Counterproductive work behavior and organizational citizenship behavior: Understanding their nature and antecedents through familial, longitudinal, and concurrent data

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DEDICATION

For my mom, dad, and siblings who inspired and supported me from start to finish

ABSTRACT

This dissertation includes a series of three studies designed to further illuminate the origins of nontask performance (i.e., counterproductive work behavior [CWB] and organizational citizenship behavior [OCB]) using individual differences and behavioral genetics perspectives: Familial resemblance, maladaptive individual differences, and longitudinal modeling of prosocial and disinhibited behaviors and attitudes. Study 1 examined familial resemblance in CWB and OCB among familial dyads (i.e., twins, non-twin siblings, parents-offspring, and couples). Biometric analyses were used to estimate the degree to which preexisting individual differences (i.e., genetic variability) and the environment (i.e., environmentality) accounted for variation in nontask performance. Analyses revealed that that CWB was more heritable ($a^2 = .39$) than OCB ($a^2 = .22$). Spouse/partner similarity in couples was used to examine whether spousal influence was a source of non-work, environmental variance identified in CWB and OCB. However, results suggested that spousal influence on nontask performance is limited. In Study 2, we explored maladaptive personality traits as possible individual differences accounting for unique variance beyond normative personality traits, which have historically been the focus in research examining personality and nontask performance. We used the 25 facet traits of the Personality Inventory for the DSM-5 (PID-5), alongside the lower-order traits from the Multidimensional Personality Questionnaire, a measure of normative personality traits. CWB had small to moderate, significant relationships with each of the maladaptive traits, while correlations between the maladaptive traits and OCB ranged from negligible to negative and moderate. While the normative traits accounted for similar amounts of variance in both CWB and OCB, maladaptive traits accounted for an additional 10.4% and 5.7% of variance over and above the normative traits and demographic factors. Finally, Study 3 prospectively examined the relationship between adolescent prosociality, adolescent disinhibition, and nontask performance to further illuminate the nomological net of prosocial and disinhibited behaviors. Structural equation modeling revealed that adolescent disinhibition was moderately and positively associated with CWB (r =.29) but negligibly associated with OCB (r = -.07), while adolescent prosociality was positively and moderately associated with OCB (r = .25). Contrary to expectation, adolescent proscoiality was negatively and moderately associated with CWB (r = -.27). In combination, these three studies provide deeper insight into the origins of nontask performance by describing the degree to which differences in CWB and OCB are genetically influenced, exploring if maladaptive traits account for some of the observed differences in nontask performance, and finally by placing CWB and OCB in a larger scope of prosocial and disinhibited behaviors.

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INTRODUCTION

Organizational success hinges, to varying degrees, on the job performance of employees, contractors, and vendors of or to organizations. Given this, it is not surprising to find substantial investment from both academic and applied practices into understanding, predicting, and improving job performance (Berry, Sackett, et al., 2007; Fodchuk, 2007; Hammer et al., 2015; Organ et al., 2011; Sackett et al., 1989). Job performance has been recognized as multifaceted, with multiple models presented in the literature (e.g., Campbell's [1990] seminal, eight-factor model applicable to jobs broadly; a five-factor model identified for military roles specifically, Campbell et al., 1990; for a review see Viswesvaran & Ones, 2000). Rotundo and Sackett (2003) provided a succinct definition of job performance, such that job performance is made up of "three distinct groups of behaviors… task, citizenship and counterproductive performance" (Rotundo & Sackett, 2002, p. 66; see also Laczo, 2002; Lievens et al., 2008). Task performance, those behaviors "that contribute to organizational effectiveness via the technical processes and activities that result in the production of goods and services" (Laczo, 2002, p. 1; see also Borman & Motowidlo, 1993) garnered the majority of attention in early research on job performance. Counterproductive work behavior (CWB) and organizational citizenship behavior (OCB), together forming nontask performance, have only recently become a major focus of research in the industrial/organizational literature. A focus on these two behavior sets is warranted, as they have non-trivial financial implications for organizations. OCB is associated with decreased absenteeism and turnover, and with aiding in the smooth running of an organization (Podsakoff, et al., 2009). CWB, which includes a range of behaviors such as theft and absenteeism, has been conservatively estimated to cost U.S. organizations alone billions of dollars (see Mercado et al., 2018; Ones & Dilchert, 2013). Thus, it is not surprising that supervisors can place a dollar value on nontask performance (Orr et al., 1989), and that CWB and OCB are included in global ratings of job performance (Rotundo & Sackett, 2002).

Organizational Citizenship Behavior

OCB can be defined as positive behaviors, not reflecting core job tasks, that contribute to organizational function through the maintenance or improvement of the organization's social and psychological environment (Borman & Motowildo, 1993; Lee & Allen, 2002; Organ, 1997, 2018; Sackett et al., 2006). This definition draws from several previous definitions of related constructs that can be broadly grouped as OCB (Podsakoff et al., 2009; Sackett et al., 2006), including Organ's (1997, 2018) OCB and Borman and Motowildo's (1993) contextual performance. In some initial definitions, OCB carried additional requirements such as being non-enforceable by

an employer and lacking formal rewards for such behavior (Organ, 1997). While contemporary definitions of OCB no longer bear these constraints, Organ (1997) does note that, compared to task performance, OCB is "less likely to be considered an enforceable job requirement" or to lead "confidently to systematic rewards" (p. 91; see also Podskoff et al., 2009).

OCB includes a wide range of behaviors, such as helping co-workers meet difficult deadlines, finishing one's own work ahead of schedule, staying with the organization despite hardship and putting up with stressors with a positive attitude (Borman & Motowildo, 1993; Laczo, 2002; Organ, 1997; Sackett et al., 2006). However, how such behaviors are organized dimensionally, and how those subgroups of behaviors are subsequently labeled vary substantially, see Laczo, (2002) for a review (see also Brief & Motowildo, 1986; Coleman & Borman, 2000; Katz & Kahn, 1966; Organ, 1997; Smith et al., 1983; Williams & Anderson, 1991). Table I.1 presents a conceptual overlap of content in 2-, 3-, and 4-factor models of OCB.

Counterproductive Work Behavior

CWB has been defined as "any intentional behavior on the part of an organization member viewed by the organization as contrary to its legitimate interests" (Gruys and Sackett, 2003, p. 30). Such actions include an array of organizationally viewed undesirable behaviors, including theft, destruction of property, misuse of time, and inappropriate verbal or physical actions towards other organizational members (e.g., co-workers, customers) (Gruys, 1999; Gruys & Sackett, 2003). It is important to highlight that this definition includes "intentional behavior" and so excludes accidents, and contrary to the "legitimate interests" of the organization, so that whistleblowing and like behaviors are also excluded. While the bulk of this definition is largely consensus, there is some disagreement among authors regarding the importance of intent and organizational values. For instance, Ones and Dilchert (2013) only require that actions "detract from organizational goals or well-being and include behaviors that bring about undesirable consequences for the organization its stakeholders" to be included under CWB (p. 645). These authors specifically point out that this definition includes "no references to organizational norms, intention to harm, or even cognitively reasoned actions… harmful acts committed thoughtlessly, impulsively, and even out of (bad) habit are included among CWB" (p. 645). Fortunately, Ones and Dilchert (2013) identified consistent overlap in regards to the volitional nature of CWB, as well as a focus on the behavior instead of the outcome (i.e., counterproductivity) across several definitions of CWB (Gruys & Sackett, 2003; Ones & Dilchert, 2013; Robinson & Bennett, 1995; Sackett & DeVore, 2001; Spector & Fox, 2005).

