



Predicting counterproductive work behavior with narrow personality traits: A nuanced examination using quantile regression

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ABSTRACT

Conditional means models such as linear regression are regularly employed to examine relationships between personality traits and counterproductive work behavior. However, this method has several shortcomings limiting its utility. Quantile regression analysis better accounts for many of these limitations. This study investigates narrow personality traits as predictors of counterproductive workplace behavior using quantile methods with 952 working adults. Results show that quantile regression analysis provides a more nuanced representation of the relationship that personality traits have with counterproductive workplace behavior. We demonstrate that the conditional mean (i.e., regression coefficient) observed with standard ordinary least squares regression overestimates regression parameters at low levels of counterproductive work behavior, and underestimates it at high levels. The findings from this study suggest that reliance on conditional means models for the prediction of CWB may have resulted in an incomplete understanding and under appreciation of personality's actual value for the prediction of workplace deviance.

1. Introduction

Applied researchers regularly investigate relationships between psychological variables and real world outcomes using linear regression, however this method may yield results that are not optimally informative. For instance, organizational scholars typically investigate relationships between personality and job performance, job satisfaction, organizational citizenship, and counterproductive work behavior (CWB), using linear regression and other forms of conditional means modeling. These methods all yield a single statistic that serves to describe the complete relationship between variables. While these methods have been useful to expand research in many disciplines, it has a number of limitations that prevents a comprehensive understanding of the relationship between predictor and outcome variables (Hao & Naiman, 2007; Petscher, Logan, & Zhou, 2013).

Quantile regression analysis is a method that overcomes many of these limitations and allows for more nuanced examinations between predictor and response variables. The purpose of this study is to examine the relationship between several narrow personality traits and CWB using quantile regression analysis, and to contribute new insights to this field of applied research. The aim is not to fully explicate quantile analysis, but to demonstrate its utility in applied research of this type.

In what follows we will briefly describe the limitations of traditional linear regression and then proceed to analyze the relationship between several narrow personality traits and CWB. In the process, we will show how our capacity to understand and advance theory, along with our ability to develop predictive models is being constrained by our reliance on conditional means modeling, and how it could be enriched using quantile methods.

1.1. Conditional means modeling and quantile analysis

Both the utility and drawback of traditional linear regression is that it seeks to model and fit a conditional mean function, which, in essence, examines the average degree to which variable X relates to variable Y (Petscher et al., 2013). This is valuable seeing as many of the analytic techniques that scholars employ with great success including ANOVA, hierarchical regression analysis, multilevel analysis and structural equation modeling, are all forms of conditional means modeling (Petscher et al., 2013).

Conditional means modeling nevertheless has several important weaknesses limiting its utility. Most important is that it cannot be used at non-central locations where the interests of social scientists often lie (Hao & Naiman, 2007; Li, 2015). According to Li (2015, p. 77) linear regression models can only produce interesting summary statistics of a

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covariate, and cannot depict its full distributional impact unless the variable has the same effect on both the central and tail. Because it uses only the grand mean for interpretation, the model can only give an incomplete regression picture.

This stands in contrast with the natural inclinations of applied researchers to understand how changing values of the predictors might impact on the underlying distributional shape of the response variable (Hao & Naiman, 2007). For instance, when researchers are interested in the predictive relationship between personality and CWB, we are presumably trying to understand what is going on at the high end rather than the low end of the counterproductive distribution.

However, conditional means models do not allow for such nuanced examinations, since an assumption of these models is that the relationship between the predictor and outcome variable is equally strong across the entire distribution. Thus, we tend to assume that there are no slope differences in the regression line. For instance, when aggression is thought to be predictive of CWB, it is likely that this relationship will be at its most meaningful at high levels of aggression, and conversely, that low levels of aggression might have little predictive value. Unfortunately, conditional means modeling does not accommodate such differential relations. This means that we cannot investigate relationships among variables where we expect them to be most interesting. Neither can we compare those areas on the distribution where we expect relationships to be weak and strong with one another. Although such theoretical conjectures might exist in the minds of researchers, they are not modelled explicitly using conditional means models. This is a substantial constraint on our ability to develop and test comprehensive theories (Petscher et al., 2013).

While it is of course, possible to divide an outcome variable into smaller chunks and to investigate them separately, the tacit assumption by researchers using conditional means models is, arguably, that this is unnecessary because there is a known linear relationship. While this might be true in many instances, the relationship might not be equally linear across the entire distribution and in this sense, obscure important variations given that results from conditional means do not generalize well to non-central locations (Li, 2015).

