## Big Five<sup>©plus</sup> Re-Test. Or the Reliability of a Psychological Measure Derived from the Five Factor Model

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*Abstract*: Following a concise description of the well-known Five Factor psychological model and an explanation relating to why this model is important and useful for projects that aim at evaluating human personalities, the authors have described several relationships between this model's factors and: a). performance (both generic and specific performance types), and b). other relevant psychological dimensions. The following sections include a presentation of the premises and of the motivation supporting our independent construction of a personality-evaluation measure (i.e., the Big Five<sup>©plus</sup>), while also describing its design strategy and actual validation. The first stage of this empirical study (applied on a 302-subject panel-lot) led to the conclusion that the analyzed data distribution does not significantly differ from a normal distribution. During the second analysis stage, we examined the scores of the test-retest reliability procedure and concluded that these indicators are within acceptable limits (above the r = .70 threshold). We therefore concluded that our questionnaire is a stable, reliable one, and that it constantly measures the advanced dimensions proposed by the Five Factor Model.

*Key words:* personality, psychological evaluation, Five Factor Model, Big Five, test-retest reliability.

Despite the fact that the first systematic verbal evaluations of human personality can be traced back approximately 3,000 years to ancient China (Ben-Porah, 2003), the practice of assessing human personalities with the aid of standardised questionnaires began some 100 years ago, when Alfred Binet and Theodor Simon (1905) started to elaborate on a measure for estimating human intelligence. Initially centered on the evaluation of cognitive dimensions (mostly intelligence), only after the 1920s did psychologists attempt to identify individual differences in what the structural aspects of human personality are concerned. During and immediately after World War II, the general interest in evaluating human intelligence by using standardized measures increased tremendously, as did the number of variables that such measures targeted (Weiner & Green, 2008). Shortly afterwards, however, puzzled by a multitude of personality variables arising from various studies and unsatisfied by the many overlaps between these variables, as well as by the numerous problems concerning the reliability of evaluation methodologies themselves, psychological analysts began to wonder whether one can actually find a common thread among these variables, and whether human personality can be

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described by using a limited number of more comprehensive variables, identifiable through a more precise, incontestable methodology (Constantin et al., 2008). Over the past twenty years, however, such changes have triggered the convergence of factor-related research (branching off from the psychology of personality) and psycho-lexical studies headed towards the same general-factorial model of personality structure, namely the "Five Factor Model" (factorial approach), or the "Big Five Model" (lexical approach)<sup>1</sup>. This model puts forth five main personality factors — namely, *extraversion, agreeableness, conscientiousness, neuroticism,* and *openness* — dimensions that include the vast majority of (sub)factors forming the structure of human personality (Dimitriu & Constantin, 2010). Currently, there is a relative consensus among authors that the Five Factor Model is one of the most popular and thoroughly investigated models in contemporary psychology (Van der Linden, te Nijenhuis & Bakker, 2010; Zhao, Seibert & Lumpkin, 2010).

## 1. The Five Factor Model Factors and Their Relationships with Performance and Other Psychological Variables

*Conscientiousness* is the Five Factor Model factor most frequently associated with performance, whether we are referring to generic performance (Barrick & Mount, 1991; Tett, Jackson & Rothstein, 1991), academic performance (Noftle & Robins, 2007; Trapmann, Hell, Hirn & Schuler, 2007; Paunonen & Ashton, 2001), career-related and work-performance (Fong & Tosi, 2007), or business and managing performance (Zhao, Seibert & Lumpkin, 2010).

Although the connection between conscientiousness and performance is a highly stable one, having been highlighted in almost all fields of activity, this particular relationship is not the only one tackled here. Barrick & Mount (1991) identified a total of two Five Factor Model factors as being sufficiently linked to performance as to become valid predictors of it. Their research suggests that *conscientiousness* and *extraversion* are accountable for 22% and 13% of performance variation, respectively. A similar study (Tett, Jackson & Rothstein, 1991, apud. Hogan & Holland, 2001) revealed significant relationships between performance and all factors of the Five Factor Model, such as *extraversion* (r =

<sup>&</sup>lt;sup>1</sup> Throughout this article, we will employ the "Five Factor Model" formulation as a direct reference to the factorial approach which we too have embraced, and which we have resorted to in designing the Big Five<sup>®plus</sup> measure. Concurrently, we will, of course, present empirical data analyses.

