0.37	0.41

Note. Upper diagonal – intercorrelations of Disintegration facets (self-report). Lower diagonal – correlations between latent factors of Disintegration facets when informant perspectives are taken into account (based on CTCU model). Cronbach's alphas are printed on the main diagonal in parentheses. M – means of item values, or average value of the scale items (self-report). SD – Standard Deviations (self-report). NI – the first number denotes the number of items per scale, the second denotes the number of reverse keyed items. MR-SR – validity coefficients (mother's report and self-report) Correlations between Disintegration facets in the informants' blocks are omitted for parents' rating (same informants – different facets and different informants – different facets). The full MTMM matrix with DELTA facets is given in Appendix A in the Supplementary material. The full MTMM matrix with DELTA + NEO PIR-R facets is given in Appendix B in the Supplementary material.) FR-SR – validity coefficients (father's report and self-report). MR-FR – validity coefficients (mother's report and father's report). GEI – General Executive Impairment, PD – Perceptual Distortions, P – Paranoia, D – Depression, FA – Flattened Affect, SOD – Somatoform Dysregulations, EA – Enhanced Awareness, MT – Magical Thinking, M – Mania, SA – Social Anhedonia.

NEO PI-R subscales, within each of the three methods (same informant, different facets); and r_3 as the mean absolute correlation between DELTA and NEO PI-R subscales, across the three methods (different informants, different facets). A descending order of these three coefficients is expected if convergent and discriminant validity exists. For the purpose of comparison, the corresponding coefficients[5] were calculated for each of the NEO PI-R domains.

To answer the question regarding the degree of convergent and discriminant validity in a unified and coherent framework, MTMM CFA was performed. First, the focus was on the correlations between DELTA subscales (by analyzing the 30×30 matrix, i.e., 10 facets of Disintegration across 3 different informants). If obtained, the expected correlations between the facet scores, when the method variance was taken into account, would directly support one of the central claims of the study, namely, that correlations between the 10 scale scores are not due to the common informant (method) factor, but reflect converging (correlated) behavioral regularities.

The Correlated Traits Correlated Uniqueness (CTCU) MTMM CFA model was tested, with MLMV estimator (maximum likelihood parameter estimates with standard errors and a mean- and variance-adjusted chi-square test statistic), robust to non-normality. CTCU approach was more likely to lead to convergence and to produce proper parameter estimates than any other MTMM model (Marsh, 1989; Marsh & Bailey, 1991). The CTCU model presents method effects as correlations between the uniqueness of variables measured by a common method. The model has no assumptions about the dimensionality of the method effects, but assumes that they are uncorrelated. To investigate relationships among these traits, the trait factors were allowed to be correlated.

Exploratory Structure Equation Modeling (ESEM) was used to investigate the adequacy of the six-factor solution of the FFM and Disintegration facets when method factors were taken into account (120×120 matrix was analyzed, i.e., 10 facets of Disintegration + 30 facets of the NEO PI-R inventory across 3 different informants). Factor loadings and relationships among the latent traits were used to interpret the degree of convergent and discriminant validity, respectively. ESEM (Asparouhov & Muthén, 2009; Marsh, Morin, Parker, & Kaur, 2014; Marsh et al., 2010) is offered as the integration of Exploratory Factor Analysis (EFA), CFA, and Structural Equation Modeling (SEM). ESEM allows for many important features of confirmatory strategies (such as tests of predictive relations between latent constructs adjusted for measurement error, comparison between the models, or testing of intercepts and factor invariance over groups or occasions), while at the same time preserving free estimations of cross-loadings (constrained to be zero in a CFA, thus making it over-restrictive, especially in the case of complex personality/clinical constructs).

Following the recommendations of Hu and Bentler (1999), several goodness-of-fit (GoF) indices that evaluate misspecification in both the structural model (Standardized Root Mean Square Residual, SRMR) and the measurement model (Root Mean Square Error of Approximation, RMSEA, and Comparative Fit Index, CFI) were examined. Hu and Bentler (1999) suggested that CFI should be greater than 0.95 (although values from 0.90 to 0.95 might be

[5] Note that the coefficients r_1, r_2 and r_3 were calculated for each trait separately, instead of calculating common r_1, r_2 and r_3 for the whole MTMM matrix (given in Appendix B in the Supplementary material). For each of the 6 domain traits these coefficients were calculated by averaging their facet values. For example, validity coefficient (r_1) for DELTA was calculated by averaging correspondent facet correlations across the three possible combinations of informants i.e. self-report – mother, self-report – father, and mother – father (10 DELTA facets $\times$ 3 informant pairs = 30 correlations). Coefficient r_1 for N, for example, was calculated by averaging 6 correspondent facet correlations across the three possible combinations of informants (18 correlations). Coefficient r_2 for DELTA was calculated by averaging all DELTA – N, E, O, A, C facet correlations within each of the three informants (10 DELTA facets $\times$ 30 NEO PI-R facets = 300 correlations) and then by averaging for all three (i.e. 900 correlations). Coefficient r_2 for N, for example, was calculated by averaging all N - DELTA, E, O, A, C facet correlations within the informants (6 N facets $\times$ 34 DELTA, E, O, A, C facets = 204 correlations), and then for all three informants (i.e. 612 same informant, different facets correlations). In case of r_3 for DELTA we averaged all DELTA – N, E, O, A, C facet correlations across the three possible combinations of informants, (again 900 correlations, but this time different informant, different facets correlations were included). In case of r_3 for N, for example, we averaged all N-DELTA, E, O, A, C facet correlations across the three possible combinations of informants (i.e. 612 different informant, different facets correlations). The same procedures were repeated for the remaining four traits. Having in mind the good convergent and discriminant validity of NEO PI-R, to calculate r_1, r_2 and r_3 for the six traits together (i.e. the usual way) could have masked the potentially weak convergent and discriminant validity of DELTA, had we obtained it.

acceptable; Marsh et al., 2010), RMSEA should be less than 0.06, and SRMR should be less than 0.08.

MTMM CFA and ESEM analyses were performed in Mplus version 7 software. All other analyses were completed in SPSS Version 21.0.0.1 software.

2.3. Results and discussion

The number of items per scale, the number of reverse keyed items, their means, standard deviations, reliabilities, and correlations between the Disintegration facets (just for self-report measures), are given in Table 1. The full matrix, including information on the ratings, is given in Appendix A in the Supplementary material. Cronbach Alphas of the DELTA subscales were found to be uniformly high across different informants (from 0.78 to 0.88 in the case of the mothers' reports, and from 0.77 to 0.89 in the case of the fathers' reports). Cronbach Alphas of NEO PI-R facet scales across all three informants were in the range (0.50–0.82) similar to the values reported by the authors (Costa & McCrae, 1992), except for the Openness to Values scale that was below 0.40 (Appendix B in the Supplementary material). The higher-order maximum likelihood (ML) factor explained approximately the same portion of variance across different informants (44.4% in self-report, 43.7% in mothers' ratings, and 45.4% in fathers' ratings).