The distinction between counterproductive behavior and counterproductivity is neatly described by Sackett and DeVore (2001). CWB are those intentional *behaviors* that *may* lead to

undesirable outcomes (e.g., sleeping on job, consuming alcohol at work). Counterproductivity is the "tangible outcomes of counterproductive behavior," (e.g., the call missed while employee X was asleep, the accident caused as a result of employee Y operating equipment while intoxicated) (Sackett & DeVore, 2001, p. 145). In the examples given here, it is possible that no call was missed by employee X while he sleeps, and no accident occurs as a result of employee Y's drinking, but both of these actions would still fall under the category of CWB. As noted above, definitions of CWB focus on the behavior, rather than the outcome (Gruys & Sackett, 2003; Robinson & Bennett, 1995; Spector & Fox, 2005). The examples above can be contrasted with a scenario of an employee who accidentally broke equipment. This negative outcome is not accompanied by intentional behavior, and thus such behavior would not constitute a CWB – certainly by Gruys and Sackett (2003) definition, though perhaps conditionally by Ones's and Dilchert's (2013) (e.g., a true accident versus carelessness).

Sackett and DeVore (2001) pointed out that the study of individual forms of CWB (e.g., theft; poor work quality) had discrete literatures prior to work presented in the 1980s and late 1990s (Griffin et al., 1998; Hollinger & Clark, 1983; Robinson & Greenberg, 1998). Shortly after a shift towards studying different counterproductive behaviors sets simultaneously, Sackett and DeVore (2001) proposed a hierarchical model of CWB. They described a general counterproductive work behavior factor, followed by narrower groupings such as the seminal two-factor model by Bennett and Robinson (2000) a level below the general factor, and a third level made up of the narrower behavior sets (e.g., theft, absenteeism, substance use at work; see Gruys, 1999). In addition to the 2-factor model described by Bennett and Robinson, (2000), a five-factor model has also been proposed by Spector et al., (2006). Table I.2 presents these models showing their conceptual content overlap and sub-group labels.

OCB and CWB: Separate Constructs by Nature Not Literature

OCB and CWB have been shown to be separate constructs, rather than opposite poles of the same continuum (Fox et al., 2012; Sackett et al., 2006) – a finding that is neatly paralleled by altruism and antisocial behavior, which have also been shown to be distinct constructs with separate etiologies (Krueger et al., 2001). Sackett et al., (2006) used self-report data from 900, full-time employees and found that their 18 CWB items and 15 OCB items loaded onto different factors via confirmatory factor analysis. Additionally, CWB and OCB show a different pattern of associations with a variety of personality traits (see also Anglim et al., 2018; Dalal, 2005; Pletzer et al., 2021). Correlations between CWB and OCB have ranged from small and positive to large and negative, with factors such as elicited versus truly discretionary OCB (Spanouli & Hofmans, 2016; Vigoda-Gadot, 2007) or the presence of antithetical items (i.e., OCB items that are more

strongly related to lack of CWB than the presence of OCB, Dalal, 2005; Spector et al., 2010, see Table I.3) playing a role in such variation. However, meta-analytic results (Dalal, 2005), as well as theory, suggests that CWB and OCB are likely moderately and negatively correlated with each other within the nomological net.

Predictors of nontask performance

Organizational Factors

A wide array of organizational factors have been identified as predictors of CWB and OCB. Organizational factors, which Podsakoff and colleagues (2000) broadly grouped into leadership behaviors (e.g., leadership styles or employee perceptions of supervisors), task characteristics (e.g., task variety), and organizational characteristics (e.g., organizational climate, justice), tend to show small to moderate correlations with OCB, and somewhat smaller associations with CWB (Bruursema, 2007; Chen & Chiu, 2009; Chiu & Chen, 2005; Colquitt et al., 2013; Dalal, 2005; Ehrhart, 2004; Mercado et al., 2018; Podsakoff et al., 2009; Podsakoff et al., 2000; Rentsch & Steel, 1998; Ruiz-Palomino & Martínez-Cañas, 2014; Sackett & DeVore, 2001; Smith et al., 1983). However, it is worth qualifying this observation given the amount of available information before settling on a statement of comparison. Not all organizational factors have been given equal attention to as predictors or CWB and OCB. For example, OCB shows a much stronger relationship with leader-member exchange (i.e., LMX - a dyadic relationship associated with mutual respect; see Colquitt, 2001; Gerstner & Day, 1998) than does CWB (OCB $r_{\text{corrected}} = .35$; Rockstuhl et al., 2012; CWB $r_{\text{corrected}} = -.14$; Colquitt et al., 2013). However, the OCB effect was built on 62 studies, while the CWB effect contains only two. Thus, while the statement OCB is more strongly associated with LMX than CWB stands given the data, it is also appropriate to temper that conclusion with a call for additional research. It is possible for the LMX-CWB overserved effect to increase in magnitude with the inclusion of larger samples, or for it to shrink. Thus, results to date suggest that OCB appears to be well (though hardly completely) accounted for by organizational factors. Organizational factors do not appear to predict CWB as well as OCB on the whole. However, some organizational factors, such as justice, have very consistent, negative relationships with CWB[1].

Individual Difference Factors

Gender and age. Gender and age represent two commonly included demographic factors in psychological research. The overall effect of gender on OCB has generally been found to be

[1] The consistent, negative relationship between varying forms of justice and CWB led Mercado et al., (2018) to conclude "all forms of organizational justice have non-negligible relationships with manifestations of CWB" (p. 42).

nonexistent or small at best. Allen (2006) identified small effects of gender on self-reported OCB, with women reporting just slightly more engagement in interpersonally directed, but not organizationally directed, OCB than men (OCBI r = .07, OCBO r = -.03). Meta-analytic findings in self-report and supervisor-report samples identified virtually no difference between in men's and women's engagement in OCB (Ng et al., 2016). On the other hand, evidence suggests a small effect of gender on CWB. Averaging over several meta-analyses, Mercado et al., (2018) reported an overall CWB and gender reliability corrected correlation of $r_{corrected}$ = .08, with men engaging in slightly more CWB than women. Interestingly, Berry et al., (2007) found that self-reported interpersonal deviance showed a slightly more male bent ($r_{corrected}$ = .19) than self-reported organizational deviance ($r_{corrected}$ = .11). Differences between reporters (e.g., self, peer, or supervisor), showed a scattered pattern of results with large standard deviations, such that drawing firm conclusions on the influence of reporter on the gender effect for CWB is challenging (Berry et al., 2007; Ng et al., 2016).

An age specific meta-analysis of age and OCB found a small, but positive relationships between the demographic factor and work behavior (self-rated OCB $r_{corrected}$ = .08, other-rated OCB $r_{corrected}$ = .08, Ng & Feldman, 2008). In a more recent, albeit not age focused meta-analysis, near zero correlations were identified (Carpenter et al., 2014). Evidence suggests a small, but negative relationship between age and CWB, such that older employees engage in fewer CWB (Berry, Ones, et al., 2007; Ng & Feldman, 2008; Sackett et al., 2006).

General cognitive ability. General cognitive ability (GCA; i.e., intelligence or general mental ability) is defined as "a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly, and learn from experience" (Gottfredson, 1997, p. 13). General cognitive ability has had a prominent, albeit controversial role in the I/O literature (Viswesvaran & Ones, 2002). GCA has been shown to display sound validity with the organizationally important criterion of job performance (Hunter & Schmidt, 1970; Sackett et al., 2021; Schmidt & Hunter, 2004). Meta-analytic evidence showed a moderate, and positive relationship between general cognitive ability and organizational citizenship ($r_{corrected}$ = .23; Gonzalez-Mulé et al., 2014).

