



## The higher-order factors of the Big Five as predictors of job performance

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### ABSTRACT

Despite the fact that the relationship between the Big Five personality traits and job performance has been widely investigated, no study has focused on the criterion validity of Stability and Plasticity, the two higher-order factors of personality. The current research aims to fill this gap in the literature by relying on a hierarchical model that includes both the Big Five and their higher-order factors. Two studies were conducted among incumbents working for an insurance company ( $n = 101$ ) and security agents ( $n = 201$ ). Stability (but not Plasticity) accounted for variance in job performance beyond that accounted for by measures of the Big Five.

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The affirmation of the Big Five model (i.e. Extraversion/Energy, Agreeableness, Conscientiousness, Emotional stability and Openness/Intellect) as one of the most influential description of personality structure (Goldberg, 1993) has bolstered the interest of practitioners and researchers in the field of Industrial and Organizational Psychology for personality assessment (but see Block, 1995 for a different perspective). The understanding of how personality is related to Job Performance (JP) is important for personnel selection and theories linking individuals' characteristics to organizational behavior. Considerable meta-analytical evidence has suggested that JP is associated with conscientiousness and, to a lesser extent, with emotional stability across different occupational groups (Barrick, Mount, & Judge, 2001; Salgado, 1997). Empirical findings supported the incremental validity of these traits over measures of general mental ability (GMA) (Dunn, Mount, Barrick, & Ones, 1995). The traits of extraversion and agreeableness have also been shown to be predictive of JP, although only for specific occupations or performance criteria (Barrick et al., 2001; Salgado, 1997). The Big Five (BF), however, may not represent the highest level of generality at which the association between personality and JP can fruitfully be examined. In the present study, we examined the role of personality in predicting JP using a hierarchical model that incorporates the BF and their higher-order factors.

Although the BF were initially conceived as orthogonal traits (Costa & McCrae, 1995; Goldberg, 1993), factor analysis has demonstrated that two higher-order factors, or metatraits, exist above the BF (DeYoung, 2006; DeYoung, Peterson, & Higgins, 2002; Digman, 1997). These factors were labelled as *Stability* (or Alpha), which reflects the shared variance of Emotional stability, Agreeableness and Conscientiousness, and *Plasticity* (or Beta), which reflects the shared variance of Extraversion and Openness. Both

these factors have been shown to have a genetic basis (Jang et al., 2006; McCrae et al., 2008). Stability appears to reflect stable functioning in emotional, motivational, and social domains, whereas Plasticity appears to reflect the tendency to explore the environment, both behaviorally and cognitively.

The relations between JP and personality can be conceived in terms of the metatraits for several reasons. First, the fact that Agreeableness, Conscientiousness, and Emotional stability are associated with JP may suggest a role for Stability. In this regard, Ones, Viswesvaran, and Schmidt (2003), argued that “the conglomeration of these three personality constructs [i.e. conscientiousness, agreeableness, and emotional stability] corresponds to Digman (1997) factor alpha [Stability] (i.e., the socialization second-order factor of personality—a higher-order factor than the Big Five) and is particularly relevant in the prediction of behaviors at work (p. 23)”. They also speculated that: “scoring high on this higher-order personality trait would predict a whole spectrum of work behaviors, from avoiding drug and alcohol use, to engaging in appropriate customer service behaviors from dealing with stress well to not stealing, from avoiding absenteeism to actually being a stellar overall performer on the job” (Ones & Viswesvaran, 2001, p. 37). It is difficult to advance similar arguments for Plasticity. Whereas extraversion has proved to be a relevant predictor of JP only for specific occupational groups, for example for those which require leadership or teamwork abilities (Barrick et al., 2001), openness has shown inconsistent or even negative correlations with JP. At the best, it seems arguable that Plasticity will be related to JP only for jobs which require agentic qualities.

A different argument for expecting that Plasticity and Stability would be related to JP is that measures of JP are general in nature (Hogan & Roberts, 1996; Ones & Viswesvaran, 1996). According to the correspondence principle (Fishbein & Ajzen, 1975), the generality of typical JP criteria (e.g. overall or average performance) calls for similarly broad trait measures (Ones & Viswesvaran, 1996; Ones, Viswesvaran, & Schmidt, 1993). Since organizational criteria are often

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broad and complex (Ones & Viswesvaran, 1996), one may expect that broad personality traits should have higher criterion validity than specific and narrow traits. Obviously this does not negate the possibility that, to a certain extent, JP can be related also to the single BF. A relationship between JP and a first-order component (for example conscientiousness) is indeed conceivable also in the presence of a significant influence of the respective higher-order dimension (Stability). This relation would represent the influence of the unique part of conscientiousness that is not explained by Stability (i.e. that is not shared with the other first-order components). On the other hand, the variance shared by the metatraits components may play a role in the prediction of JP, over and above the specific variance of each BF. Furthermore, one should not underestimate results from other studies (Ashton, 1998; Schneider, Hough, & Dunnette, 1996) which have highlighted the risk that complex predictors may dilute important variance in more specific facets. Empirical findings are still lacking in this regard. To the best of our knowledge, no study has examined the link of Stability and Plasticity with JP, as well as their incremental validity over and above the BF traits.