The average convergent validity coefficient of DELTA facets across informants was moderate (mean $r_1 = 0.36$), consistent with other reports in which college students were rated on broad personality traits by different types of informants (Biesanz & West, 2004). The discriminant validity between facets examined within the same informants yielded lower correlations (mean absolute, $r_2 = 0.16$), as expected. The discriminant validity coefficients between facets were lowest when examined across different informants (mean absolute, $r_3 = 0.09$). Similar values were obtained for facets of N ($r_1 = 0.38$; $r_2 = 0.20$; $r_3 = 0.11$), A ($r_1 = 0.36$; $r_2 = 0.16$; $r_3 = 0.09$), O ($r_1 = 0.36$; $r_2 = 0.12$; $r_3 = 0.08$), and C ($r_1 = 0.39$; $r_2 = 0.17$; $r_3 = 0.10$). Validity coefficient was higher in the case of E ($r_1 = 0.45$; $r_2 = 0.16$; $r_3 = 0.10$). These results indicate the multifaceted DELTA scale was found to behave in a similar manner to the multifaceted NEO PI-R inventory domain scales.

A more straightforward insight into the level of convergent validity of the Disintegration facets was demonstrated by the CTCU MTMM CFA of the DELTA subscales (that was used to address Question 1). The CTCU model provided an excellent fit to the data ($\chi^2_{(df)} = 285.48_{(225)}$, $RMSEA_{(90\%\ CI)} = 0.024_{(0.014–0.032)}$, SRMR = 0.033, CFI = 0.98). Factor loadings of the observed facets to the latent facet factors of the CTCU model are provided in Fig. 1.

The finding of primary importance here is the high correlations between the latent factors of facets (see Table 1, lower triangle). It appears that the convergence of Disintegration facets was not due to the presence of a single informant bias, but instead it appears to be genuine, and as strong as those of the other traits.

When the presence of more independent method factors within each of the informants is allowed it produces considerably higher correlations between the Disintegration facets in comparison to zero-order correlations among them. Although it is known that the CTCU model tends to overestimate correlations between the latent factors (Conway, Lievens, Scullen, & Lance, 2004), the CTCM (Correlated Traits Correlated Methods) model[6] estimations of these correlations were practically the same (average correlations between the facet latent factors were 0.60 in case of CTCU, and 0.57 in case of CTCM model), suggesting that the correlations between the latent facet factors could be genuinely high, independent of how method factors are modeled. It appears that controlling for the method factors particularly increases correlations between self-report Disintegration facets reflecting concurrent/opposite affective states (e.g. Mania and Flattened affect, or Mania and Depression, see Table 1 and Appendix A in the Supplementary material). These method effects may reflect, for example, the presence of positively elevated mood during the testing, inflating endorsement of the items tapping mania while not influencing or even decreasing endorsement of items tapping depression or flattened affect. In other words, method variance within self-report measures may entail a selective influence of one type of mood on DELTA facets reflecting concurrent/opposite affects. If the method variance was not controlled for, self-report DELTA facet intercorrelations may appear lower than they actually are.

It should be noted that Social Anhedonia has low correlations with several facets, even after taking into account the method of assessment, suggesting its more peripheral significance as an indicator of Disintegration. On the other hand, the correlation between Perceptual Distortion and Somatoform Dysregulation scales seems to be high enough to suggest difficulties in differentiation between these two constructs by the 114-item DELTA version. However, this finding pertains only to self-report, not ratings, which might be the result of an informant-bound problem. Furthermore, other correlations obtained from this sample were found to be unusually high, such as the correlation between Anxiety and Depression (NEO PI-R), being 0.71. This could partly be the result of the distributions of these scales having a tendency to be skewed. In fact, when the correlation was calculated based on a subset of students with less skewed scores it dropped below 0.70. Nevertheless, we also allow for the possibility that there is still room for the psychometric refinements of these two scales in 114-item DELTA version.

The crucial test of whether the Disintegration factor is separate from the FFM when the method of assessment is taken into account (Question 2) was addressed by the full CTCU MTMM ESEM, based on all 120 variables (Appendix B in the Supplementary material). In the six-factor solution, the following factors were extracted (and Geomin-rotated): Disintegration, E, O, A, N and C. It had an acceptable fit ($\chi^2_{(df)} = 6810.24_{(4095)}$, $RMSEA_{(90\%\ CI)} = 0.038_{(0.036–0.039)}$, SRMR = 0.045, CFI = 0.92). These GoF indices seem to be either better (Marsh et al., 2010) or similar (Gore & Widiger, 2013) to those reported for less complex models. All Disintegration facets had primary loadings on the Disintegration factor except one – Social Anhedonia. It had a primary (negative) loading on E, systematically across all three informants (Appendix C in the Supplementary material). This finding, in accordance with Watson et al. (2008) and Tackett et al. (2008), raises the question regarding the position of Social Anhedonia in the model, indicating that it has more in common with a low E. Therefore, Social Anhedonia is a candidate for exclusion from the Disintegration model. Correlations between Disintegration and N, E, O, A, and C factors were 0.21, −0.15, −0.17, −0.30, and −0.10, respectively. The low *negative* correlation found between the Disintegration and O goes against the suggestion to articulate psychosis proneness phenomena as high O.

In the five-factor solution (Appendix D in the Supplementary material), the following factors were extracted: Disintegration, E, A, O, and C. The N factor collapsed, and its facets were blended (with a negative sign) mostly with E (Anxiety, Depression, and Self-consciousness), but also with A (Angry Hostility) and O (Vulnerability). This model ($\chi^2_{(df)} = 7225.57_{(4210)}$, $RMSEA_{(90\%\ CI)} = 0.039_{(0.038–0.041)}$, SRMR = 0.050, CFI = 0.91) was slightly inferior to the six-factor model ($\Delta\chi^2_{(\Delta df)} = 415.33_{(215)}$, $p < 0.001$; $\Delta CFI = 0.01$). Importantly, the Disintegration factor holds irrespective of whether five or six factors were extracted. In conclusion, these findings provide support for the existence of the Disintegration factor as being

[6] This model, assuming that a single latent factor underlies each method, and that methods are correlated, also had excellent GoFs ($\chi^2_{(df)} = 425.40_{(327)}$, $RMSEA_{(90\%\ CI)} = 0.025_{(0.018–0.032)}$, SRMR = 0.044, CFI = 0.97).