The relationship between cognitive ability and CWB appears more nuanced. In their predictive study, Dilchert et al., (2007) identified a negative, moderate relationship between cognitive ability and CWB in a sample of police officer job applicants across multiple agencies. In contrast, a longitudinal analysis conducted by Roberts et al., (2007) found a small, but positive (r = .10) association between adolescent GCA and later adult CWB in a large community sample. While such a finding seems in conflict with the work of Dilchert et al. (2007), it is important to

keep in mind that the samples used provide insight into different questions: What is the impact of cognitive ability among employees in similar roles (Dilchert et al., 2007) versus how is general cognitive ability related to engagement in CWB across a variety of roles (Roberts et al., 2007)? Here, strength of association, not mean level differences, are being examined. Meta-analytic evidence suggests a null relationship between GCA and CWB ($r_{corrected}$ = -.02, k=35, N = 12,074; Gonzalez-Mulé et al., 2014). However, who reported CWB impacted this relationship (self-reported CWB $r_{corrected}$ = .05, k=19, N = 6,700; combined objective and supervisor-reported CWB $r_{corrected}$ = -.11, k=16, N = 5,374). While the effects are both small, they are directionally in line with the self-report (i.e., Roberts et al. 2007) and non-self-report (i.e., Dilchert et al., 2007) findings cited above.

Personality. An impressive body of work has been devoted to the study of personality and its associations with nontask performance. However, this work has focused primarily on normative (alternatively normal-range or adaptive) personality traits, such as those included in the Big 5 (i.e., Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism) and HEXACO (i.e., Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness) models (Anglim et al., 2018; Chiaburu et al., 2011; Dalal, 2005; Mercado et al., 2018; Pletzer et al., 2021; Sackett et al., 2006). A (lack of) conscientiousness, agreeableness, emotional-stability, and honesty-humility appear to be the traits most strongly and consistently associated with CWB (Berry et al., 2012; Dalal, 2005; Mercado et al., 2018; Pletzer et al., 2021; Sackett et al., 2006). Prospective studies of adolescent personality and later adult CWB reveal that the traits such as Conscientiousness and Agreeableness are negatively associated with later adult CWB[2] (Le et al., 2014; Roberts et al., 2007). Additionally, items tapping Conscientiousness and Honestly-Humility are often included as part of personality-oriented integrity tests which have been used to attempt to screen for CWB in applicants (see Berry, Sackett, et al., 2007; Fine et al., 2016; Giordano et al., 2020; Sackett et al., 1989). While OCB shows consistent and small to moderate positive associations with Conscientiousness, Agreeableness, Emotional Stability[3], and Honesty-Humility, OCB has also associated with higher

[2]Roberts et al. (2007) used the Multidimensional Personality Questionnaire, which includes traits like Aggression and Control, which can be mapped to the Big 5 traits as (low) Agreeableness and Conscientiousness, respectively, see Church (1994).

[3]The association between OCB and Neuroticism/Emotionality is somewhat inconsistent. Pletzer et al. (2021) meta-analytic results suggest that OCB is negligibly associated with Emotionality, a trait of the HEXACO model related to, but not exactly Neuroticism/Emotional stability. In the HEXACO model, the variance associated with Big 5 Neuroticism and Agreeableness is partitioned among Emotionality, Agreeableness, and Honesty-Humility. It is unclear why meta-analytic evidence shows this pattern of results.

levels of Extraversion and Openness to Experience (Anglim et al., 2018; Chiaburu et al., 2011; Dalal, 2005; Pletzer et al., 2021; Sackett et al., 2006).

Developmental Considerations. While individuals, to varying degrees, adapt their behavior to appropriately meet the environmental context (e.g., the incumbent who wishes to steal but restrains the urge because of security cameras), two individuals under the same environmental pressures may still react differently given their unique experiences and predispositions. It could be that adolescent factors are largely irrelevant to adult CWB and OCB, as nontask performance is more strongly tied to individual differences associated with adult attitudes and beliefs (e.g., learned cynicism of organizations, see Andersson, 1996; O'Connell et al., 1986; the matured [i.e., proximal measure of] personality). However, it is also possible that individual differences present in childhood are early manifestations of what we later label OCB and CWB, such that engagement in nontask performance is the adult developmentally parallel behavior sets stemming from the same individual difference (i.e., continuity; Caspi & Roberts, 1999). As noted earlier, adolescent Conscientiousness and Agreeableness have been shown to be predictive of adult CWB years later (Le et al., 2014; Roberts et al., 2007). Similarly, conduct disorder in adolescence has been prospectively (Roberts et al. 2007), and adolescent problems at school retrospectively (Stanek et al., 2017) associated with greater engagement in CWB. Such findings shed light on the developmental origins of CWB. Unfortunately, no similar work has looked at adolescent predictors or OCB.

Relative role of the person and situation

It is unclear whether organizational or individual differences (including but not limited to personality), in aggregate are consistently better predictors either form of nontask performance. An informal review of the literature suggests generally stronger effects of organizational factors with OCB than with CWB, and that individual differences (overall) predict OCB and CWB well. Unfortunately, with the exception of O'Brien and Allen (2007), few studies appear to have attempted a direct comparison of these predictor categories. In a series of univariate analyses, O'Brien and Allen (2007) found that organizational factors (i.e., perceived organizational justice, perceived organizational support, and job satisfaction) accounted for consistently more variance in self-reported OCB (ranging from 8.3% to 18.5%) than self-reported CWB (ranging from 1.1% to 7.0%). On the other hand, the authors found the individual differences (i.e., Conscientiousness, trait anger, and locus of control) accounted for similar amounts of variance in CWB (ranging from 1.5% to 20.7%) and OCB (0.0%–19.3%).

Summary of the current studies

This dissertation includes three studies to further illuminate the origins of nontask performance, where by origins I refer to those individual differences (traits, life experiences, psychopathology - either proximal or distal to the actual, nontask behaviors) that may play causal roles in nontask behaviors. It is worth stating that causal and deterministic are not equivalent here (e.g., low agreeableness may be casual to conflict with co-workers, but I do not make the case that a person low in agreeableness *must* be in conflict with co-workers). First, I examined familial resemblance in nontask performance among twins, nontwin and adoptive siblings, parents and offspring, and midlife and late-life couples. Similarity among family members' (e.g., parents–offspring, siblings) engagement in nontask performance was assessed to estimate the degree to which preexisting individual differences (i.e., genetic variability) and the environment (i.e., environmentality) accounted for variation in CWB and OCB. Second, I expand the study of personality and nontask performance by examining the associations between nontask performance and the Personality Inventory for the DSM-5, the latter which assesses variation in maladaptive, clinically relevant personality traits that do not themselves constitute formal personality disorders. Finally, I prospectively examine whether adolescent disinhibition and prosociality (measured via a combination of behaviors, attitudes, opinions, and clinical symptoms) are differently related to later CWB and OCB to further clarify how nontask performance fits within the larger nomological net of prosociality and disinhibition.

In each of these studies, I employed either or both the Minnesota Twin Family Study (MTFS) and the Sibling Interaction and Behavior Study (SIBS), both community samples from Minnesota Center for Twin and Family Research (MCTFR), which hosts a series of longitudinal studies following pairs of siblings (e.g., twins) from adolescence through adulthood, as well as their rearing parents. In both these samples, participants completed a self-report measure of CWB and OCB in adulthood. CWB was measured via a slightly adapted version of Bennett's and Robinson's (2000) scale, which included 19-items tapping interpersonally and organizationally directed deviance. These items can be found in Table A.15. OCB was measured via a slightly adapted version of Laczo's 15-item OCB scale, which measures the three facets of OCB described by Coleman and Borman (2000) (i.e., interpersonal, organizational, and conscientious initiative citizenship behaviors). These items can be found in Table A.14. In combination, these studies offer three unique perspectives, using samples and methodologies not often employed in industrial/organizational research, for furthering our understanding CWB and OCB.

