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Implicit conscientiousness predicts academic performance

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ABSTRACT

Across two studies, we provide the first evidence of a positive causal relationship between implicit conscientiousness and academic performance. Results showed how both implicit and explicit conscientiousness predicted the number of examinations that students successfully passed in the semester that followed their participation in the study. The implicit measure of conscientiousness is shown to be incrementally valid when compared to two different explicit measures. Participants' gender moderated the effect of implicit, but not explicit, conscientiousness. Lastly, we found that motivating students to manage their impression resulted in an increased self-reported conscientiousness which was not reflected in the implicit measure, nor did this manipulation affect the predictive validity of implicit and explicit conscientiousness. The main theoretical and practical implications of these findings are discussed.

1. Introduction

An important topic in the evaluation of personality concerns participants' ability to convey an "augmented" image of their selves. Any time social desirability and impression management strategies are an issue, self-reported measures might be inadequate because they might lead to wrong decisions (e.g., to hire a rather negligent person that is quite able to manage how he is perceived). On the other hand, self-reported measures of conscientiousness have been found to be extremely useful to predict scholastic and job performance. Since the famous meta-analysis by Barrick and Mount (1991), personality measures have increasingly and effectively been used in scholastic and organizational contexts. More recent work has demonstrated that conscientiousness is the best personality predictor of job performance, training performance and academic achievements, and that it has incremental validity beyond cognitive ability (Di Fabio & Busoni, 2007; Higgins, Peterson, Pihl, & Lee, 2007; Schmidt & Hunter, 1998, 2004). Chamorro-Premuzic and Furnham (2004) explained the relationship between conscientiousness and academic performance (typically ranging from $r = .2$ to $r = .5$) in terms of the persisting, self-disciplined, and achievement-oriented nature of conscientious students.

Yet, Komar, Brown, Komar, and Robie (2008) showed that faking has strong effects on the criterion-related validity of conscientiousness, and Holden (2008) suggested that the influence of faking might have been seriously underestimated.

On the contrary, the predictive validity of implicit measures is not influenced by social desirability (Greenwald, Poehlman, Uhlmann, & Banaji, 2009), as implicit measures are generally more resistant to faking (see, e.g., Blair, 2002), especially when respondents are new to the technique (Fiedler & Blümke, 2005) and when they are not instructed on how to fake it (Do Yeong, 2003). As far as conscientiousness is concerned, Steffens (2004) showed that instructed participants were very well able to fake the NEO-Five Factor Inventory (NEO-FFI, Borkenau & Ostendorf, 1993) but not the implicit measure of conscientiousness. In this study, the authors measured implicit conscientiousness by means of an Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998), which is the most widely used implicit technique and is applied in very different domains (see Lane, Banaji, Nosek, & Greenwald, 2007 for a review). Since it was first presented in 1998, the IAT was followed by many other techniques (e.g. Bar-Anan, Nosek, & Vianello, 2009; Payne, Cheng, Govorun, & Stewart, 2005), but so far, none of them showed equally good psychometric properties (Greenwald et al., 2002; Greenwald et al., 2009; Robusto, Cristante, & Vianello, 2008). In personality research, implicit techniques have been successfully employed to measure many constructs, among which the Big-Five personality traits (e.g. Boldero, Rawlings, & Haslam, 2007; Grumm & von Collani, 2007; Steffens, 2004).

Implicit measures have also been used to investigate scholastic performance. Nosek, Banaji, and Greenwald (2002) demonstrated that the attitude toward mathematics predicts unique variance of the Scientific Aptitude Test (SAT). Kiefer and Sekaquaptewa (2007) found that the interaction between gender identity and implicit (but not explicit) gender stereotypes predicts both the final grade and participants' career goals. The gender-science stereotype

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(according to which men are typically associated with science and women with arts) also predicts national gender differences in mathematics achievement (Nosek et al., 2009).

Inter-individual differences in implicit constructs are typically a valid predictor of behavior. In a recent meta-analysis conducted on 103 different studies ($K = 140$ independent samples, $N = 10967$), Greenwald et al. (2009) observed a moderate significant correlation between IAT-measured implicit constructs and behavior, and the authors found that this relationship was independent from social sensitivity (subjects' eagerness to be perceived positively). IAT-measured implicit constructs enhance our capability to predict relevant behavior, and this is especially the case when studying socially sensitive research topics or when impression management is an issue (e.g. in admission tests or job selection).

In this paper we will investigate whether an implicit measure of conscientiousness (implicit conscientiousness) might represent a valid alternative to traditional measures when impression management is an issue. Hence, we hypothesize that it will effectively predict academic performance even when participants are motivated to fake.