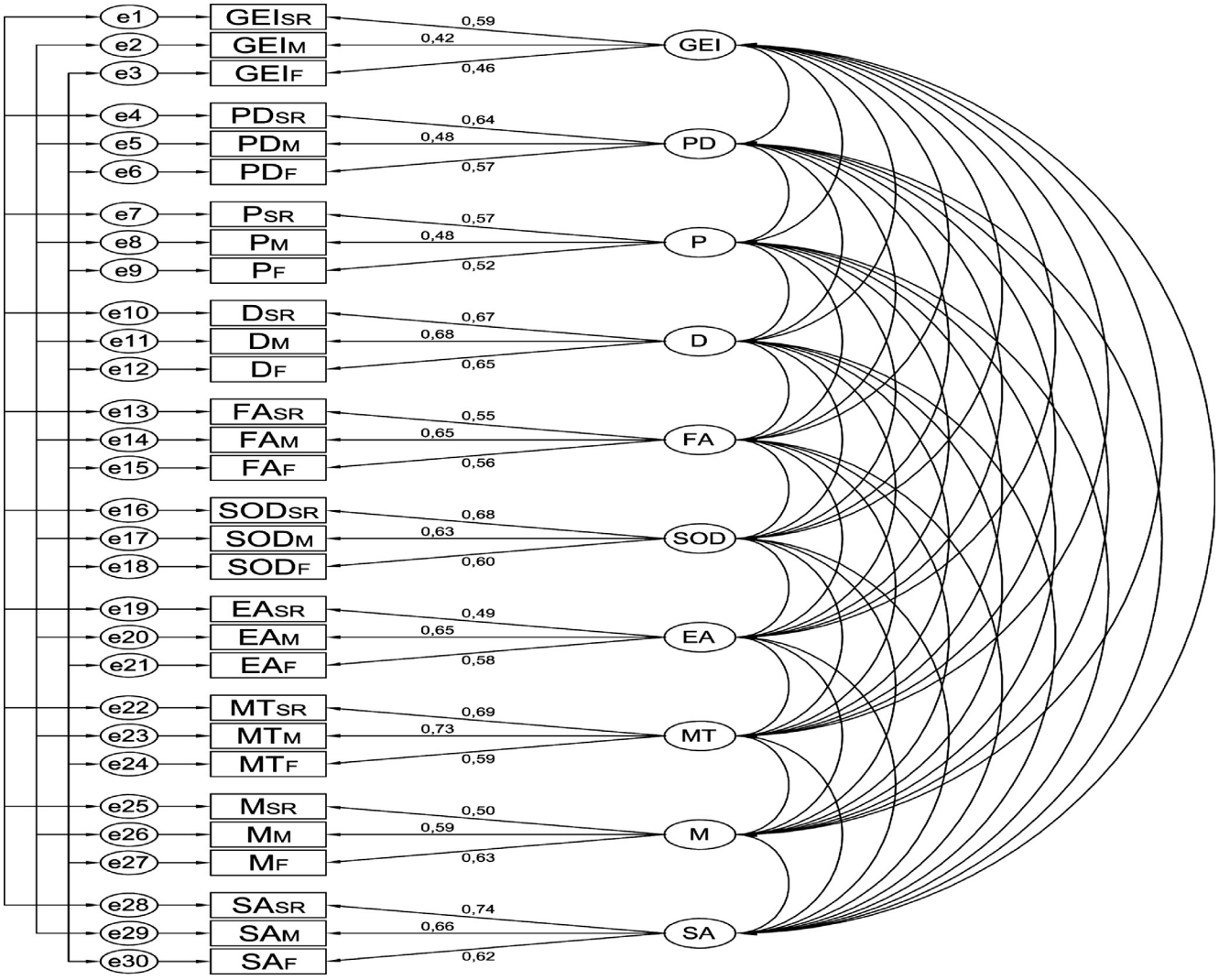

Fig. 1. Correlated Traits Correlated Uniquenesses (CTCU) Parameter Estimates (Completely Standardized Solution) of the Multitrait-Multi-Informant Matrix of the Covariances Between Disintegration Facets. Arrows indicate loadings of the informants' observed scores on the latent traits. Method effects are presented as correlations (values not printed) between the uniquenesses of variables (e1-e30) measured by a common assessment method. Values of the correlations between the latent facet traits are not printed here, they are given in Table 1. GEI – General Executive Impairment, PD – Perceptual Distortion, M – Mania, D – Depression, P – Paranoia, FA – Flattened Affect, SA – Social Anhedonia, MT – Magical Thinking, SD – Somatoform Dysregulation, EA –Enhanced Awareness. SR – Self Report, M – Mother's Report, F - Father's Report.

separate from the FFM when different methods of assessment were taken into account.

3. Study 2: FFM and disintegration in a representative sample

> *"That which cannot be conceived through anything else must be conceived through itself"*
>
> [Spinoza, *Ethics*, First Part, Axiom II]

3.1. Overview

In Study 1, the generalizability of the six-factor structure was demonstrated across methods (i.e., informants). The main purpose of Study 2 is to explore further whether the Disintegration factor is a real behavioral disposition separate from FFM, not merely an artifact of common method biases (Podsakoff et al., 2003). Study 2 aims to answer the four questions outlined below.

Question 1. Does the six-factor structure hold in a different sample? The results obtained in Study 1 were based on a highly homogenous and educated population, i.e., undergraduate students, thereby the sample was not representative of the general population in terms of age, education, abilities, professional interests, or gender structure. To further evaluate the generalizability of the joint NEO PI-R and DELTA factor structure obtained from a student sample, a stratified random sample of the Serbian population was recruited. Furthermore, in such a sample a normal distribution of Disintegration factor should be expected if the trait-like reconceptualization of psychosis proneness is valid.

Question 2. Does the six-factor structure hold independently of the way the items are presented to the participants (mixing items from DELTA and NEO PI-R inventories, instead of grouping them)? In contrast to Study 1, in this study the DELTA inventory was not administered to the participants as a separate instrument, but rather its items were intermixed with NEO PI-R items to investigate the influence of item mixing/grouping on the stability of the Disintegration factor. It could be argued that grouping the DELTA items may create a temporal mental set that produces a spurious factor that might be mistaken for a real disposition.

Question 3. Is it possible to recover the proposed structure of the Disintegration factor beginning at the item level? Such evidence would eliminate the possibility that Disintegration is an artificial

structure whose separation from FFM was the result of the inadequate grouping of items into proposed facets. Although based on the results of factor analyses, one could argue that the procedure of the initial item selection for the facets of the DELTA scale – described in Section 2.2.2.2 – might have had elements of arbitrariness. For this reason, the model of Disintegration was tested at the item level, including all 114 items. However, bearing in mind the well-known problem of fitting highly complex models, i.e., those comprised of over 50 variables and 5 factors (see Marsh et al., 2010), an additional model of the Disintegration factor was tested with a reduced number of items, i.e., 50 of the original 114 items. Because promising CFA and ESEM findings have never been reported on more than 60 items (postulating 5 factors), our choice to test the Disintegration model with 50 items (i.e., postulating 10 factors at the first level of hierarchy, and 1 factor on the second level) seems further justified by this practical consideration. Besides, shorter versions are also more convenient for use in future research.

This shorter version of the Disintegration model was also developed to make another planned investigation of the six-factor solution, based on NEO PI-R and DELTA inventory items, fairer. That is, as the sheer number of items in the DELTA inventory (114, i.e., almost half of the number of items in the NEO PI-R inventory) can influence the extraction of a separate Disintegration factor in a joint factor analysis, the number was reduced to 50 – comparable to the number of items constituting NEO PI-R domain scales (48 items per scale). Although the joint EFA of 240 NEO PI-R and 50 DELTA items can be considered rough and purely exploratory, its negative result, i.e., failing to extract the Disintegration factor comparable to the postulated one, may bring into question the existence of Disintegration.