Table I.1. Conceptual understanding of factor *overlap** between common taxonomies in the OCB literature

Organ (1988; 1997) Podsakoff et al., (1990, p. 155)	Borman & Motowidlo (1993, p. 82) (see also Borman et al. 2001)	Coleman & Borman, (2000) Borman et al., (2001, p. 55)	Williams and Anderson (1991, p. 601-602) Smith, Organ & Near (1983; see also Organ, 1988)*
Altruism: "Discretionary behaviors that have the effect of helping a specific other person with an *organizationally relevant* task or problem."	"Helping and cooperating with others."	*Interpersonal/Personal Support*: A combination of helping others (e.g., aiding with or directly performing their tasks; offering emotional support), cooperation, courtesy, and motivating (e.g., acknowledgement of others' achievements, cheerleading).	*OCBI*: "Behaviors that immediately benefit specific individuals and indirectly through this means contribute to the organization (e.g., helps others who have been absent, takes a personal interest in other employees)." Altruism*
Courtesy: "Discretionary behavior on the part of an individual aimed at *preventing* work-related problems with others from occurring."	"Volunteering to carry out task activities that are not formally part of own job."		
Civic Virtue: "Behavior on the part of an individual that indicates that he/she responsibly participates in, is involved in, or is concerned about the life of the company."	"Endorsing, supporting, and defending organizational objectives."	*Organizational support/Citizenship performance*: A combination of "representing the organizational favorably by defending and promoting it … showing loyalty by staying with the organization despite temporary hardships. Supporting the	*OCBO:* "Behaviors that benefit the organization in general (e.g., gives advance notice when unable to come to work, adheres to informal rules devised to maintain order)." Generalized compliance (or conscientiousness)*
Sportsmanship: "Willingness of the employee to tolerate less than	"Persisting with enthusiasm and extra effort as necessary to		

ideal circumstances without complaining."	complete on task activities successfully."	organization's mission and objectives, complying with organizational rules and procedures."	
Conscientiousness: "Discretionary behaviors on the part of the employee that go *well beyond the minimum role requirements* of the organization, in the areas of attendance, obeying rules and regulations, taking breaks, and so forth."	"Following organizational rules and procedures."	*Job/task citizenship performance* *Conscientious initiative*: A combination of "persisting with extra effort despite difficult conditions. Taking the initiative to do all that is necessary" and self-development.	

Note. * Some content areas within a certain category (e.g., Coleman and Borman Job/task citizenship self-development) may not be relevant to other models where overlap suggested (e.g., Organ's conscientiousness)

Table I.2. Conceptual understanding of factor overlap between common taxonomies in the CWB literature

(Hollinger & Clark, 1983; Hollinger & Clark, 1982, p. 98)	(Bennett & Robinson, 2000; Robinson & Bennett, 1995)	(Spector et al., 2006, p. 448-450)
Property deviance: When employees "acquire of damage the tangible property or assets of the organization without authorization (e.g., the theft of tools, equipment, or money from the workplace.)"	*Organizational Deviance:* Minor (production deviance such as leaving early or wasting resources) to serious (property deviance such as sabotaging equipment or stealing) counterproductive behaviors aimed at the organization	*Production deviance:* "Purposeful failure to perform job tasks effectively the way they are supposed to be performed"
		Sabotage: "Defacing or destroying physical property belonging to the employer"
		Theft: The taking of property that does not belong to the individual
Production deviance: "Behaviors which violate the formally proscribed norms delineating the quality and quantity of work to be accomplished (e.g., tardiness, sloppy or slow workmanship, or the use of alcohol and drugs while at work)."		*Withdrawal*: "Behaviors that restrict the amount of time working to less than is required by the organization… absence, arriving late or leaving early, and taking longer breaks than authorized."
	Interpersonal Deviance: Minor (political deviance such as showing favoritism or gossiping about co-workers) to serious (personal aggression such as sexual harassment or verbal abuse)	*Abuse towards others:* "Harmful behaviors directed toward co-workers and others that harm either physically or psychology through marking threats, nasty comments,

	counterproductive behaviors aimed at individuals associated with the organization	ignoring the person, or undermining the person's ability to work effectively"

Table I.3. Example of OCB items with reverse coding versus antithetical items

	Positively coded for OCB	Reverse coded for OCB
OCB Items (i.e., appropriate for an OCB measure)	**Presence of positive** "I will stay late to finish work that has an upcoming deadline"	**Presence of positive (R)** "I won't stay late to finish work that has an upcoming deadline"
Antithetical Items (i.e., inappropriate for an OCB measure)	**Absence of negative** "I avoid coming in late"	**Absence of negative (R)** "I often come in late"

Note: Sample items created for the purpose of this example.

STUDY 1

Familial resemblance, citizenship, and counterproductive work behavior: A combined twin, adoption, parent-offspring, and spouse approach

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ABSTRACT

Given the well-documented importance of counterproductive workplace behavior and organizational citizenship behavior (together nontask performance), it is important to clarify the degree to which these behaviors are attributable to organizational climate versus preexisting individual differences. Such clarification informs where these behaviors stem from, and consequently has practical implications for organizations (e.g., guiding prioritization of selection criteria). We investigated familial resemblance for nontask performance among twins, nontwin and adoptive siblings, parents and offspring, and midlife and late-life couples drawn from two, large-scale studies: the Minnesota Twin Family Study and the Sibling Interaction Behavior Study. Similarity among family members' (e.g., parents–offspring, siblings) engagement in nontask performance was assessed to estimate the degree to which preexisting individual differences (i.e., genetic variability) and the environment (i.e., environmentality) accounted for variation in counterproductive and citizenship behavior. We found that degree of familial resemblance for nontask performance increased with increasing genetic relationship. Nonetheless, genetically identical individuals correlated only moderately in their workplace behavior (r =.29–.40), highlighting the importance of environmental differences. Notably, family members were more similar in their counterproductive than citizenship behavior, suggesting citizenship behavior is comparatively more environmentally influenced. Spouse/partner similarity for nontask behavior was modest and did not vary between midlife and late-life couples, suggesting spousal influence on nontask performance is limited. These findings offer insight to organizations regarding the degree of nature (individual differences) and nurture (including organizational factors) influences on nontask performance, which has implications for the selection of interventions (e.g., relative value of applicant selection or incumbent interventions).

Counterproductive workplace behavior (CWB) and organizational citizenship behavior (OCB), together referred to as nontask performance, are recognized as crucial components of the multidimensional construct job performance. CWB can be defined as behaviors that harm, or have the potential to harm, the legitimate interests of an organization and its members (e.g., Gruys & Sackett, 2003; Ones & Dilchert, 2013). CWB can range from extended breaks, to theft and the physical assault of coworkers, and has been conservatively estimated to cost U.S. organizations billions of dollars a year (see Bennett & Robinson, 2000; Mercado et al., 2018). The economic benefits of OCB (i.e., positive behaviors outside of core job tasks that contribute to maintenance or improvement of the organization's social and psychological environment; Borman & Motowildo, 1993; Lee & Allen, 2002; Organ, 1997, 2018; Sackett et al., 2006) have not been similarly estimated. Nonetheless, citizenship behaviors which include supporting colleagues and the organization above and beyond organizational requirements, are associated with increased unit-level performance and decreased turnover (Podsakoff et al., 2009). Additionally, supervisors can give a theoretical dollar value to nontask performance when asked (Orr et al., 1989), and CWB and OCB are included in global ratings of job performance (Rotundo & Sackett, 2002). In fact, a succinct definition of job performance was given by Rotundo and Sackett (2002), who specified an employee's contribution as $\omega 1 * \text{task performance} + \omega 2 * \text{OCB} - \omega 3 * \text{CWB}$, where the individual weights (ω) are determined by organizational values and the values of individual raters (Rotundo & Sackett, 2002; see also Laczo, 2002; Lievens et al., 2008).