In this contribution, we present two studies aimed to investigate the competitive value of Stability and Plasticity with respect to the BF in the prediction of JP. In both studies Stability and Plasticity were used to predict objective performance, which is the type of criteria on which personnel decisions are based (Robie & Ryan, 1999). In the first study, the incremental value of the metatraits over the BF was tested in a sample of sales representatives. In the second study we tried to replicate our results using a sample of security guards. Arguably, the personality profile required to achieve success in these two jobs are quite different. For example, social abilities and extraversion (associated with Plasticity), may be important for a social profession such as being a salesman, but less important, or not important at all for a security guard. Since both jobs require workers to be responsible, scrupulous, emotionally stable, and, to a certain extent, agreeable, one may expect that Stability would predict JP in both samples. The link between Plasticity and JP, instead, could emerge for salesmen only (study 1), for which personality characteristics like extraversion, social competence, and interpersonal effectiveness may also be desirable.

## 1. Study 1

From a psychometric perspective, Stability and Plasticity represent two multidimensional constructs (Edwards, 2001), as they refer to several distinct but related dimensions (i.e. different combinations of the BF) treated as assessing two distinctive, higher-order, theoretical concepts (Law, Wong, & Mobley, 1998). The validity of multidimensional constructs should be submitted to the same empirical tests as standard psychological constructs (Edwards, 2001; MacKenzie, 2003). Accordingly, in this study we empirically tested the relations of the BF and their higher-order factors with JP using two models. In the Big Five Model (BFM), five latent traits were modeled as latent variables predicting JP. In the Stability-Plasticity model (SPM), two higher-order factors were modeled. The first (Stability) loaded by conscientiousness, emotional stability, and agreeableness, and the second (Plasticity) loaded by energy and openness. We evaluated the predictive value of both models, using the criteria to compare correlated construct models (i.e. the BFM) with multidimensional construct models (i.e. SPM) proposed by Edwards (2001).

## 2. Method

### 2.1. Participants and procedures

Participants were one hundred and one sales representatives, working for a national insurance company. The mean age of

participants was 39.81 (SD = 7.3). Data on the BF were collected in January 2007, during specific testing sessions organized by a local section of the company, located in Rome. All participants were advised through informed consent that performance evaluations would not be affected by their decision to participate. Performance data were gathered from the human resources department at the end of the same year.

### 2.2. Measures

#### 2.2.1. Big Five

Personality traits were measured through a short version of the Big Five Questionnaire (BFQ, Caprara, Barbaranelli, & Borgogni, 1996). The BFQ contains 60 items that form five domain scales (Extraversion/energy, Agreeableness, Conscientiousness, Emotional stability, and Openness), and 10 “facet” scales, with six items on each scale. The response scale of the items varied from 1 (very false for me) to 5 (very true for me). Cronbach’s alpha coefficients ranged from .73 (Extraversion/energy) to .88 (Emotional stability).

#### 2.2.2. Job performance

Individuals’ performance evaluations were obtained from the human resources department records. These data were supplied by the organization, and are part of the standard evaluation process. They consisted of a composite index comprising both objective data (i.e., number of sales) and supervisors’ subjective evaluations, as prescribed by the company’s performance appraisal procedure. This index ranged from 1 (low performance) to 3 (high performance).

### 2.3. Statistical analyses

The hypothesized models were tested by means of *Mplus* 4.01 (Muthén and Muthén, 1998–2008). We used WLSMV as the method of estimation, which is particularly suited for dealing with non-normal or categorical data (Flora & Curran, 2004). It provides weighted least square parameter estimates which rely on a diagonal weight matrix with robust standard errors and mean and variance adjusted chi-square test statistics (see Muthén and Muthén, 1998–2008). All models were evaluated following current standards (Kline, 2008; Muthén and Muthén, 1998–2008): CFI and TLI > .95, RMSEA < .06, and WRMR < 1.00.

### 2.4. Modeling strategies

We tested two models. In the BFM the five traits are posited as latent variables loaded by the respective facets. The BF were allowed to correlate. In the SPM we added Stability and Plasticity as second-order factors. The chi-square difference test was used to compare the fit of these two nested models. If the more parsimonious SPM demonstrated a fit equal to that of the BFM, we evaluated: (a) the contribution of Stability and Plasticity to JP, and (b) the incremental contribution of each single BF, over and above their higher-order factors. To this aim, we used a structural equation model where the specific effects, stemming from each of the BF, were conceptualized as the paths linking JP to the disturbances of the first-order personality factors (see Bentler, 1990).

## 3. Results and discussion

### 3.1. Descriptive statistics

Correlations, means, and standard deviations for the ten facets of the BFQ are presented in Table 1. Both facets of Conscientiousness and Agreeableness were highly correlated with JP. Significant

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