Question 4. Will our data demonstrate clear differential relationships between Disintegration facets and the two components of O: PO and PI? Based on the findings reported in Section 1.1, both positive and negative Disintegration symptoms are expected to have considerably larger correlations with PO than with PI: positive Disintegration symptoms are expected to have substantial positive correlations, and the negative symptoms negative correlations with PO. In the Disintegration model, the positive symptoms are represented by Perceptual Distortions, Paranoia, Somatoform Dysregulations, Magical Thinking, and Enhanced Awareness, and the negative symptoms are roughly represented by Flattened Affect and Social Anhedonia. Even if the evidence of these differential relations is not quite clear at the level of zero-order correlations, one would expect – based on the evidence of Chmielewski et al. (2014) – that the removal of PI variance from PO resolutely increases the correlations between positive symptoms of Disintegration and PO.

3.2. Materials and methods

3.2.1. Sample

The target sample was a representative sample of the general Serbian population aged 18–64 years (N = 1001). The sample universe was based on 2002 Census data. A two-staged stratified random representative sample design was employed. The strata were 24 municipalities/cities that serve as administrative centers for each of the 24 respective districts of Serbia and 11 municipalities representing the capital city (25th district), grouped by settlement type (urban or rural) and age group (18–29, 30–39, 40–49, and 50–64 years). Strata allocation was proportional to the 2002 population figures. There were two sampling stages. First stage: Sampling units were households; the method of household selection was a random route technique starting from given addresses based on the dwelling register. Second stage: A respondent within a household represented the secondary sampling unit; respondent selection was based on the last birthday in the household in the given age quota. The sample consisted of 49% men and 51% women between the ages of 18 and 64 years (M = 40.17, SD = 12.69). Analyses at the item level were done on 997 subjects, due to missing values.

3.2.2. Procedure

The household/respondent selection method was defined, and a starting point (i.e., a particular address) and route for each test administrator were specified prior to the field survey. The maximum number of respondents per starting point was 10, and the test administrator began with a given address (or the house nearest to it). After a successful testing session, the test administrator then counted the houses/apartments in a row and walked to the 10th apartment or the 5th house. If a selected respondent declined to participate, or was not found at the address after two attempts, then the testing session was considered unsuccessful. In such cases, the test administrator chose the next nearest apartment or house. No more than five test sessions were conducted within the same apartment building. If a planned number of testing sessions in a certain street could not be completed, then the test administrator went to the next nearest street.

All subjects signed a written consent form and received compensation for participation in the study in the amount of 1000 dinars (equivalent to 10 Euros). The inventories (in the Serbian language) were administered by professional test administrators experienced in public opinion and market research. Test administrators participated in a day-long training course in which the specifics of administering personality inventories were explained to them. In instances where the participant had problems reading the items, the test administrator read the items aloud.

3.2.3. Measures

The same measures were used as in Study 1, but for this study only the self-report versions. This time, the 114 DELTA items were added to the 240 NEO PI-R inventory items, such that every third item presented to the respondents was from the DELTA inventory. This type of item ordering fits the one already applied in NEO PI-R.

3.2.4. Analytic strategy

ESEM was used to compare the five- and six-factor solutions of the FFM and Disintegration facets. ESEM was also used to test the model of 10 converging Disintegration facets based on all 114 items.

Part of the analyses was completed with a set of 50 items, selected from the full 114-item DELTA version as described in Section 3.1. Question 3. The reduction of the number of DELTA items was performed using an Ant Colony Optimization (ACO) algorithm, a recently proposed heuristic procedure for conducting automated searches. The algorithm mimics the behavior of real ants managing to establish the shortest route from their colony to the sources of food by following the trail repeatedly marked by other ants via pheromone (here, the process of updating the pheromone level was based upon the improvement of a GoF index for each randomly generated model). The usefulness of ACO has already been demonstrated in maximizing the model fit (Marcoulides & Drezner, 2003) and, together with other criteria (validity coefficients), in developing shorter questionnaire forms (Leite, Huang, & Marcoulides, 2008; Olaru, Witthöft, & Wilhelm, 2015). The optimization criterion used here was the CFI, one of the most popular GoF indices in SEM, as suggested by Bentler (1990). This normed comparative index is built on the comparison between noncentrality parameters of chi-square discrepancy distributions of the tested model and the basic, more restricted model, usually a model assuming no covariances between the variables. The important aspect of the ACO strategy here was that an unequal number

of items per facet was allowed. There was even a possibility of assigning no items to a facet category if it had not contributed to the optimization of the criterion. Such initial conditions allowed for the additional test of whether there are facets whose items actually do not contribute to the optimization of the proposed model.

The final model, based on the set of items selected by ACO, was tested by CFA (again, MLMV estimator was used to correct for deviation from multivariate normality of the data). All CFA and ESEM analyses were undertaken in Mplus version 7. ACO was performed in R software for Windows, version 3.1.2. The R routines created all the structures and did the iterations, while relying on Mplus for the calculation of CFI in each step of the iterative process.

ML EFA (with promax-rotated factors) of the NEO PI-R and the reduced number of DELTA items (50 items, all previously normalized, for the aforementioned reasons) was conducted to investigate whether the Disintegration factor could be extracted at the item level. Factor scores from the EFA are labeled "empirically derived scores", and simple sum scores of the items that are expected to belong to the predefined six dimensions are labeled "theoretically derived scores". We compared these two scores as a very rough check of similarity of the theoretically and empirically derived structures, starting from the items. Although we had a somewhat unfavorable subject-to-variable ratio (around 3:1), and low commonalities (between 0.2 and 0.3, on average) for the factor analysis (MacCallum, Widaman, Zhang, & Hong, 1999), this rough analysis was still very informative. Keeping in mind that the FFM model is well-established, the lowest correlation between empirically-derived factor scores and theoretically-derived summation scores for the five traits sets the benchmark below which the correlations of the equally derived Disintegration scores should be taken as a failure to recover the Disintegration factor, based on items. SPSS, version 21.0.0.1 was used to normalize the item distributions and to do item-level ML EFA.

3.3. Results and discussion

3.3.1. Six-factor vs. Five-factor structural model

The descriptive statistics for the six domain scores are provided in Table 2. The six-factor ESEM solution (Table 3) had an acceptable fit ($\chi^2_{(df)}$ = 1868.74 $_{(555)}$; RMSEA$_{(90\%\ CI)}$ = 0.049$_{(0.046-0.051)}$; SRMR = 0.023; CFI = 0.94). GoF indices of the five-factor solution – nested under the six-factor solution – were less adequate ($\chi^2_{(df)}$ = 2623.41 $_{(590)}$; RMSEA$_{(90\%\ CI)}$ = 0.059 $_{(0.056-0.061)}$; SRMR = 0.030; CFI = 0.90). This solution – in which N factor again collapsed – was clearly inferior to the six-factor solution ($\Delta\chi^2_{(\Delta df)}$ = 754.67$_{(35)}$, p < 0.001; ΔCFI = 0.04). Correlations between factors in the six-factor solution tended to be slightly higher than when the method factors were taken into account in Study 1: correlations between Geomin-rotated Disintegration and N, O, E, A, and C factors in the representative sample were 0.33, −0.08, −0.19, −0.29, −0.43, respectively.