(0.16) and *agreeableness* (r = 0.33). Such research quotes *extraversion* as a reliable predictor of job-performance in sales-agencies and as a valid indicator of training and managerial performance (Barrick & Mount, 1991), as well as of other similar variables.

While investigating the relationships between Five Factor Model factors, vocational interests and individual considerations on personal efficiency and *self-efficacy* (i.e., the degree of confidence regarding one's ability to accomplish a particular task or action), Margaret M. Nauta has pointed out significant, strong correlations between the five personality factors and all types of self-efficacy (in connection with vocational interests, self-efficacy may be *realistic, investigative, artistic, social, enterprising* and *conventional*); nine out of 30 derived correlations attained values equal to 0.30 or higher. *Openness* was positively correlated with all six dimensions of self-efficacy, *conscientiousness* with social, enterprising and conventional self-efficacy, social and enterprising types, *agreeableness* with social self-efficacy, while *neuroticism* proved to be negatively correlated to 'investigative' and 'enterprising' self-efficacy. This study has also shown that there exists a mediating effect of self-efficacy in what the relationships between Big Five personality factors and vocational interests were concerned (Nauta, 2004).

A study conducted by J. Bruce Tracey demonstrated that both *general intelligence* and *conscientiousness* are important predictors of employees' work-performance within the service-industries (e.g., restaurants). These individual characteristics differ in importance, according to the respective employees' personal work-experience level. Hence it was shown that general mental abilities designate a superior work-performance indicator for *new* employees, while conscientiousness is a better performance predictor in the case of more experienced employees (Tracey, Sturman & Tews, 2007).

McElroy and Dowd's (2007) experimental study highlighted the ways in which the Big Five *openness* personality factor influences what is known to be the psychological "anchor effect". Results have indicated that the participants who obtained high scores for *openness* (as opposed to those with lower scores) were more likely to become influenced by previously visualized stimuli (i.e., the "anchor" stimulus), when forwarding their evaluations. Subjects with higher openness scores were thus shown to be prone to anchor effects — which is to say that they have provided, in average, larger estimations of a river's length (the length of the Mississippi) (McElroy & Dowd, 2007).

Other researchers (Ang, Van Dyne & Koh, 2006) examined the connection between the Five Factor Model factors and the Four Factor Model regarding cultural intelligence (CQ — metacognitive, cognitive, motivational, and

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behavioural). Following regression analyses, significant correlations between *conscientiousness* and metacognitive cultural intelligence were established, as well as between: *agreeableness, neuroticism* and behavioural cultural intelligence, between *extraversion* and cognitive, motivational and behavioural cultural intelligence. Interestingly enough, the study has also shown that openness is the single personality factor significantly linked to all four aspects of cultural intelligence. That is to say openness is a personality trait linked with a person's potential for efficient functioning / adapting in different cultural environments (Ang, Van Dyne & Koh, 2006).

Wood and Roberts (2006) investigated the effects of age- and gender/social roles on the creation of expectations regarding the five main personality traits of the Five Factor Model. In two separate studies, these authors analyzed the roles associated by society to teenagers', students', parents' and grandparents' age(s), concluding that the general population's expectations towards these age categories are relatively unitary and subscribe to the theoretical model describing the development of personality traits. In the case of two additional experimental studies, the scientists supplied the participating subjects with age- and gender/social-related key information (concerning, for instance, notions such as motherhood or parenthood), in the end discovering that individuals independently use this information when creating expectations about other people (Wood & Roberts, 2006).