Understanding Origins

Although the importance of nontask performance to organizational success has been well documented, the degree to which organizational context and preexisting individual differences contribute to nontask performance has long been debated in the I/O literature (e.g., Davis-Blake & Pfeffer, 1989; Konovsky & Organ, 1996). Research has shown that a range of specific factors that includes both contextual (e.g., organizational justice and ethical leadership) and employee personality (e.g., conscientiousness and self-esteem) contribute to nontask performance (Avey et al., 2011; Mercado et al., 2018; Sackett et al., 2006). Understanding the total contributions of contextual factors and preexisting individual differences to nontask performance (i.e., the combination of counterproductive work behavior, CWB, and organizational citizenship behavior, OCB) can lend key insight into how such variation in behaviors arise. One approach to making this determination would be aggregating the effect of know influences, although this

would seem to require that all relevant influences on CWB and OCB were known *a priori*. We propose an alternative approach based on the analysis of twin and family data. In essence, we seek to investigate the importance of preexisting differences be estimating the degree to which different family members have similar levels of nontask performance. Although analysis of familial resemblance is not without its own limitations, it does have the advantage of providing a lower bound estimate of the contribution of preexisting individual differences to nontask performance.

Behavioral genetics is the subdiscipline within psychology concerned with the analysis of family resemblance data to draw conclusions about the aggregate contributions of genetic and environmental factors to individual differences in behavior. Arvey et al. (2016) discussed the importance of behavior genetics in understanding the role of the person and environment in work-related outcomes and encouraged use of this methodology among organizational researchers. There have, nonetheless, been only a few applications of behavioral genetics in applied psychology including studies of job satisfaction (Li et al., 2016), entrepreneurship (see Arvey et al., 2016, for a review), and a single study of CWB (Stanek et al., 2017). These studies used the analysis of familial resemblance to decompose the variance in a specific trait into its genetic and environmental components. Since variance indexes the degree of individual differences in a trait, these analyses effectively quantified the contribution of genetic and environmental factors to individual differences. The basic analytical model that has been used in most twin studies (Polderman et al., 2015) assumes that trait variance can be decomposed into three components: additive genetic effects (designated as A and known as the trait's heritability or a^2 when expressed as a proportion of trait variance), shared environmental effects (C, which are the effects of environmental factors shared by reared-together relatives and a source of their behavioral similarity, or c^2 when expressed as a proportion of trait variance), and nonshared environmental effects (E, which are the effects of environmental factors that are not shared by reared-together relatives and so are a source of their behavioral dissimilarity, or e^2 when expressed as a proportion of trait variance; Arvey & Bouchard, 1994).

Behavioral genetic studies can provide insight into the contribution of preexisting individual differences to traits like OCB and CWB by showing that they are heritable. Specifically, the importance of preexisting individual differences would be strongly implicated by finding that genetically related individuals engage in similar levels of OCB and CWB even when employed by different organizations. Existing behavioral genetic research leads to the strong expectation that both OCB and CWB will be heritable to some degree. Behavioral

genetic studies of a wide range of behavioral traits (i.e., traits that are marked by fairly consistent behaviors, attitudes, beliefs, or values) have repeatedly shown that the resemblance between any two family members is proportional to the degree to which they are genetically related, implicating the importance of genetic influences (Plomin et al., 2016). For instance, fraternal (i.e., dizygotic) twins on average have half the genetic overlap as identical (i.e., monozygotic) twins, and fraternal twins are less similar in their behavioral traits than identical twins are. Indeed, the consistency with which genetic influences on behavior have been found has led to what has been called the First Law of Behavior Genetics: "All human behavioral traits are heritable" (Turkheimer, 2000). Even though existing research consequently leads us to expect both OCB and CWB will be heritable, and by implication that preexisting individual differences are important, that research does not tell us the magnitude of heritability nor whether one trait is more heritable than the other. Heritability can markedly differ across physical and psychological traits, with genetic variation accounting for relatively small proportions of variance (less than 10%), moderate proportions of variance (~30%–50%), or large proportions of variance (upwards of 60%), depending on the trait (Polderman et al., 2015). For example, heritability estimates of 50% for OCB but only 10% for CWB would strongly implicate the contribution of preexisting individual differences to the former but nongenetic factors, including organizational factors (e.g., coworker or manager influences), to the latter. In this example, an individual predisposed to OCB would likely engage in prosocial work behaviors under a variety of environmental contexts (e.g., with or without encouragement from the organization). Simultaneously, about half the variation in OCB would stem from environmental influences such as ethical leadership and coworker influences, and potentially non- work-related environmental factors (e.g., family stressors, nonwork social norms). Correspondingly, a lower heritability in CWB would indicate that environmental influences account for the majority of the variance in CWB. In either case, it is important to recognize the additive nature of the environmental and genetic effects—variation in both genetics and environmental experiences contribute to differences in individuals' behavioral traits, including CWB and OCB.

Predictors of Nontask Behavior Guiding Predictions for Nontask Behavior

Insights Into Heritability

While there has been limited research on familial resemblance for nontask performance, behavioral genetic research on correlates of OCB and CWB provides a basis for hypotheses about the magnitude of genetic and environmental contributions to these two traits. Both CWB and OCB are correlated with individual difference traits well established as heritable in the

behavioral genetic literature including general cognitive ability (Briley & Tucker-Drob, 2013; Gonzalez-Mulé et al., 2014) and personality (Chiaburu et al., 2011; Matteson et al., 2013; Mercado et al., 2018). In addition, the general externalizing factor of which CWB may be an indicator—and its established indicators including antisocial behavior and substance abuse (Krueger et al., 2005)—has been shown in multiple studies to be moderately to strongly heritable, a^2 = .60–.80 (e.g., Burt, 2009; Hicks et al., 2004; Kendler et al., 2011; Krueger et al., 2002). Of interest is the study by Hicks et al. (2013), which found significant resemblance in externalizing among both biological and adoptive (i.e., nongenetically related) siblings, suggesting both genetic and shared environmental influences on externalizing. Similar findings have been identified for criminal behavior (Kendler et al., 2015). Although there have been few behavioral genetic studies of prosocial behavior, of which OCB might be an indicator, twin studies have found significant heritable effects for social responsibility, altruism, and childhood prosocial behaviors (Knafo & Plomin, 2006; Koenig et al., 2007; Rushton, 2004). Such findings lead us to hypothesize that:

Hypothesis 1: Like most behavioral traits, OCB and CWB will be heritable.