These findings represent strong empirical evidence favoring the Disintegration factor as being separate from the FFM. The extraction of a separate Disintegration factor did not depend on whether items were mixed with NEO PI-R items as in this study, or grouped in a separate instrument as in Study 1. Again, all DELTA facets were found to have primary loadings on the Disintegration factor, except Social Anhedonia, with the primary loading on low E. In accordance with the expectation that Disintegration is a personality trait, its score was found to have a normal distribution in the general population (Table 2).

Although not a primary focus here, the ESEM revealed a slight change in the position of factorial axes E and A (usually in Serbian samples, low Dominance, Activity and Excitement Seeking tend to converge with A, while Altruism and Trust tend to converge with warm and gregarious aspects of E) (Knežević, Džamonja-Ignjatović, & Đurić-Jočić, 2004). This finding reflects the already observed "fuzzy boundary between the Extraversion and Agreeableness domain" (John et al., 2008, p. 136), that is, the already established strong relationships between enthusiasm aspects of E and compassion aspects of A (i.e., rewarding and empathy-driven aspects of social affiliation) (DeYoung, Quilty, & Peterson, 2007).

3.3.2. Disintegration: Item-level analysis

3.3.2.1. Item-level analysis of all 114 DELTA items. ESEM analysis of all 114 items showed marginally acceptable GoFs of the hypothesized ten factor structure ($\chi^2_{(df)}$ = 9105.28$_{(5346)}$; RMSEA$_{(90\%\ CI)}$ = 0.027$_{(0.026-0.027)}$; SRMR = 0.026; CFI = 0.87). The only problematic GoF is CFI, which is below the acceptable value of 0.90. However, it could be the result of the sheer number of items, as demonstrated and discussed by Olaru et al. (2015).

3.3.2.2. Item-level analysis of the reduced set of 50 DELTA items. In line with the previous interpretation was the fact that it was possible to establish a complete CFA-based measurement model of Disintegration with an acceptable fit ($\chi^2_{(df)}$ = 1626.48$_{(1165)}$; RMSEA$_{(90\%\ CI)}$ = 0.020$_{(.018-0.022)}$; SRMR = 0.038; CFI = 0.90), when the number of DELTA items was reduced to 50. Although the number of items was reduced, it still represented a complex CFA model, with 3 levels of hierarchy, from 50 items, via 10 first-order factors, to the second-order Disintegration factor (loadings of the items on the first-order factors and loadings of the facets on the higher-order Disintegration factor are given in Appendix E, Supplementary material).

As already stated, these 50 items were selected by using the ACO algorithm. The ACO algorithm selected 8, 7, 7, 6, 5, 4, 4, 3, 3, and 3 items from the original Perceptual Distortions, Paranoia, Somatoform Dysregulations, Depression, Social Anhedonia, Magical Thinking, Mania, Flattened Affect, General Executive Impairment, and Enhanced Awareness scales, respectively (5 items were reverse keyed), thus suggesting that behavioral contents contributing to the maximization of the model CFI could be extracted from each facet. This shorter version is highly similar to the full 114-item DELTA scale in every important respect (i.e., the correlation

Table 2
Means, Standard Deviations, Skewness (Sk), Kurtosis (Ku), Median Skewness (Sk_i) and Median Kurtosis (Ku_i) of the items within the domain, and Kolmogorov-Smirnov tests (K-S Z) of the normality of distributions of the six domain scores on the representative sample of Serbian population.

	M	*SD*	Sk	Ku	Sk_i	Ku_i	K-S *Z*	*p*
Neuroticism[a]	89.61	19.53	0.01	0.72	0.17	0.78	0.91	0.38
Extraversion[a]	105.42	20.03	−0.17	0.32	−0.16	−0.75	0.76	0.60
Openness[a]	103.29	19.14	0.28	0.37	−0.08	−0.78	1.79	0.00
Agreeableness[a]	114.46	17.89	−0.12	0.14	−0.47	−0.45	0.87	0.43
Conscientiousness[a]	124.44	21.12	−0.24	0.09	−0.74	0.15	0.86	0.45
Disintegration[b]	2.47	0.42	0.16	−0.41	0.46	−0.34	0.83	0.49

[a] Assessed by the NEO PI-R inventory, total scores calculated as the sums of item scores.
[b] Assessed by the DELTA inventory, total score calculated as the average of item scores.

Table 3
Factor loadings of geomin-rotated maximum likelihood factors extracted on NEOPI-R and DELTA facets – Standardized parameter estimation (general population, self-report measures).

	N	E	A	O	C	D
Neuroticism						
Anxiety	**0.54**	**−0.41**	−0.03	0.01	0.06	0.25
Angry hostility	**0.51**	0.02	**−0.34**	−0.07	−0.04	0.24
Depression	**0.33**	**−0.39**	−0.03	−0.01	−0.16	**0.39**
Self-consciousness	**0.30**	**−0.41**	0.08	−0.07	−0.03	0.20
Impulsiveness	**0.54**	0.12	0.06	0.04	**−0.36**	0.00
Vulnerability	0.24	**−0.37**	0.02	0.02	**−0.43**	0.20
Extraversion						
Warmth	0.02	**0.36**	**0.65**	−0.06	0.04	0.09
Gregariousness	−0.04	**0.57**	**0.33**	−0.03	−0.16	−0.02
Assertiveness	−0.09	**0.59**	−0.13	0.12	0.19	−0.03
Activity	0.25	**0.52**	0.05	−0.01	**0.31**	0.06
Excitement seeking	0.07	**0.63**	−0.05	0.18	−0.22	0.15
Positive emotions	0.05	**0.52**	**0.32**	0.19	−0.10	−0.04
Openness						
Fantasy	0.21	0.03	−0.03	**0.54**	−0.28	−0.10
Aesthetics	−0.06	−0.12	0.13	**0.83**	−0.04	0.13
Feelings	0.25	0.03	0.28	**0.45**	0.07	−0.01
Actions	−0.06	0.18	−0.11	**0.45**	−0.14	−0.01
Ideas	−0.03	0.14	−0.11	**0.63**	0.09	−0.01
Values	−0.01	0.02	0.19	0.20	−0.17	−0.29
Agreeableness						
Trust	−0.21	0.12	**0.67**	−0.02	−0.07	0.02
Straightforwardness	−0.07	**−0.45**	**0.44**	0.00	0.05	−0.16
Altruism	0.07	−0.02	**0.67**	0.01	0.20	−0.08
Compliance	**−0.37**	**−0.47**	**0.44**	0.03	0.01	0.02
Modesty	−0.02	**−0.52**	0.25	−0.09	−0.13	−0.03
Tender-mindedness	0.08	**−0.32**	**0.52**	0.14	0.14	0.01
Conscientiousness						
Competence	−0.07	0.22	0.12	−0.03	**0.66**	−0.11
Order	0.13	−0.03	−0.13	0.13	**0.66**	−0.05
Dutifulness	0.05	−0.09	0.17	0.02	**0.62**	−0.17
Achievement	0.13	**0.30**	0.02	0.04	**0.70**	0.01
Self-discipline	−0.08	0.05	0.02	−0.02	**0.80**	−0.03
Deliberation	−0.27	−0.15	−0.03	−0.01	**0.63**	0.03
Disintegration						
GEI	0.04	−0.10	−0.04	−0.06	**−0.32**	**0.55**
PD	−0.11	0.05	−0.04	0.01	−0.08	**0.89**
P	0.04	0.07	**−0.38**	−0.03	0.02	**0.55**
D	0.06	−0.29	−0.22	0.00	−0.19	**0.49**
FA	−0.13	−0.04	−0.16	−0.23	−0.24	**0.44**
SOD	−0.02	−0.17	−0.01	0.02	−0.12	**0.73**
EA	0.00	0.05	0.08	**0.55**	0.05	**0.60**
MT	0.05	−0.02	0.04	0.25	0.08	**0.62**
M	0.24	**0.40**	0.12	0.07	0.01	**0.56**
SA	−0.07	**−0.43**	**−0.42**	−0.08	−0.02	0.22