Lounsbury et al. (2003) have looked into the relationships between personality traits and career satisfaction levels, while analyzing a number of 5932 subjects (divided into 14 occupational groups). The researchers highlighted the fact that three main factors of the Five Factor Model correlate with career-satisfaction (conscientiousness, extraversion and openness), as well as with specific traits such as assertivity and an occupational predilection to client-services and human resources management positions. The correlations between career satisfaction and the Five Factor Model's factors proved to be of medium values: conscientiousness registered r = 0.25 over the entire population (0.27 in case accounts, 0.27 in client services, 0.24 in engineering/sciences, 0.29 in human resources, 0.24 in information technology, 0.26 in general management, 0.20 in marketing); extraversion: r = 0.22 over the entire population (0.24 in accounts, 0.24 in consultancy, 0.34 in client services, 0.27 in human resources, 0.24 in information technology, 0.20 in marketing, 0.21 in sales. Regression analysis has indicated that three personality traits (sub-factors of the Five Factor Model) were constantly connected to career satisfaction - namely, emotional resilience, optimism and *work perseverance* — which predicted 17% of the career satisfaction variance. (Lounsbury et al., 2003).

Another study, signed by Roccas, Sagiv, Schwartz & Knafo (2002), analysed 246 students and linked the Five Factor Model personality traits with various personal values. As anticipated, *agreeableness* was strongly correlated with traditional values and kindness, *openness* with universal and self-directive values, while *conscientiousness* proved to be linked to the need for personal development and conformity. Conversely, the values and personality traits analyzed via the NEO-PI-R measure have emphasized different correlational patterns in what religiousness and positive effects are concerned (Roccas, Sagiv, Schwartz & Knafo, 2002).

A study conducted by Lodi-Smith and Roberts (2007) confirmed the fact that there exists a correlation between work-involvement, religiousness, family, voluntary activities involvement and personality traits corresponding to the Five Factor Model. More precisely, both work- and family-involvement have been positively correlated with *agreeableness*, *conscientiousness* and *emotional stability*.

During a 2009 research applied to a Romanian sales-firm (132 subjects comprised of sales-agents and sales coordinators/directors), our Big Five plus measure was implemented in order to examine which of the five personality factors (or their sub-factors) would be able to serve as predictors of high levels of sales-performance (Dimitriu & Constantin, 2010). In what sales-directors/ coordinators were concerned, there existed high correlations between the variable sales-performance (i.e., a composite index number attributed to every employee during a yearly evaluation) and the variables *sociability* (r = 0.61) and *level of* activism (r = 0.61), both sub-factors of the Five Factor Model extraversion dimension. At least in what the analysed firm was concerned, individuals working in upper management positions required a high level of sociability (i.e., they needed to communicate freely, to be expansive and be surrounded by stimulating people), but were also asked to be active and employ a dynamic, alert, multi-tasking work rhythm. In the case of simple sales-agents, the two variables belonging to the main factor *extraversion* maintained their privileged position within the correlational hierarchies related to sales-performance (for *sociability* r = 0.34; for *level of activism*, r = 0.44); aside from these, significant correlations were registered for three *conscientiousness* sub-factors (*personal efficiency*, r = 0.34; ambition/need for self-accomplishments, r = 0.35; perseverance, r = 0.27), and two factors of *openness* towards new experiences (*intellect*, r = 0.25; *imagination*, r = 0.25; *i* 0.35). Furthermore, this study has put forth valid models of predicting sales-performance, by using both the five main factors of the Five Factor Model, and their sub-factors / various facets (Dimitriu & Constantin, 2010).

One may go on and quote many more similar studies that link the main factors of the Five Factor Model with various other psychological and social variables — in fact, the number of these kind of studies remains astonishingly large.

## 2. Big Five<sup>©plus</sup> Construction and Validation

# 2.1. Premises and Motivation behind Big Five $^{\bigcirc plus}$ 's Independent Construction

It is evident that the Five Factor Model is scientifically regarded as coming as close as possible to exhaustively understanding human personality, allowing for frequent linkages between personality variables and generic or specific types of performance. Moreover, various implementations of this model, such as those proposed by Goldberg (1999) or Costa and McCrae (1987), present a detailed image of the many facets (sub-factors) of the main five factors, therefore making it possible for scientists to establish discriminative and detailed personal profiles of the analyzed subjects. For instance, Goldberg's model (1999) includes six facets for each of the factors, generating a genuine 'x-ray' of an individual's personality via no less than 30 sub-factors / facets (Constantin et al., 2008).