Differential Heritability

We expect to find that both OCB and CWB are heritable; we do not, however, expect them necessarily to be equally heritable. Engagement in CWB has been consistently seen in the face of organizational injustice, suggesting that this behavior is to some degree reactive (see Mercado et al., 2018). Analogously, supportive and ethical leadership seem to enhance the expression of OCB (Podsakoff et al., 2000; Rockstuhl et al., 2012). Although organizational factors are consequently seen to play a role with both OCB and CWB, the literature suggests that OCB may be more strongly tied to the work environment than CWB. Unfortunately, our confidence in this conclusion is limited by the few studies to have directly compared the prediction of OCB and CWB (i.e., O'Brien & Allen, 2007). O'Brien and Allen (2007) found that in univariate models, organizational factors (i.e., perceived organizational justice, perceived organizational support, and job satisfaction) accounted for consistently more variance in self-reported OCB (ranging from 8.3% to 18.5%) than self-reported CWB (ranging from 1.1% to 7.0%). In contrast, personality traits (i.e., Conscientiousness, trait anger, and locus of control) accounted for similar amounts of variance in CWB (ranging from 1.5% to 20.7%) and OCB (0.0%–19.3%). These findings suggesting that organizational factors matter more for OCB than CWB, lead us to the hypothesis that:

Hypothesis 2: The contribution of unique environmental factors will be greater for OCB than for CWB, such that family members will be more similar in their engagement of CWB than

OCB.

Although we have emphasized the importance of heritability in implicating preexisting individual differences, the long-term consequences of common rearing (what behavioral geneticists call the twins' shared environment), would also implicate preexisting individual differences. Unlike heritable influences, which are pervasive, there is limited evidence of shared environmental influences on behavioral phenotypes (Plomin et al., 2016; Turkheimer, 2000), so that we might expect limited contribution of the shared environment to nontask performance. Nonetheless, behavioral geneticists have found that some traits are influenced by the shared environment (e.g., cognitive ability) even though the shared environmental influence appears to wane with age (Tucker-Drob & Briley, 2014). Importantly, one of the exceptional behavioral genetic traits showing an effect of common rearing is externalizing psychopathology and its indicators (Han et al., 1999; Hicks et al., 2013). Given the previously cited study by Stanek et al. (2017) linking CWB with externalizing psychopathology, we hypothesize that:

Hypothesis 3: There will be enduring effects of the shared rearing environment in CWB but not OCB.

Nature of Spousal Similarity

It appears that all (or nearly all) complex behavioral traits are to some degree heritable. None is, however, completely heritable. The environment is always important, although the nature of environmental influence appears to be predominantly of the nonshared rather than shared variety (Turkheimer, 2000). One source of nonshared environmental influence would be the previously discussed organizational factors, but nonshared influences need not be restricted to workplace factors. To investigate one possible non-workplace factor within our familial resemblance framework, we also analyzed spousal similarity for CWB and OCB. Spouses may show similarity on traits because of assortative mating (i.e., the "tendency for individuals to select partners resembling them based on certain characteristics"; Humbad et al., 2010, p. 827; see also Eaves et al., 1984). Alternatively, spousal similarity may be a consequence of the behavior of one spouse influencing that of the other. While correlation should not be taken for causation, the convergence of spousal similarity on a trait over time implies some degree of spousal influence rather than, or in addition to assortative mating. Under assortative mating, we expect spousal similarity to be maximal at the time of mating and to be stable or modestly wane with age. Alternatively, under the spousal influence model, we expect spouses to grow in similarity over time, a phenomenon known as spousal

convergence (Humbad et al., 2010).

While spousal similarity on most personality traits tends to be low (Plomin & Deary, 2015), there is evidence for spousal similarity on Aggression (Humbad et al., 2010), which appears to increase with the length of marriage, suggesting spousal convergence. Spouses, like other nuclear family member pairs, are also similar in externalizing (Galbaud du Fort et al., 2002; Taylor et al., 2000), criminal behavior (van de Weijer & Beaver, 2017), and traits such as Alienation and Traditionalism (Humbad et al., 2010). In a sample of Dutch spouses spanning two generations, van de Weijer and Beaver (2017) identified similarity on criminal behavior prior to marriage, which suggested assortative mating, as well as increased similarity between spouses on criminal offending after marriage, suggesting spousal influence. Interestingly, Leikas et al. (2018) found no spousal similarity on benevolence values, values for improving the welfare of the in-group (Schwartz, 2012), suggesting individuals neither select a partner on such values, nor become more similar on such values over time. This leads us to the hypothesis that:

Hypothesis 4: Spousal/partner similarity will be greater for CWB than OCB, and late-life couples will be more similar on CWB than midlife couples will be.

Summary of the Present Study

We investigated the nature of familial resemblance in CWB and OCB among monozygotic (MZ, i.e., identical) twins, dizygotic (DZ, i.e., fraternal) twins, nonadoptive (i.e., biologically related) siblings, adoptive siblings, adoptive and nonadoptive parents and offspring, midlife couples, and late-life couples. Data came from the Minnesota Center for Twin and Family Research, which includes a series of studies that follow adolescents into adulthood, their rearing parents, and their later spouses/partners. Biometric analyses of twin and adoptive/nonadoptive sibling data were used to estimate degree of heritability and environmentality of OCB and CWB by taking advantage of degree of genetic relatedness and rearing environment overlap. Similarity among adoptive siblings and adopted offspring and their rearing parents would implicate the contribution of shared environmental factors from childhood or adolescence. Greater MZ than DZ correlations would implicate genetic variation. Similarity between spouses was also assessed. Greater similarity among late-life than midlife couples would suggest spousal influence rather than, or in addition to, assortative mating.

Method

Sample and Nontask Performance Measures

The research draws from two ongoing studies from the Minnesota Center for Twin and

Family Research (MCTFR): The Minnesota Twin Family Study (MTFS) 11- and 17-year-old cohorts and the Sibling Interaction and Behavior Study (SIBS). Both studies involve longitudinal assessment of two siblings beginning in adolescence and extending through early adulthood, along with their rearing parents. Sibling pairs included both MZ and same-sex DZ twins, and adoptive (i.e., genetically unrelated), nonadoptive (i.e., full biological siblings), and mixed adopted/nonadopted sibling pairs. Inclusion criteria at the intake assessment included living within driving distance of the University of Minnesota and having no physical, intellectual, or behavioral disabilities that would preclude completion of in-person assessments. In the SIBS sample, adoptive sibling pairs were required to be genetically unrelated to each other.

The University of Minnesota Institutional Review Board (IRB) approved both studies. The IRB study title and protocol number for the twin and twin-spouse/partner study were "Adolescent drinking and midlife outcomes: A prospective cotwin control study" and 9109M04330. The IRB study title and protocol number for the sibling and parent study were "Free will, determinism, and the development of character: An adoption study" and STUDY00001118. Research using data from these ongoing studies has been published in a variety of journals (e.g., Iacono & McGue, 2002; McGue et al., 2007).

Twins and Their Romantic Partners

The initial twin's sample included 2,764 male and female MZ and same-sex DZ twins that were first assessed at the target age of either 11 or 17 (see Iacono & McGue, 2002). Twin families were recruited via publicly available birth records of twins born between 1972 and 1984 in Minnesota. The Minnesota-statewide sample reflects the state's population for the birth years sampled, with 95.8% participants being White. Data for this study come from the fourth follow-up to the initial assessment, which started in 2017 and remains ongoing. One thousand and ninety-five twins (466 males and 629 females) were assessed and 1,012 of these twins (433 males and 579 females) met the criteria to be included in the analyses reported here: They were employed and had a valid CWB or OCB score. In this twin sample, there were 261 MZ twin pairs, 130 DZ twin pairs, and 230 unmatched (i.e., singleton) twins. Twins had a mean age of 40.9 years (*SD* = 2.5). In some cases, education level was not available for the twins at the most recent follow-up. In these cases, education was backfilled with previous reports of education, and age at which education was assessed ranged from 24.4 to 47.5 years (mean = 34.4, *SD* = 6.4). Spouses/partners of twins were also recruited to answer a series of questionnaires at this follow-up assessment if they were living with the twin partner. Five hundred and eighty-six spouses/partners met our inclusion criteria (i.e., employed and had a matched spouse who met the twin inclusion criteria) and were included in this study. Spouse/ partners had a mean age of 41.8

years (*SD* = 4.7). The majority of the twin–spouse/partner pairs reported being married (89.6%), and 16 were same-sex couples. Follow-up data collection remains ongoing and additional information on recruitment and sample details can be found in Iacono et al. (1999), Iacono and McGue (2002), and McGue et al. (2017).