Note. Factor loadings equal or greater than 0.30 are shown in boldface. Primary loadings on the "wrong" factors are shown underlined. GEI – General Executive Impairment, PD – Perceptual Distortions, P – Paranoia, D – Depression, FA – Flattened Affect, SOD – Somatoform Dysregulations, EA – Enhanced Awareness, MT – Magical Thinking, M – Mania, SA – Social Anhedonia.

coefficient between the total scores was 0.96, while Tucker's coefficient of congruence of their 10 facets' loadings was 0.99).

These results are not frequently achieved with complex personality measures and models (Marsh et al., 2010, 2014; McCrae, Zonderman, Costa, Bond, & Paunonen, 1996; Olaru et al., 2015). In conclusion, this proposed model of Disintegration seems to adequately represent the structure of relationships among the items, based on a general Serbian population.

3.3.3. Disintegration and FFM: Item-level analysis

Finally, item-level ML EFA (with the number of factors set a priori to 6 and promax-rotated) of the 240 NEO PI-R items and 50 DELTA items (all previously normalized) showed that Disintegration items were not absorbed by the FFM factors. Moreover, the Disintegration items tended to form a factor more similar to its summation score (r = 0.94) than any of the other five factors (r values for C, E, A, O, and N, were 0.90, 0.77, 0.65, 0.90 and 0.74, respectively). Thus, at the item level, the Disintegration factor appears to be more robust than any of the other five traits operationalized through the FFM on the sample representative of the Serbian population. Normalization of the items prior to this EFA rendered untenable the speculation that the separate psychosis proneness factor could be an artifact caused by the skewed distributions of its items (Nunnaly & Bernstein, 1994). Factor loadings of the 290 normalized items are given in Appendix F, Supplementary material.

3.3.4. Disintegration and openness: Facet-level analysis

The conceptual importance of the relationships between the O and Disintegration factors was discussed in Section 1.1. The

correlations between them at the facet level are provided in Table 4. Our study found little support for *differential* relationships between schizotypy symptoms and the two components of O: PO and PI. As seen in Table 4, the only strong correlation of O facets (both PO and PI) is with Enhanced Awareness, which is a dimension relatively peripheral to Disintegration, with a somewhat ambiguous status (i.e., Enhanced Awareness has high loadings on both Disintegration and O). A similar example within the FFM is Angry Hostility, with primary loadings on N, but with strong replicable secondary loadings on low A (N and A being nearly orthogonal). Correlations of positive symptom facets with PO were not noticeably higher than those with PI. Actually, most of correlations were low to the extent that they cannot be used to justify a conceptual unification of Disintegration and O.

In addition to the zero-order correlations between the Disintegration facets and O, Table 4 also shows the semi-partial correlations of the PO and Disintegration facets which control for the variance of the other PI facets, and the semi-partial correlations between PI and Disintegration facets when the variance of PO is controlled for. This analysis was inspired by Chmielewski et al. (2014), as described in Section 1.1. The removal of PI variance from PO apparently does not increase this correlation as would be expected.

4. General discussion

The current study suggests that 9 strongly converging facets (the original 10 Disintegration facets minus Social Anhedonia, which was repeatedly shown to be – despite having strong relations to Disintegration – a primary indicator of low E) might reflect an acceptable taxonomy of psychosis proneness, and might serve as its "true" behavioral endophenotype (Gottesman & Gould, 2003). The studies presented were designed to address several major concerns regarding the existence of Disintegration as a major personality trait beyond the FFM.

4.1. High correlations among disintegration facets are not an artifact of sample characteristics or of data collection methods

This study found strong convergence of the Disintegration facets in both undergraduate student and general population samples when Disintegration was assessed using the newly constructed DELTA inventory. Moreover, the convergence was independent of the method of assessment, suggesting a genuine, strong commonality among the facets, regardless of whether they are self-reported or rated by close others (parents).

4.2. Disintegration is independent of the Big Five

If the Disintegration subscales tapped behavioral consistencies that did not emanate from a separate common disposition, they would have been absorbed by the five factors assumed to comprehensively describe personality space. In order to demonstrate the robustness of the assumed six-factor solution (FFM + Disintegration), we have shown its replicability across different methods (informants), samples, units of analyses, and item arrangements. This study found that all Disintegration subscales, except Social Anhedonia, had primary loadings on the Disintegration factor. As Social Anhedonia was unambiguously shown to be a primary indicator of low E, it was excluded from the model of Disintegration. However, our findings demonstrating a consistent relationship between Social Anhedonia and Disintegration are in line with the findings of Chapman et al. (1994) that demonstrated the crucial role of Social Anhedonia (together with Magical Thinking) in predicting psychosis in a 10-year follow-up study. Taken together, these findings seem to point to the fact that not only Disintegration, but also at least some aspects of low E, may play a role in increasing the risk for psychosis.

We found little support for the claim that Disintegration phenomena should be located in the domain of FFM O, either in its present form, where aspects of PO and PI are combined, or in the

Table 4
Correlations between facets of disintegration and openness.

	Representative sample, self-report measures (N = 1001)							
	O1	O2	O3	O4	O5	O6	PO	PI
PD	0.05	0.01	−0.12**	0.04	−0.07*	−0.25**	−0.03	−0.11**
	0.09*	0.07*	−0.07*	0.03	−0.09*	−0.24**	0.03	−0.13**
MT	0.24**	0.23**	0.16**	0.06*	0.04	−0.15**	0.27**	0.00
	0.25**	0.26**	0.18**	−0.05	−0.13**	−0.22**	**0.32****	−0.19**
P	−0.01	−0.08*	−0.20**	−0.01	−0.10**	−0.29**	−0.13**	−0.17**
	0.05	−0.01	−0.13**	0.01	−0.05**	−0.26**	−0.05	−0.12**
EA	**0.32****	**0.52****	**0.33****	0.22**	**0.35****	−0.05	**0.51****	0.28**
	0.21**	**0.40****	0.24**	0.02	0.06	−0.18**	**0.41****	−0.02
GEI	0.05	−0.06*	−0.19**	−0.04	−0.24**	−0.26**	−0.09**	−0.24**
	0.15**	0.08	−0.08*	−0.04	−0.24**	−0.23**	0.06*	−0.25**
SOD	−0.02	0.01	−0.11**	−0.02	−0.18**	−0.19**	−0.05	−0.18**
	0.05	0.12**	−0.03	−0.02	−0.20**	−0.18**	0.07*	−0.20**
D	−0.03	−0.10**	−0.25**	−0.06	−0.19**	−0.25**	−0.17**	−0.22**
	0.05	0.01	−0.16**	−0.02	−0.14**	−0.20**	−0.06	−0.17**
FA	−0.16**	−0.24**	**−0.42****	−0.11**	−0.26**	−0.19**	**−0.36****	−0.27**
	−0.06*	−0.12**	**−0.33****	−0.02	−0.11**	−0.10**	−0.25**	−0.11**
M	0.24**	0.21**	0.27**	0.13**	0.15**	−0.06	**0.31****	0.12**
	0.20**	0.15**	0.24**	0.03	0.00	−0.14**	0.28**	−0.04
SA	−0.21**	−0.28**	**−0.42****	−0.15**	−0.28**	−0.25**	**−0.40****	**−0.32****
	−0.10**	−0.13**	**−0.31****	−0.04	−0.11**	−0.15**	−0.26**	−0.14**
DTOT	0.08*	0.05	−0.13**	0.01	−0.10**	−0.28**	0.00	−0.15**
	0.13**	0.13**	−0.06	−0.02	−0.14**	−0.28**	0.09**	−0.20**