Considering that the above-quoted model is a reference in the field (directly quoted by numerous studies analyzing the variables related to professional performance), we have decided to refer to it when engaging in the development of our independent, Five Factor Model-based measure; what further motivated us was the fact that, at that particular moment (2007), similar valid projects were lacking.

#### 2.2. Big Five©plus: Stages of Construction and Design

The first steps in developing the Big Five<sup>©plus</sup> model were taken in the autumn of the year 2007. A group made up of seven experts, members of the E-team project<sup>2</sup>, began analyzing the model proposed by Goldberg (1999) in order to become familiarized with this particular description of the five main factors. We chose Goldberg's variant due to its notoriety, as well as its specificity — as noted

<sup>&</sup>lt;sup>2</sup> *The E--team* is a mixed research group, including students, tutors and alumni from the "Alexandru Ioan Cuza" University's Faculty of Psychology and Educational Sciences. Currently, it includes over 45 active group members, sharing a research portfolio that places the Five Factor Model project under the umbrella of developing various personality-evaluation measures (more details are available at: <u>http://www.eteam.lx.ro</u>).

in the previous paragraphs, each of the five personality 'super-factors' are described by Goldberg via six additional, distinct sub-factors.

This model's particularities determined us to opt for a sequential approach towards the construction of our measure, by separately analyzing and operationalizing each factor. One preliminary condition in designing our instrument was to make all of the measure's future items concern or describe behaviours and situations relevant both to the specifically analyzed facet / sub-factor, as well as to the main 'super-factor'. Secondly, we were careful to firmly differentiate between the various sub-facets, avoiding any possible 'overlaps', despite the occasional strong similarities between the theoretically described variables. Thirdly, we were determined to avoid, in practical terms, any social desirability bias in what prospective answers to our future questions were concerned. In this sense, we opted for designing the items as affirmations offering two response possibilities; the analyzed subjects would thus be asked to choose the narrative continuation that would best suit their style, attitude, or mental framework (Constantin et al., 2008).

Throughout the entire process of item construction, we have been cautious not to provide answer variants which would be more, or less desirable than their counterparts. Added to these standards was the attention paid to clear, simple, non-equivocal item formulations. The primary stage of the item design was complemented by later reviews, re-formulations and corrections; for each of the five main factors, we have been thus working with over 200 items. At the end of individual analyses, we retained 60 items for each Five Factor Model factor, and 10 items for each of the main factors' six (sub)facets.

The final variant of our measure's first version proposed a total of 306 items, with each of the five main factors (*extroversion, agreeableness, neuroticism, consciousness* and *openness*) entailing 60 items, plus a series of 6 supplementary items for a specific sub-factor, which we have additionally identified (and which is absent from Goldberg's model), namely *perfectionism*.

The Big Five<sup>©plus</sup> questionnaire, in its 306-item version, was applied during the spring of 2008 on a group of 258 subjects. Following a reliability analysis (Alpha Cronbach, internal consistency), we found that each of the measure's five main factors provided Alpha Cronbach coefficients above the 0.70 threshold (see Table 1).

<i>able 1</i> . Internal consistency coefficient	is, big rive (500 helli version
Big Five <sup>©plus</sup> 306 factors	Alpha Cronbach
Extroversion	.925
Agreeableness	.831

Table 1. Internal consistency coefficients, Big Five<sup>©plus</sup> (306 item version).

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Neuroticism	.820
Consciousness	.834
Openness	.861

Although all five main factors registered very high internal consistency levels for both versions of the measure (the 240 and 150 item variants, respectively), the sub-factors' internal consistency was not as good as anticipated for each individual sub-factor. Another problem that we had to face during this process was the fact that the main factors proved to correlate (with each other) within the measure — while in general, Five Factor Models are not supposed to generate correlations between the five main variables.

Taking all of these findings into account, in October 2008 we have proceeded to reformulate the items in order to optimize the measure's reliability parameters. In this sense, maintaining a high internal consistency coefficient for each of the 30 factors of our instrument was only a secondary criterion in deciding which items to preserve in later versions of the questionnaire. Principal criteria for selecting and redefining the final items were: *correcting the existing correlations* between the main factors or between their various facets; optimizing the *differentiating capacity* of each item and optimizing each factor's *content validity*. Resulting from this analytic, reformulating process was an upgraded version of the questionnaire (Big Five<sup>©plus</sup> 209), with a total of 240 items; each of the five main factors included a total of 48 items, while each facet was described by 8 items. This upgraded version has been applied in January 2009 on a group of 511 subjects.