Another important shortcoming of conditional means modeling is that real world data on outcome variables often violate required assumptions such as normally distributed residuals and homoscedasticity (Cohen, Cohen, West, & Aitken, 2003). Thus, methods based on conditional means modeling do not deal well with non-normal distributions. This is particularly relevant to research on CWB, which typically suffers from excessive positive skew in our experience. Quantile regression is an alternative approach well suited to overcome several limitations of the conditional mean framework (Koenker & Bassett, 1978; Li, 2015).

Quantile regression is particularly well-suited to investigate relationships between heavy-tailed outcome variables and their predictors (Li, 2015). Most important however, is that quantile analysis facilitates nuanced examination of associations among variables, and as such, better accounts for the shortcomings of conditional means modeling (Koenker & Bassett, 1978; Li, 2015; Petscher & Logan, 2014). According to Hao and Naiman (2007), this method has gained popularity among researchers in several fields of study, most notably in economics, but also in other fields including sociology, ecological sciences and medicine. While quantile regression is not a new idea (Koenker & Bassett, 1978), it has yet to be incorporated in mainstream psychological research, barring few exceptions such as developmental psychology (Petscher & Logan, 2014).

1.2. Personality and counterproductive work behavior

A vast literature has empirically linked CWB to broad and narrow traits of personality. The degree to which the dimensions of the Five Factor Model (FFM; John, Naumann, & Soto, 2008; McCrae & Costa Jr, 1990) is directly related to CWB is especially well researched. Meta-

analytic and other large sample studies have found consistent, meaningful associations for Conscientiousness, Agreeableness and Neuroticism with overall, interpersonal and organizational forms of CWB (Berry, Ones, & Sackett, 2007; Chang & Smithikrai, 2010; Dalal, 2005; Sackett, Berry, Wiemann, & Laczko, 2006; Salgado, 2002), as well as more specific CWBs such as absenteeism (Salgado, 2002), turnover (Salgado, 2002; Zimmerman, 2008) and accident involvement (Clarke & Robertson, 2005; Salgado, 2002). Weak to negligible correlations have largely been observed for Extraversion and Openness to Experience across a range of CWBs (Salgado, Moscoso, & Anderson, 2013).

Several narrow personality traits have also been found to be related to a range of CWBs. These traits include Locus of Control (Fox & Spector, 1999), Trait Anger (Fox & Spector, 1999; O'Brien & Allen, 2008), Negative and Positive Affect (Crede, Chernyshenko, Stara, Dalal, & Bashshur, 2007; Kaplan, Bradley, Luchman, & Haynes, 2009), Self-Esteem (Chang & Smithikrai, 2010), Manipulation, Risk-Taking, and Egotism (O'Neill & Hastings, 2011).

Thus, there is ample evidence that broad and narrow personality traits are meaningfully associated with CWB. However, in most previous research the relationship between personality and CWB was investigated with correlations (including the meta-analyses) and various forms of conditional means modeling (i.e., O'Neill & Hastings, 2011). However, such single statistics may not adequately represent more complex relationships.

1.3. Present study

In this study, we focus on the relationship between several narrow personality traits and CWB. In contrast to previous research of this type, we make use of quantile regression analysis, which allows for examinations beyond the conditional mean to include non-central locations, with particular interest in the upper tail. We focussed on narrow personality traits because they facilitate conceptual clarity when compared to broad personality dimensions. For example, while it was thought that the Neuroticism dimension of the FFM was not predictive of CWB, Hastings and O'Neill (2009) showed how important relations between the Anger subfacet and CWB were being obscured at the broad dimensional level.

2. Method

2.1. Participants

Participants were 952 working adults ranging between 18 and 78 years of age (mean = 35, SD = 12). The sample comprised of 384 (40.3%) men and 491 (51.65) women, with 77 participants not indicating their gender. The ethnic distribution was 405 (42.5%) Black/African; 259 (27.2%) White; 99 (10.4%) mixed origin; 94 (9.8%) Indian and 11 (1.2%) Asian, with 84 (8.8%) participants opting not to answer the question. Data were collected by 4th year psychology students as part of a course in research methods.

2.2. Instruments

Personality variables were measured with the Work-related Risk and Integrity Scale (WRISc; Van Zyl & de Bruin, 2017), a personality based integrity measure that contains 81 statements to which participants respond on a 5-point Likert scale: Strongly Disagree = 1, Disagree = 2; Somewhat agree/Somewhat disagree = 3; Agree = 4; Strongly Agree = 5. The WRISc measures 12 universal narrow personality traits namely: Aggression, Low Effortful Control, Negative Affect, Callous Affect, Impulsivity, Locus of Control (external), Manipulation, Egotism, Pessimism, Risk-Taking, Rule-Defiance and Cynicism. In previous research, these traits were identified as salient narrow attributes related to CWB. The constructs were subsequently operationalized and empirically evaluated, culminating in the WRISc (for more on the

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