Note. O1 – Fantasy, O2 – Aesthetics, O3 – Emotions, O4 – Actions, O5 – Ideas, O6 – Values, PO – Pure Openness (mean score of O1, O2, and O3), I – Intellect (mean score of O4, O5, and O6), PD – Perceptual Distortions, MT – Magical Thinking, P – Paranoia, EA – Enhanced Awareness, GEI – General Executive Impairment, SOD – Somatoform Dysregulations, D – Depression, FA – Flattened Affect, M – Mania, SA – Social Anhedonia, DTOT – Disintegration, total sore. 1th row – Zero-order correlations; 2nd row – Semi-partial correlations of the O and Disintegration facets, which in case of PO facets control for the variance of the PI facets, and *vice versa*. PO and PI in this row are calculated as the first PC of these three standardized residuals. Correlations above 0.30 are bolded.

** $p < 0.01$.

* $p < 0.05$.

direction of PO. Disintegration phenomena (except Enhanced Awareness, which had high loadings on both Disintegration and O) were found neither at the surface nor buried within FFM O. The core indicators of Disintegration tended to form a factor orthogonal or slightly negatively related to O. These results are in line with meta-analyses and the majority of recent studies demonstrating weak relations between O and psychotic-like entities. Only the correlations of Disintegration with the N factor (as defined in the FFM model) tended to be stable across samples, and in line with the aforementioned meta-analytical estimations (between 0.3 and 0.4). They are somewhat lower when methods are taken into account (around 0.2), and somewhat higher between summation scores (around 0.5). These correlations are at the level existing *within* the FFM space (van der Linden, Nijenhuis, & Bakker, 2010).

The extraction of the Disintegration factor independent of the FFM cannot be cursorily explained by arguing that it captures psychopathology, while the FFM taps normal personality variations. As the Disintegration factor was extracted based on non-clinical samples, and was found to have a normal distribution in the general population, it is highly unlikely that psychotic disorder or any other kind of *illness* caused the extraction of the factor, but rather its *subclinical*, *trait-like*, *normally distributed variations* did. Some of the findings, representing the overwhelming evidence on the continual distribution of Disintegration-like phenomena in non-clinical populations, have been already mentioned in the introduction.

The Disintegration factor is a factor related to many aspects of dysfunctional behavior (similar to Neuroticism), but is obviously not a categorical, transitory state with a low prevalence rate, that could be ascribed to an illness. The relationship of Disintegration to dysfunctionality itself cannot be a reason for its exclusion from the domain of personality. Such an exclusion would be arbitrary given that the N factor also entered the field of personality from psychopathology, and is closely connected to dysfunctional behavior (Ormel et al., 2013). Moreover, Disintegration-like phenomena have been found to have many interesting relationships with variables outside of the field of psychopathology, such as spiritual experiences (Jackson, 1997), paranormal beliefs (Goulding, 2005), generative, but not evaluative creative cognition (Holt, 2015), militant extremism (Stankov, Saucier, & Knežević, 2010), elevated social Internet use (Mittal, Tessner, & Walker, 2007), or right wing orientation and prejudice toward minorities (Keller & Knežević, 2016). It should be noted also that the pattern of loadings indicates that Disintegration is not a *general* factor of dysfunctionality or psychopathology, as its core content consists of disintegrative phenomena, while broad areas of abnormal behavior (i.e., antisocial, impulsive, anxiety-related and anhedonic phenomena) remain within other factors (A, C, N, and E, respectively).

Nevertheless, there are reasons to believe that the relations among the Disintegration factor, psychosis and other forms of psychopathology are complex, similar to the relations between N and major depressive disorder, for example (see discussion in Durbin & Hicks, 2014; Ormel et al., 2013). The fact that there are trait-like, normally distributed disintegrative phenomena in the general population by no means implies that just one model of Disintegration-psychosis associations (e.g., the spectrum model) is correct, and that the others (e.g., precursor, predisposition, or common cause model) are not. These relations remain to be established.

Although the subscales measuring Disintegration facets tend to form a factor independent of the FFM, if they capture only a narrow segment of behavior this may cast a doubt on the importance of Disintegration as an independent general disposition. Our strategy for selecting subscales/facets was oriented toward maximizing representativeness of the domain rather than the convergence of psychotic-like phenomena, was a safeguard against the psychological triviality of the extracted Disintegration factor. Actually, the adopted research strategy would not have worked if a disposition existing outside the FFM space had not strongly "attracted" this array of *prima facie* different behavioral indices.

4.3. Conceptual foundations of disintegration as a trait

While Big Five domains fit the traditional view of personality, i.e., representing adaptive aspects of functioning and underlying motivational forces, Disintegration seemingly encompasses only dysfunctional behavior. This apparent lack of adaptive value challenges the position of Disintegration as a personality trait. Answering this challenge, one influential view in the literature is that creativity might represent the adaptive aspect of disintegration phenomena (Carson, 2014; Eysenck, 1995). The evidence and arguments questioning this view also exist (Keller & Miller, 2006; Schlesinger, 2009), as well as an interesting attempt to reconcile these opposing positions (Simonton, 2014). Thus, the overall evidence on this hypothesis seems to be inconclusive.