At this point, we have re-engaged in the internal consistency analysis for each factor, while also trying to combine the procedure with a parallel examination of each item's discrimination capacity, with the ultimate purpose of establishing a 150-item version of our measure. Table 2 displays the internal consistency analysis results of the 2009 version (Big Five<sup>©plus</sup> 240), as compared with the 2008 version (Big Fve<sup>©plus</sup> 306).

Big Five <sup>©plus</sup> factors	Alpha Cronbach			
	Big Five <sup>©plus</sup> 306	Big Five <sup>©plus</sup> 240		
Extroversion	.925	.902		
Agreeableness	.831	.805		
Neuroticism	.820	.812		
Consciousness	.834	.805		
Openness	.861	.785		

*Table 2.* Comparative Internal Consistency coefficients for the 240-item version of the Big Five<sup>©plus</sup> Measure.

Having successfully checked the content validity and internal consistency levels, we then set forth to examine how "normal" the measure's (240-item version) factor distribution presented itself, as well as to proceed with a test-retest reliability analysis. Only then were we able to plan a testing of our measure's concurrent validity, by applying the Big Five<sup>©plus</sup> 240 questionnaire together with similar, valid measures (Constantin et al. 2010, unpublished).

## 3. The Big Five<sup>©plus</sup> (240-Item Version) Measure: How Well Does it Score? An Analysis of Its Psychometric Qualities

Our analysis was derived from a panel group of 302 individuals, the same subjects who had filled in the questionnaire 6 months earlier. From an age-dispersion point of view, respondents were ranged between 15 and 77 years of age (medium = 34, 96, standard deviation = 11.55). Women constituted 55.6% of the group's population, while men — 38.1%; in what education was concerned, 1.7% of all participants had only secondary level studies, 54.6% had passed the baccalaureate, and 39.7% had university degrees. From those employed, 44% worked in public institutions, while 32.1% in private firms, mostly in the service sector (47,4%), and fewer engaged in production (7.9%) or strictly commercial (6.6%) activities. From an income-related point of view, the income distribution levels ranged within 300-500 Euro (28.5% of participants), closely followed by the 200-300 Euro (23.2%), and 100-200 Euro (18.9%) thresholds, respectively.

## 3.1. Analyzing the Factors from a Data Distribution Perspective (the Distribution's 'Normality')

Prior to beginning a statistical check of the test-retest reliability, we set forth to verify the degree of our measure's factors' distribution 'normality'. To this end we resorted both to descriptive statistics (minimum, maximum, medium, standard deviation, skewness and kurtosis indicators), and to the Kolmogorov-Smirnov non-parametric test, so as to compare our data distribution with that of a normal one.

As can be observed in Table 3, the variable *extroversion-test* is statistically described as follows: 0.08 minimum, 0.96 maximum, 0.49 medium with a 0.18 standard deviation, skewness = 0.08, kurtosis = -0.42. The KS test registered a  $d_{(268)} = 0.64$  value, where p = 0.80, which indicates that the data distribution from our group does not significantly differ from a normal one. Similarly, the statistical parameters of the *extraversion-retest* variable and its KS test ( $d_{(271)} = 0.86$ , p = 0.45) confirm a normal distribution of the analyzed data.

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One-Sample Kolmogorov-Smirnov Test				
Variable name	KS value	р	Ν	
Extroversion Test	.643	.803	268	
Extroversion retest	.860	.451	271	
Agreeableness Test	.778	.581	272	
Agreeableness Retest	1,126	.158	272	
Consciousness Test	.859	0.452	273	
Consciousness Retest	1.279	.076	288	
Neuroticism Test	1.217	.104	273	
Neuroticism Retest	1.238	.093	273	
Openness Test	1.505	.022	276	
Openness Retest	1.320	.061	276	

Table 3. Statistical parameters of the Big FiveStatistical parameters of the Big Fiveagreeableness, consciousness, neuroticism and openness factors.

