



# It depends how you look at it: On the relationship between neuroticism and conscientiousness at the within- and the between-person levels of analysis

Nadin Beckmann<sup>a,\*</sup>, Robert E. Wood<sup>b,1</sup>, Amirali Minbashian<sup>a,2</sup>

<sup>a</sup> Accelerated Learning Laboratory, Australian School of Business, University of New South Wales, Sydney, NSW 2052, Australia

<sup>b</sup> Accelerated Learning Laboratory, Melbourne Business School, University of Melbourne, 200 Leicester Street, Carlton, Vic. 3053, Australia

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## ABSTRACT

Research on personality structure has primarily focused on patterns of covariation between traits, and less emphasis has been put on the organization of relationships between thoughts, feelings and behaviors as they occur within individuals. Over several weeks 115 managers from large Australian companies were assessed multiple times a day employing experience-sampling methodology. Within- and between-person variation in personality responses was analyzed using hierarchical linear modeling and correlation analyses. Findings indicate that analyzing personality as a within-person phenomenon reveals information not well captured by the trait approach. While conscientiousness and neuroticism were negatively correlated at the between-person level, this relationship was reversed at the within-person level. Results are discussed in terms of the distinctness of the within- and between-person structure of personality.

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## 1. Introduction

The study of personality structure has long been an important topic in personality research. Much of this research has focused on between-person differences in personality traits and the patterns of covariation among these traits (e.g., McCrae & Costa, 1997). Less emphasis has been put on the organization of relationships between thoughts, feelings and behaviors as they occur within individuals (see Cervone, 2005). However, there is growing evidence that within-person variability (a) represents a large part of the total variability observed in personality responses, (b) is systematic, and, importantly, (c) coexists with between-person stability in these variables (e.g., Fleeson, 2001). In this paper we provide empirical evidence for the distinctness of the between-person and the within-person structure of personality by studying the inter-relationship between two major personality dimensions, neuroticism and conscientiousness, at both the between- and within-person levels of analysis.

This paper makes three contributions. First, it investigates whether the negative neuroticism–conscientiousness relationship observed in between-person studies is merely a description of differences between individuals, or whether it also characterizes the internal psychological structure that individuals possess. Second,

by studying the co-variability of two personality dimensions over time and situations this paper draws conclusions about the structure of personality as it unfolds within individuals. This is important, as until recently there has been a strong reliance in the study of personality on between-person analyses; however, between-person analyses provide little insight into the psychological functioning of the individual (Borsboom, Mellenbergh, & Heerden, 2003). Finally, it provides evidence for the generalisability of previous findings on within-person variability in personality responses to non-student samples, and discusses applications of a within-person approach to the study of personality in organizational settings.

Prior studies on within-person variability in personality responses (Borkenau & Ostendorf, 1998; Fleeson, 2001, 2007) have been limited to student samples in university settings, which typically allow for greater opportunity for expression of personality throughout the day than more structured work environments. It is, therefore, not clear to what extent these findings generalize to non-student samples. We study the relationship between neuroticism and conscientiousness in a sample of experienced managers operating in their natural organizational work environments, using experience-sampling methodology.

We concentrate on neuroticism and conscientiousness for three main reasons: (a) Among the personality dimensions neuroticism and conscientiousness have been shown to have the highest predictive validity in regard to work outcome variables, such as job performance, and, hence, are of high relevance in a work context (Barrick & Mount, 1991, 2000); (b) The dimensions of neuroticism and conscientiousness refer to affective components (e.g., feeling

\* Corresponding author. Tel.: +61 2 9931 9187; fax: +61 2 9931 9199.

E-mail addresses: [nadin.beckmann@unsw.edu.au](mailto:nadin.beckmann@unsw.edu.au) (N. Beckmann), [r.wood@mbs.edu](mailto:r.wood@mbs.edu) (R.E. Wood), [amiralim@unsw.edu.au](mailto:amiralim@unsw.edu.au) (A. Minbashian).

<sup>1</sup> Tel.: +61 3 9349 8243.

<sup>2</sup> Tel.: +61 2 9931 9181; fax: +61 2 9931 9199.

frustrated) and work-related motivational and behavioral components (e.g., investing effort) that can be expected to vary across different situations at work; (c) Neuroticism and conscientiousness have been shown to be substantially negatively correlated at the between-person level of analysis (Mount, Barrick, Scullen, & Rounds, 2005). The appropriateness of a within-person interpretation for the between-person finding – i.e. when an individual experiences greater neurotic tendencies he or she also tends to act less conscientiously – has not been tested directly.

In our approach we follow Borsboom et al.'s (2003) call for more research on the similarities and differences between the between-person and the within-person structure of psychological constructs. The implicit assumption that the statistical relationship between traits represents the same relationship between associated states observed over time within a person needs to be tested. This is because statistically, any type of relationship at the between-person level can coexist with any type of relationship at the within-person level of analysis (Nezlek, 2001; Schmitz, 2006; Tennen & Affleck, 1996). Specifically, within a work context with accountabilities and rewards at risk high levels of negative affect (e.g., as a result of working towards deadlines) may be positively related to conscientious behaviors, such as level of effort.