2. First study

This study tests the hypothesis (H1) that implicit conscientiousness predicts academic performance at least as much as explicit conscientiousness.

2.1. Method

2.1.1. Participants and procedure

Fifty psychology students at the University of Padua participated in the study without any form of financial reward. Data were collected in individual cubicles at the beginning of the first semester. Their mean age was 21.77 ($SD = 1.03$). Although precise data concerning participants' gender was not collected, the vast majority were male. After they signed the informed consent, they were told to read the instructions on the screen. A computerized version of the explicit conscientiousness scales (BFO and BFQ), with the items in random order, preceded or followed a Conscientiousness-IAT in counterbalanced order. Then, participants indicated their year of enrollment, the number of examinations successfully passed, their mean examination mark and were finally thanked and debriefed.

2.1.2. Measures

2.1.2.1. Independent variables (IV). The study used an IAT-based implicit measure of conscientiousness, and the conscientiousness scales of the Big Five Observer (BFO, Caprara, Barbaranelli, & Borgogni, 1994) and of the Big Five Questionnaire (BFQ, Caprara, Barbaranelli, & Borgogni, 2000) as explicit measures. We used two explicit measures of conscientiousness because the BFO and the IAT share the same items and consequently they are more comparable to each other than the IAT and the BFQ. Indeed, the BFO conscientiousness scale consists of eight pairs of bipolar adjectives. One adjective of each pair concerns a conscientiousness element; the other one concerns its direct antonym. The position, between the pair of adjectives, that best describes the respondent is given on a 7 point scale. The BFQ conscientiousness scale has also been standardized for the Italian population, and it consists of 24 items evaluated on a scale of 1 (Absolutely untrue for me) to 5 (Absolutely true for me). Example of items in the BFQ scales are: "Messiness annoys me a lot" and "I rarely give up". Reliability indexes are provided in Table 1. The IAT used the category labels I, Others, Conscientious, Not Conscientious. Eight pronouns related to the nominal categories "I/Others" were used as stimuli to represent them. The eight bipolar pairs of adjectives of the BFO conscientiousness scale were used to represent the nominal categories "Conscientious/Not Conscientious". A list of all stimuli is available from the first author. Participants were tested individually in a laboratory. The seven-block IAT employed (Greenwald, Nosek, & Banaji, 2003) presented stimuli related to the target dimension (I vs. Others) and the attribute dimension (Conscientious vs. Not Conscientious) in the center of the computer screen in an alternating fashion. Blocks 1, 2 and 5 provided practice trials and blocks 3, 4, 6 and 7 provided critical trials. Participants were asked to categorize stimuli as belonging to the concepts displayed at the top-left or top-right screen corner by pressing, as quickly and accurately as possible, the response key "A" or "L", respectively. The order of the test blocks was counterbalanced. Past research successfully employed the IAT for measuring some or all the Big Five traits, showing in many ways that IATs can validly assess the semantic aspect of trait self-concepts. Implicit conscientiousness has been found to be different from explicit conscientiousness (although they are moderately correlated) and implicit personality traits were shown to effectively predict spontaneous behavior (Schnabel, Asendorpf, & Greenwald 2008; Steffens & Schulze König, 2006).

2.1.2.2. Dependent variables (DV). Academic performance was measured with two self-reported indexes of prior academic achievement, i.e. participants' mean examination mark (ranging from 18 to 30) and the number of exams successfully passed in the past year (ranging from 0 to 8).

2.2. Results

The IAT D effect (Greenwald et al., 2003) and the mean scores on the BFO and BFQ scales were computed as independent variables (IV) for each participant. All variables can be considered normally distributed (kurtosis and skewness indexes < 2 *SE*). Table 1 shows summary statistics, internal consistencies, and Pearson correlations of the implicit conscientiousness, explicit conscientiousness and academic performance measures. Our participants

Table 1
Study 1. Descriptive statistics and intercorrelations between study variables.

	M (*SD*)	α (n. items)	Correlations			
			BFO	BFQ	Mean Mark	Number of Exams
IAT D	.39 (.32)	.73 (24)	.13	.21	.24	.29*
BFO	4.73 (.71)	.73 (8)		.72**	.10	.14
BFQ	3.31 (.37)	.76 (24)			.05	.03
Mean examination mark	25.97 (1.68)					.71**
Number of exams successfully passed	5.01 (1.45)					

The IAT-Number of Exams correlation is greater than the BFQ-Number of Exams correlation ($p < .05$) whereas the IAT-Number of Exams and the BFO-Number of Exams correlations are not different (test performed with the Fisher's *r* to *z*' transformation).

* $p < .05$.

** $p < .01$.