The *agreeableness-test* variable entails a similar statistical description (Table 3), while its KS test results ( $d_{(272)} = 0.77$ ; p=0.58) show that the data distribution for our analyzed group is also a normal one. Similarly, the statistical parameters of the *agreeableness retest* value, as well as the KS test levels show that the data distribution in question does not significantly differ from a normal distribution ( $d_{(302)} = 1.12$ ; p = 0.15).

Concurrently, the *consciousness* and *neuroticism* variables (both *test* and *retest*) were described (Table 3) by normal-distribution statistical parameters (including the KS test results):

A more particular case was that of the *openness test* variable (minimum = 0.19, maximum = 0.90, medium = 0.47, with a standard deviation of 0.13, skewness = 0.66, kurtosis = 0.41). Its KS test indicated that our data distribution significantly differs from that of a normal one ( $d_{(276)} = 1.50$ ; p= 0.02). Considering these results, we have consequently checked for abnormal scores among the variable's values, since we preferred not to engage in any data transformations at this point. By producing a "*steam and leaf*" chart, we observed several abnormal values, as compared with the rest of registered values. We therefore created a filter to eliminate the values above 0.85. A thus repeated KS test has revealed a  $d_{(270)} = 1.19$ , where p = 0.11 — a result which we deem acceptable, and which permitted us not to perform additional data-transformations, which might have affected the credibility of our reliability results. In what regarded the *openness retest* (Table 3) variable, both the preliminary statistical data and the KS test values indicated that our data distribution does not significantly differ from a normal one (d <sub>(270)</sub> = 1.32; p = 0.06).

#### 3.2. Test-Retest Reliability Analysis

Reliability is the first and foremost condition that a standardized questionnaire needs to fulfill (Constantin, 2004), referring to the extent to which such an instrument measures certain psychological attributes, in a systematic and repeated manner (Walsh & Betz, 2001). In other words, it designates a test's precision in assessing certain psychological traits (Havârneanu, 2000). Up until this stage of research, we used two out of three methods of examining a measure's reliability, namely the "inter-item consistency" method, and the "split half" method. The former involves checking the degree of 'homogeneity' of each item within a factor, while the latter evaluates the internal consistency / one-dimensional character of the factors) — both obtaining very good Alpha Cronbach coefficients.

To analyze the most important indicator of our measure's stability (the test-retest reliability), and since we considered our data distribution to be a normal one (as previously explained), we made use of the Pearson correlation method. In general, a measure's test-retest reliability levels are considered very good if the correlation coefficient between the values obtained during two successive applications of the questionnaire is above the 0.80 level; if this value exceeds a 0.70 threshold, the results are also considered reasonably good (Balicco, 1998). Table 4 presents the correlation coefficients' values that we obtained following the measure's two successive applications (at a 6 month interval).

Pearson Correlations					
	test Extroversion	test Agreeableness	test Neuroticism	test Consciousness	test Openness
retest_ Extroversion	<u>0.74</u> **	037	271**	144*	.311**
retest_Agreeableness	003	<u>0.67<sup>**</sup></u>	.047	093	.089
retest_ Neuroticism	325***	.116	<u>0.77<sup>***</sup></u>	147*	240***
retest_ Consciousness	112	058	169**	<u>0.72<sup>**</sup></u>	124*
retest_ Openness	.387**	.045	196**	130*	<u>0.71<sup>**</sup></u>

*Table 4*. Big Five<sup>©plus</sup> (240) questionnaire's *correlations scores*, as obtained during two successive applications.

Note:  $* \le .05, **p \le .01$ .

As can be observed above, the statistical data indicate that our measure's reliability did not succeed in surpassing the 0.80 value, so as to be considered *very* good. It however proves that we have inscribed ourselves within *reasonable reliability limits* (above the .70 threshold, with the exception of the *agreeableness* factor). Considering that this measure evaluates human personality based on the

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answers provided by the questioned subjects themselves (self-analysis), it is possible that a bias (intentional or not) towards desirable answers might have contaminated the data. Furthermore, the questionnaires were administered by students, which means that a proper control of the exact application methods could not be established.