In the next paragraphs we elaborate on the between-person relationship between neuroticism and conscientiousness. We discuss reasons as to why the two personality dimensions might be related, even though conceptually this is not expected. We then move onto findings at the within-person level of analysis that might give some indication about the relationship between state indicators of neuroticism and conscientiousness.

## 2. Between-person relationship between neuroticism and conscientiousness

From a between-person perspective neuroticism and conscientiousness are strongly negatively correlated. In fact, the negative neuroticism–conscientiousness correlation is the most robust cross-domain correlation among the Big Five factors, which Mount and colleagues (2005) estimated to be  $-.52$  when corrected for sampling error and unreliability. The empirical evidence for a strong negative relationship between the factors neuroticism and conscientiousness contradicts a conceptual assumption of the five-factor model: the orthogonality of its factors (Costa & McCrae, 1995; Goldberg, 1993a, 1993b). While, one should keep in mind that the Big Five have been “discovered” in factor analyses using orthogonal rotation techniques, non-trivial correlations between scale scores of the Big Five factors are well documented and this finding has led to some discourse in the literature (Block, 1995; Costa & McCrae, 1992b, 1995; Eysenck, 1992; McCrae, Zonderman, Costa, Bond, & Paunonen, 1996; Saucier, 2002).

From a conceptual perspective, it has been argued that inherent properties of trait terms in the English lexicon lead to non-orthogonality in the data structure (Goldberg, 1993a; Costa & McCrae, 1992a; Costa & McCrae, 1992b; McCrae et al., 1996; Peabody & Goldberg, 1989). Goldberg (1993a) and Hofstee, de Raad, and Goldberg (1992) have shown that English trait terms are located in clusters in a multi-factorial space – the Big Five factors – and that many trait terms represent blends of at least two (orthogonal) factors. For instance, trait terms located between the factors neuroticism (or emotional stability) and conscientiousness typically clustered at the evaluative congruent poles, i.e., were high or low in both emotional stability and conscientiousness. Another argument refers directly to the social desirability of most trait terms (Block, 1995; Costa & McCrae, 1992b; Peabody & Goldberg, 1989). If neuroticism is reversed and labeled emotional stability then all Big Five factors imply desirable personality characteristics,

at least in the western culture. Self-ratings of respondents who view themselves positively or who would like to be viewed positively by others (social desirability) might be inflated on all five factors. Observer-ratings, however, might not present this bias in positivity. In line with this argument Biesanz and West (2004) found that data compiled across diverse informants (self, peer, parent) produced a more orthogonal structure of Big Five traits than data from any single source of information.

From a measurement perspective, it has been argued that non-orthogonality of the Big Five factors is an unintended outcome of the Big Five scale construction process. As the Big Five factors are not equal in size, that is they differ in the number of trait terms that they subsume (Goldberg, 1993a; Saucier, 2002; Peabody & Goldberg, 1989), attempts to create instruments with scales of equal size include sampling of items for the two smaller factors (neuroticism, openness) that are also related to some extent to the other three factors (extraversion, agreeableness, conscientiousness). This practice might explain unexpected correlations between the broad (including conscientiousness) and not so broad (including neuroticism) factors (Saucier, 2002). Finally, it has been argued that the particular selection of facets to represent the five factors in major Big Five measures contributes to “undesirable” Big Five scale inter-correlations (Costa & McCrae, 1995; McCrae et al., 1996). Support for this argument can be found in studies that have analyzed facet scales across several major Big Five instruments (e.g., NEO-PI-R, Costa & McCrae, 1994; PCI, Mount, Barrick, Laffitte, & Callans, 1999; HPI, Hogan & Hogan, 1992; AB5C-IPIP, Goldberg, 1999). Findings show that not all conscientiousness and neuroticism facets contribute equally to the shared variance between the two factors (DeYoung, Quilty, & Peterson, 2007; Roberts, Chernyshenko, Stark, & Goldberg, 2005).

Digman (1997) has argued, however, that the Big Five are essentially oblique. According to his view frequently observed factor scale score inter-correlations are meaningful indicators of higher order factors in the personality structure. Based on a fairly diverse set of data in terms of the sample and the methodology used, Digman (1997) found evidence for the existence of two higher order factors, socialization and personal growth. Based on Digman's work neuroticism and conscientiousness could be interpreted as part of the same higher order construct, socialization, hence, their interrelatedness.

The evidence to date is not conclusive as to whether the between-person correlation between conscientiousness and neuroticism is, indeed, conceptually meaningful. However, if the negative correlation between the two dimensions is taken seriously, it can be assumed that individuals who tend to be more neurotic than others also tend to act less conscientiously than others in the same population. In this paper we study whether, at the level of the individual, stronger neurotic responses are associated with less conscientious behaviors.

## 3. Within-person relationship between neuroticism and conscientiousness

In order to study the within-person relationship between neuroticism and conscientiousness we need to conceptualize the two constructs as state variables. We assume that neurotic and conscientious thoughts, feelings and behaviors vary considerably over time and situations and that this variation is systematic (i.e., different from error).

Fleeson (2001) suggested conceptualizing personality traits as density distributions of trait-relevant behaviors or states. He explored the distribution of Big Five relevant states in students' everyday life over a period of 2–3 weeks employing an experience sampling approach. Within-person variability was high and

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