Sibling Pairs and Their Rearing Parents

The original SIBS sample included 1,234 offspring from 409 adoptive (from 124 mixed families and 285 adoptive families) and 208 nonadoptive sibling pairs and their rearing parents. Initiated in 1998, the families were systematically ascertained from three large adoption agencies in Minnesota for adoptive siblings or from Minnesota state birth records for nonadopted sibling pairs. Adoptions were closed, and no data was collected from adoptive offspring's birth parents. Additional details concerning the recruitment of the SIBS sample can be found in McGue et al. (2007). At the intake assessment, a total of 613 (99% of the target sample of 617) mothers and 551 (89%) fathers were assessed. Among the 1,234 assessed offspring in the 617 families, two (from different adoptive families) were judged to be ineligible after they had completed their intake assessment (one adopted participant was found to be biologically related to their participating sibling and a second adopted participant had an IQ that suggested mild intellectual disability, a study exclusion criterion).

Data for this study come from SIBS follow-up three, which started in 2018 and continued through 2021. Parental data broadly reflect the state's population in racial demographics, with almost all rearing parents being White, but not in socioeconomic status (SES; measured via a combination of educational attainment, income, and occupational status), adoptive parents have higher than average SES. Adoptive offspring were primarily East Asian (66%), with approximately 21% of adoptive offspring White, and the remaining 13% another ethnicity. Seven hundred and sixty-nine offspring and 587 parents completed the follow-up three assessment. Among these, 708 offspring (280 males and 428 females, mean age = 31.8 years, *SD* = 2.7) and 536 parents (mean age = 64.8 years, *SD* = 4.8) also met the inclusion criteria for the present study: They were employed, or had been employed in the case of the parents, and had a valid CWB or OCB score. An additional inclusion criterion was required of the parents, that they had a participating offspring or spouse.

Nontask Work Behavior Measures

Self-report was used for all measures and samples in this study. The items and prompts for nontask work performance were the same for the twins, twin–spouse/partners, and sibling pairs, but slightly different for parents to allow responses from parents whose most recent

employment occurred more than 3 years before the time of assessment. Twins, twin–spouse/partners, and siblings pairs were asked to rate the extent to which they engaged in the behaviors over the past 3 years if they had been employed or self-employed full or part time at any time in past 3 years. Sibling rearing parents were asked if they were currently or previously employed, and asked to answer nontask performance items based on their current job or most recent job if they had been, but were not currently, employed. The full scales can be found in Appendix A Table A.14 and Table A.15, and item level descriptives can be found in the Table A.26. To minimize the effect of extreme scores, all scores were winsorized at three standard deviations above and below the mean within each sample (twins, twin–spouse/partners, siblings, and parents) for CWB, OCB, and their facets. This affected less than 2% of the scores for each scale in each sample (vs. an expected .3% if the data were normally distributed). Distributions of scores before and after winsorization can be found in Appendix A Table A.20 . While there is evidence that performance is generally normally distributed, nonnormality can become an issue when noncomparable jobs are examined (Beck et al., 2014), as may be the case in our community sample where occupation is not controlled for.

OCB Measure. OCB was measured via an adapted version of Laczo's (2002) 15-item scale (see also Sackett et al., 2006), which measures Coleman's and Borman's (2000) three-factor model of OCB: interpersonal support (e.g., helping and motivating others), organizational support (e.g., loyalty in times of hardship, complying with rules and procedures), and conscientiousness initiative (i.e., persisting with additional effort, taking initiative). Items were rated on a 5-point frequency scale (0 = *Never*, to 4 = *Always*), whereas in Laczo (2002), the items were rated on a 4-point scale. Some questions were also slightly reworded (see Appendix A for a comparison between the original and MCTFR items). An overall OCB score was created by summing all 15 items to assess an overall tendency toward prosocial workplace behavior. OCB facets (i.e., conscientious initiative, organizational support, interpersonal support) were each the sum of five items in order to assess familial similarity in specific domains of prosocial workplace behavior. Internal consistency reliabilities for the total OCB score were $\alpha = .85$ and .84 in combined twins/partners and siblings/parents samples respectively, and similarly high for the five-item conscientious initiative and organizational support OCB facet scales (α from .78 to .80). Internal consistency reliability was, however, modest for the five-item interpersonal support OCB facet scale (α from .54 to .57; see Table 1.4). For completeness, we report results for this latter facet scale but encourage care in interpreting its results given its low reliability.

CWB Measure. CWB was measured via an adapted version of Bennett and Robinson's (2000)

19-item scale. Their scale consists of seven counterproductive work items targeted toward individuals (i.e., interpersonal deviance, CWBI) and 12 items targeted toward the organization (i.e., organizational deviance, CWBO). Items were rated on a 5-point frequency scale (0 = *Never*, to 4 = *Always*), whereas in Bennett and Robinson (2000), the items were rated on a 7-point scale, minor rewording also occurred for some questions. For instance, exchanging "took" for "taken," or adding "when not allowed" to the end of the item "Used an illegal drug or consumed alcohol on the job" (see Appendix A for a comparison between the original and MCTFR items). An overall CWB score was calculated by summing all 19 items, and facet-level scales for CWBI and CWBO computed by summing the 7 and 12 items, respectively. Internal consistency reliabilities for overall CWB were .84 and .86 in the twins-spouse/partners and siblings-parents samples respectively, and the two facets ranged from $\alpha = .78$ to .82 across two samples (see Table 1.4).

Familial Resemblance Analysis

Our analysis of familial resemblance began with the computation of correlations among all possible relative pairings including: MZ twins, DZ twins, adoptive siblings, nonadoptive siblings, nonadoptive parent–offspring, adoptive parent–offspring, the twins and their spouse/partners (i.e., midlife couples), and the SIBS mother–father pairs (i.e., late-life couples). For twins, intraclass correlations were estimated using the *psych* package in R with unmatched twins included to be consistent with the full-information maximum- likelihood method used in the biometric analysis. For nontwin siblings, groups were formed by older versus younger siblings for interclass correlations analyzed in the *stats* package. Interclass correlations were also used for parent–offspring, midlife couple, and late-life couple correlations. For parent–offspring correlations, the average of the two parents' CWB and OCB scores was used after correcting for differences by sex. When only one parent provided a CWB or OCB score that sex-corrected value was used. The significance level was set at $p < .05$.

Biometric Model Analysis

The second stage of our analysis involved the fitting of biometric models. Raw CWB and OCB scores were adjusted using regression for age and sex separately in the two samples and the residuals used in the biometric analyses (see Appendix Table A.16, for regression results; twin and nontwin sibling correlations by sex can be found in Table A.24). Twin pairs and unmatched twins and siblings (i.e., singletons; cotwin or cosibling not present) were included in these models. Full- information maximum-likelihood was used to employ all available data including the nonpaired twins and siblings, who provide information with respect to the means and variances

of the phenotypes. The standard biometric method (Neale & Cardon, 1992) decomposes variance in a quantitative phenotype (P) into additive genetic factors (A; used to estimate heritability), shared environmental factors (C; the contribution of environmental factors shared by reared-together relatives), and unique environmental factors (E; the contribution of environmental factors unique to members of a family). Variance due to measurement error is included in the E component.