To conclude, after evaluating the Big Five<sup>plus</sup> questionnaire's reliability indicators, we can safely affirm that the test which we designed is a stable, trustworthy instrument which constantly measures the dimensions that we linked to the main factors of the Five Factor Model. Evidently, we wish to confirm the measure's test-retest stability in a more controllable environment, and on a representative sample of the general population. This will constitute our (next) step, to be taken after we will have implemented a set of already-planned modifications (the measure is constantly being refined and updated), and after another preliminary verification of the questionnaire's reliability indicators.

### 4. Strategies for Confirming Big Five<sup>©plus</sup>'s Reliability Indicators

Reliability is a necessary, yet not sufficient attribute of a valuable questionnaire. To verify the more generic validity of the measure, that is to say the degree to which each factor precisely evaluates the psychological trait or dimension it aims to examine (*extraversion, agreeableness, consciousness, neuroticism* and *openness*), we have already initiated a series of projects that aim to check our measure's concurrent- and criterion-related validity (construct validity was already confirmed by the authors of the Five Factor Model itself, while content validity was verified by us during various stages of our instrument's design).

In one of our (still ongoing) studies, we have chosen to apply, in parallel with our independently designed *Big Five*<sup>©plus</sup> measure, three other popular psychological questionnaires (inspired from the same Five Factor Model) — namely, the *DECAS Questionnaire* (Sava, 2008), the *I.P.I.P. Questionnaire* (Goldberg, 1999) and the *NEO PI-R Personality Inventory* (Costa & McCrae, 1987). In this sense, preliminary results (i.e., confirmatory factorial analysis) allow us to assert that our *Big Five*<sup>©plus</sup> instrument evaluates the five main factors proposed by the Five Factor Model at least as efficiently as do these other three popular instruments, which we have deemed and regarded as comparing standards. In a forthcoming study (Constantin et al., 2010), we will provide supplementary details on the *Big Five*<sup>©plus</sup>'s validity indicator, as well as on the details related to *Big Five*<sup>©plus</sup>'s factorial model description.

#### **Reference List**

- Ang S., Van Dyne L., Koh C. (2006). Personality correlates of the Four-Factor Model of Cultural Intelligence. Group & Organization Management, 31(1), 100-123.
- Balicco, C. (1998), Les méthodes d'évaluation en ressources humaines : la fin des marchands de certitude, Les Éditions
- d'Organisation.Barrick R M. & Mount K. M. (1991). The Big Five Personality Dimensions and Job Criteria Performance: a Meta-analysis. *Personal Psychology*, 44(1), 1-26.
- Ben-Porath Y. (2003). Assessing personality and psychopathology with self-report inventory. In *Handbook of Psychology vol 10 Assessment Psychology* (pp. 554-558), Donald K. Freedheim (Editor), Irving B. Weiner (Editor-in-Chief), John Wiley & Sons New Jersey
- Constantin T., (2004), *Evaluarea Psihologică a personalului*, Editura Polirom, Iași, (290 p.)
- Constantin T., Macarie A., Gheorghiu A., Iliescu M., Fodorea A. Caldare L. (2008). Chestionarul Big Five<sup>©PLUS</sup> – rezultate preliminare. In M. Milcu (Ed.) *Cercetarea Psihologică Modernă: Direcții și perspective*, (pp. 46 – 58), București: Editura Universitară vol. 2.
- Constantin T., . Macarie A., Gheorghiu A., Iordache A., Potlog C., (2010), Chestionarul Big Five<sup>©plus</sup> - date relevante ale validității concurente. In the volume of the conference *Conferinta Internationala de Psihologia Muncii, Industriala si Organizationala "Al. Rosca"*, 22-24 Aprilie 2010 (in press).
- Costa, P.T., & McCrae, R.R.(1987). Neuroticism, somatic complaints, and disease: Is the bark worse than the bite? Journal of Personal., 55, 299-316
- Dimitriu F. & Constantin T. (2010). Factori predictivi ai performantei personalului de vânzări. În the volume of the conference *Cercetarea modernă în psihologie: Cercetări cantitative vs. Cercetări calitativ*, Sibiu - Păltiniş, May, 21<sup>st</sup> – 23<sup>rd</sup>, (in press).
- Fong, E. A., Tosi, H.b L. Jr (2007). Effort, Performance and Conscientiousness: An Agency Theory Perspective. *Journal of Management*, April 1, 2007; 33(2): 161 - 179
- Goldberg, L. R. (1999). A broad-bandwith, public-domain, personality inventory measuring the lower-level facets of several Five-Factor models. In I. Mervielde, I. J. Deary, F. de Fruyt, & F. Ostendorf (Eds.). Personality psychology in Europe (Vol. 7, pp. 7–28). Tilburg: Tilburg University Press.
- Havârneanu, C. (2000). Cunoașterea psihologică a persoanei, Iași, Polirom.
- Hogan, J., Holland, B. (2001). Personality Theory and Job Performance: Using Theory to Evaluate Personality and Job Performance Relations. A Socioanalytic Perspective. In *Hogan Assessment Systems*, <u>www.hoganassessments.com/ HoganWeb/</u> <u>documents/JAP%20Personality-Performance%20Meta-Analysis.PDF</u>, internet paper, 30. 09. 2008.
- Lodi-Smith J., & Roberts B.W. (2007). Social Investment and Personality: A Meta-Analysis of the Relationship of Personality Traits to Investment in Work, Family,