We argue that Disintegration might have yet another adaptive potential. It might be viewed as a proneness to see and feel connections among unrelated phenomena (i.e., apophenia, magical ideation, and superstition are defining features of Disintegration). Similar to Big Five dimensions that are viewed as the result of a trade-off between different fitness costs and benefits (Nettle, 2006), we propose that individual differences in Disintegration tendencies can be understood as a trade-off between the risk of failing to exploit an existing causal relationship and the risk of exploring a causal relationship that does not exist. It was argued that natural selection would favor strategies that lead to frequent incorrect assignment of cause and effect to events, as long as the occasional correct response carries a large fitness benefit (Foster & Kokko, 2009). It is obvious that there is no unconditionally optimal value of the tendency to relate unrelated events. It might be beneficial whenever an individual is faced with the events whose relationship is ambiguous (e.g., moving grass that might indicate the presence of a predator) given that there is a high fitness benefit to assigning causality correctly (e.g., not being eaten by a predator). This tendency to relate unrelated events would be disadvantageous if it is possible to rationally determine causation by analyzing prior events, or if there is no ultimate survival value of assigning causality. Simulation studies have found that the tendency to see connections where they do not exist is more likely when its cost is low relative to the perceived benefits, and when the individual is prone to believe that the connection exists (Abbott & Sherratt, 2011). We see Disintegration as a continuum of variations in this proneness. The fluctuating optimal value of this tendency can explain why genetic diversity of disintegrative tendencies (Ericson, Tuvblad, Raine, Young-Wolff, & Baker, 2011) is retained during evolution (Nettle, 2006). This proneness can create a powerful motivational force visible, for example, in costly and elaborate superstitious rituals in humans, and also animals (Skinner, 1948). In conclusion, Disintegration can be seen as a tendency to "make many incorrect causal associations in order to establish those that are essential for survival and reproduction" (Foster & Kokko, 2009, p. 36). As explained above, we suggest that these variations are probably the result of mechanisms similar to those driving variations in other personality traits, i.e., balancing selection by environmental heterogeneity.

Furthermore, the normal distribution of the Disintegration score within the general population suggests that the individual differences in underlying mechanisms of Disintegration are probably similar to those operating in other personality traits (the skewness and kurtosis of Disintegration and its facets did not deviate from those of other traits and their facets). The normal distribution of a trait score assumes influences of many underlying factors (including genes) with small size effects acting independently of

each other. Such a model tends to produce, as described by the central limit theorem, normally distributed quantitative traits, thus favoring the dimensional view of psychosis proneness (Johns & van Os, 2001; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). The new evidence of polygenic inheritance of schizophrenia (Gejman, Sanders, & Duan, 2010) is in line with this view, pointing to the common roots of schizophrenia and variations in Disintegration-like phenomena.

4.4. Comparison with other models

Although theoretically similar, the structure of Disintegration bears little resemblance to Eysenck's (1995) Psychoticism, and has only slightly more in common with Claridge's (Mason et al., 1997) four-factor structure of schizotypy. The Oddity trait, proposed by Watson et al. (2008), is similar to our proposed factor in that it represents a wide Disintegration-like trait which lies beyond the FFM, but Oddity is less similar to Disintegration in terms of the lower order facets. In the model by Watson and colleagues, many aspects of Disintegration remain neglected in the Oddity domain, such as Somatoform Dysregulations, Depression, Mania, and Enhanced Awareness. The Psychoticism domain described by Krueger et al. (2012) is part of a maladaptive trait model, oriented more toward adequate representations of personality disorders, while our model focuses on normal personality variations. Their three aspects of Psychoticism, Unusual Beliefs and Experiences, Eccentricity, and Perceptual Dysregulation, are primarily comprised of the content of only two Disintegration facets, Perceptual Distortions and Magical Thinking. The similarity of our Disintegration factor with Andresen's (2000) Generalized Dysfunctional Personality is reflected in the fact that both models recognize psychosis proneness as a trait lying beyond the Big Five and demonstrate its mostly neglected broadness. However, the Disintegration factor in this study is different from both Andresen's (2000) Generalized Dysfunctional Personality and the structure named General Factor of Psychopathology, recently suggested by Caspi et al. (2014). Apart from charting the space differently, our model suggests that anxiety-related (aspects of internalization), antisocial (externalization), and anhedonic phenomena are better located outside the Disintegration domain, within N, A/C (or Honesty domain, if the HEXACO model is included, Ashton et al., 2012), and E domains respectively.

Compared to the influential five-factor models of schizophrenia, schizotypy and psychosis (published mostly in clinical, less personality-oriented, journals, and based not exclusively on self-report but also clinical ratings; for example, van der Gaag et al., 2006), the current model, although similar, has a more detailed specification of the positive and negative symptom factors. In the Disintegration model, the positive symptoms are represented by Perceptual Distortions, Paranoia, Somatoform Dysregulations, Magical Thinking, and Enhanced Awareness, and the negative symptoms are roughly represented by Flattened Affect (after discarding Social Anhedonia). The remaining three structures usually found in five-factor models – Depression, Mania (Excitement), and Disorganization – generally parallel those suggested by our model, where the first two have the same names, and General Executive Impairments factor corresponds to the latter.

4.5. DELTA as an assessment tool

In addition to its use for research purposes, the DELTA inventory is a psychometrically sound measure of Disintegration, which might supplement information being measured by instruments assessing the five (Big Five) or six basic personality traits (Big Five + Honesty). Although it can be used in clinical settings as a part of personality assessment, its primary purpose is to tap disintegrative variations in non-clinical populations. Several versions are available with the possibility of obtaining facet scores: full 114-, 50-, 20-, and 10-item versions (the last two not described here, but can be obtain upon request from the first author).

4.6. Study limitations

One of the limitations of this study is the fact that in evaluating the separation of Disintegration factor from the other basic personality traits we relied on FFM exclusively. To evaluate how different conceptualizations and operationalizations of the five personality traits would influence their correlations with the Disintegration factor, future studies should examine models other than FFM. Keeping in mind that there are criticisms regarding how some of the traits within FFM were conceptualized (Ashton et al., 2004), the inclusion of the models such as HEXACO (containing, along with the slightly differentially articulated Big Five traits, an additional one, named Honesty) might provide additional insight related to the position of Disintegration within the basic personality space.

Another limitation of the study is the fact that only parents, i.e., persons with high level of acquaintanceship with the targets, have been included as the informants in the Study 1. Since there is evidence that the agreement between the ratings and the target's self-ratings increases with the level of acquaintanceship (Paunonen & O'Neill, 2010), future studies should include informants who do not know targets so well (e.g., peer raters), to investigate how it will influence validity coefficients of Disintegration.

Given that our findings are obtained using Serbian samples, the absence of the evidence on their cross-cultural invariance could be considered another limitation of this study. In claiming that Disintegration is a personality trait, it is also important to demonstrate stability of the Disintegration score in time, comparable to the stability indices of other personality traits.

4.7. Conclusions

It seems that the strong convergence of 9 Disintegration facets and their separateness from Big Five traits, were not a consequence of: assessment method (self-report and ratings by close others), sample characteristics (students and the general population), units of analyses (facets and items), lower endorsement rate of some Disintegration items (causing their skewed distribution), acquiescent responding, scale length, or grouping or intermixing the Disintegration items with the items measuring other personality traits. In summary, it appears that the convergence of Disintegration facets (or items) and the extraction of the Disintegration factor beyond the FFM cannot be ascribed to some of the frequent common method biases (Podsakoff et al., 2003). What is then the reason that such different, even disparate behavioral patterns hold together, and separate from the Big Five personality traits? The most parsimonious explanation is that they are parts of a real, distinct, trait-like disposition – a disposition that is no less broad, robust, and relevant than other basic personality traits. It was suggested that the adaptive/motivational potentials of the tendency to irrationally assign causation (i.e., scoring high on the Disintegration continuum), lies in the fact that occasionally correct responses can carry a large fitness benefit in specific circumstances.

Open Practices

Data for the current study are publicly available on the site: https://osf.io/jxf5q/.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jrp.2017.06.001.

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