Religion, and Volunteerism. *Personality and Social Psychology Review*, Vol. 11, No. 1, 68-86.

- Lounsbury J. W., Loveland J. M., Sundstrom E. D., Gibson L. W., Drost A. W., Hamrick F. L. (2003). An investigation of personality traits in relation to career satisfaction. *Journal of Career Assessment*, 11(3), 287-307.
- McElroy T., Dowd K. (2007). Susceptibility to anchoring effects: How oppeness-toexperience influences responses to anchoring cues. *Judgment and decision making*, 2(1), pp. 48-53.
- Nauta M. M. (2004). Self-efficacy as a mediator of the relationships between personality factors and career interests. *Journal of Career Assessment*, 12 (4) 381-394.
- Noftle E. E. & Robins W. R. (2007). Personality Predictors of Academic Outcomes: Big Five Correlates of GPA and SAT Scores. *Journal of Personality and Social Psychology*, 93, (1), 116–130.
- Paunonen S. V., Ashton M. C. (2001). Big Five Predictors of Academic Achievement. Journal of Research in Personality, 35, 78–90.
- Roccas S., Sagiv L., Schwartz S. H., Knafo A. (2002). The Big Five Personality Factors and Personal Values. *Personality and Social Psychology Bulletin*, Vol. 28, No. 6, 789-801.
- Tett R.P., Jackson D.N., Rothstein M. (1991). Personality measures as predictors of job performance: A meta-analytic review. *Personnel Psychology*, 44, 703-742.
- Tracey J. B., Sturman M. C., Tews M. J. (2007). Ability versus Personality: Factors that predict employee job performance. *Cornell Hotel and Restaurant Administration Quarterly*, vol. 48, no. 3, 313-322.
- Trapmann S., Hell B., Hirn, J.O.W., Schuler H. (2007). Meta-Analysis of the Relationship Between the Big Five and Academic Success at University. *Journal of Psychology*, 215 (2) 132–151.
- Walsh, W. B., & Betz, N. E. (2001). *Tests and assessment* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Van der Linden D., te Nijenhuis J, Bakker A. B. (2010). The General Factor of Personality: a Meta-analysis of Big Five intercorrelations and a criterion-related validity study. *Journal of research in personality* (in press).
- Weiner B. I., Green L R. (2008). History of Personality Assessment. In Handbook of Personality Assessment (Irving B. Weiner & Roger L. Greene, Eds.), New Jersey: John Wiley & Sons pp. 677
- Wood D., Roberts B. W. (2006). The effect of age and role information on expectations for Big Five personality traits. *Personality & Social Psychology Bulletin*, vol. 32, no. 11, 1482-1496.
- Zhao H., Seibert S.E., Lumpkin G.T. (2010). The Relationship of Personality to Entrepreneurial Intentions and Performance: A Meta-Analytic Review. *Journal of Management* 36 (2) p. 381 – 404.