In the standard biometric formulation (see Neale & Cardon, 1992), the variance in a quantitative phenotype, *P* (e.g., CWB), can be represented as:

$$P = A + C + E \qquad (1)$$

This model is frequently referred to as the ACE model. The expected similarity among relatives can be derived for this model under standard biometric assumptions (Plomin et al., 2013). Such assumptions include that the environment functions the same for all sibling pairs (e.g., twins do not have more similar environments than nontwin siblings) and that assortative mating is not present. Both assumptions were examined in this article—assortative mating via analysis of spousal similarity and equal environmental similarity of sibling pairs by estimating a twin-specific environment parameter in the ACE model, which was made possible by inclusion of the nontwin sibling data as explained below. An additional assumption is that genetic effects are additive (i.e., no additional increase for a phenotype due to interactions between genes—the sum of the parts *is* equal to the whole). A substantial meta-analysis of over 2,700 twin studies of more than 17,000 different traits by Polderman et al. (2015) concluded that the additive genetic assumption generally held.

Reared-together MZ twins share a genome and a rearing environment, while reared-together DZ twins share half of the additive genetic effect and a rearing environment, giving:

$$\begin{aligned} &\text{Expected MZ Covariance} = A + C \\ &\text{Expected DZ Covariance} = .5A + C \end{aligned} \qquad (2)$$

Similarly, the expected similarity among adopted (who are genetically unrelated but reared together) and nonadopted siblings is given by:

$$\begin{aligned} &\text{Expected Nonadoptive Siblings Covariance} = .5A + C \\ &\text{Expected Adoptive Offspring Covariance} = 0.0\ A + C \end{aligned} \qquad (3)$$

A, *C*, and *E* can be estimated for this model from the observed variances/covariances using standard statistical techniques (Neale & Cardon, 1992; Neale et al., 2003).

Estimates of the additive genetic variance, shared environmental variance and unique environmental variance components can then be standardized by dividing by the total phenotypic variance, such that

$$a^2 + c^2 + e^2 = 1 = \text{Total Standardized Variance of the Phenotype} \quad (4)$$

The availability of both the twin and adoption samples allowed us to test a key assumption of the twin method by determining whether the shared environment operated more strongly in twins than nontwin siblings. Specifically, the *A*, *C*, and *E* parameters can be estimated independently in the twin and nontwin sibling samples. Alternatively, we can test whether these parameter estimates are statistically homogeneous in a combined analysis of the twin and nontwin sibling samples in which the ACE estimates are constrained to be equal. If this combined model fits more poorly than when the parameters are estimated separately, we can further test whether adding a *T* parameter (representing a twins-specific environmental influence) to the expected covariance of both MZ and DZ twins but not to the similarity of the nontwin sibling pairs can account for the lack of model fit (Matteson et al., 2013). In addition to poor model fit in a twin/nontwin combined model, Matteson and colleagues point out that if twin-specific environmental influences are present, the classical twin design will overestimate c^2.

We followed the strategy presented by Matteson et al. (2013) for assessing genetic and environmental variance in both twin and adoption samples by fitting three models to each measure. We first fit a model in which the ACE parameters were fit separately in the two samples. We designate this model the *free* model. Second, we constrained the ACE parameters to be the same in the two samples, which we designate the *constrained* model. Finally, we fit a model in which the ACE parameters were the same in the two samples but greater twin than sibling resemblance was accounted for by a *T* parameter. This model is designated the *combined* model. Models were fit by maximizing a multivariate normal likelihood and compared using a likelihood ratio test.

Transparency and Openness

We have described sample recruitment, inclusion and exclusion criteria, all manipulations, and all measures used in the study. We have aligned reporting to the *Journal of Applied Psychology* methodological checklist. Research materials are available in Appendix A. Due to privacy issues, we are unable to make the data public, however, analysis code is available upon request from the first author. Data were analyzed in R Studio, Version 3.5.2 (RStudio Team, 2020). Analyses were run using the *psych* package, Version 2.1.3 (Revelle, 2016), the *stats* package, Version 3.5.2, (RStudio Team, 2020), the *Hmisc* package, Version 4.2.0 (Harrell &

Dupont, 2021), the *cocor* package, Version 1.1.3 (Diedenhofen & Musch, 2015), and the *OpenMx* package, Version 2.17.2 (Boker et al., 2021). The study design, analysis, and hypotheses were not preregistered.

Results

Descriptive statistics for demographics and nontask behaviors are presented in Table 1.4. Correlations among the demographics and nontask behaviors are presented in Tables 1.5 and 1.6 for the twins and spouse/partners, and nontwin sibling pair offspring and parents, respectively. Moderate and negative correlations were identified between CWB and OCB in the four samples (r = −.32 to −.37), and moderate-to-strong intercorrelations were identified among the OCB facets (r = .41–.58) and CWB facets (r = .31–.52). It is important to note that the male twin cohort was sampled 3 years in advance of the female twin cohort, leading to an inflated association between age and sex in the twin sample. Differences in nontask performance by sex can be found in Appendix A Table A.17, nonwinsorized means and standard deviations in Table A.18, and nontask performance regressed on education in Table A2. Education, which may act as a proxy for employment type, consistently showed negligible correlations with OCB and its facets (r =−.01–.10), as well as with organizational deviance (r =−.05–.02). On the other hand, interpersonal deviance showed a generally moderate, negative association with educational attainment (r = −.26 to −.08).Familial correlations for OCB and CWB, and their facets are presented in Table 1.7 (familial correlations using nonwinsorized scores can be found in the Appendix Table A.19). MZ twins were consistently more similar than other offspring pairs, implicating the importance of genetic factors. Although pairwise correlation differences between MZ and other offspring groups were not always statistically significant, pairwise correlation comparisons are an inefficient way of analyzing familial correlations compared to biometric methods, which optimally weight all available information (Boker et al., 2011). DZ twins and non- adoptive siblings showed intermediate and generally similar levels of correlation (e.g., OCB r = .17 and .15, while CWB = .20 and .23, respectively). Adoptive sibling correlations were generally the lowest and in no case statistically significant. Parent–offspring correlations for both adoptive and nonadoptive offspring were significant for CWB (r = .15 and .16, respectively) but not for OCB. At the OCB facet level, there was a significant correlation between parents and their nonadoptive offspring on conscientious initiative (r = .12). At the CWB facet level, there were significant correlations between parents' organizational CWB and their adoptive (r = .18) and nonadoptive (r = .20) offspring's, but not for interpersonal CWB. Midlife (twin-spouse/partner) couples were significantly but modestly correlated on CWB, OCB, and their facets

(r = .11– .19), while late-life (mother–father) couples were only significantly correlated on CWB and organizational CWB (r = .16). However, in no case did midlife and late-life couple correlations differ statistically significantly from each other. Additionally, CWB correlations were not statistically significantly different from their respective OCB correlations in any pair type (Appendix A Table A.27).

We compared the fit of ACE models in which parameters were freely estimated across twin and adoption samples (referred to as Free in Table 1.8), to models where the A, C, and E parameters were constrained equal (referred to as Constrained in Table 1.8) in the two samples separately for CWB, OCB, and their facets. Moving from the free model to the constrained model increases the degrees of freedom by three. Table 1.8 shows that model fit was not significantly reduced in OCB or OCB facet models, but a reduction in fit was observed for CWB, $\Delta\chi^2(3) = 10.1$, $p = .02$, interpersonal deviance, $\Delta\chi^2(3) = 10.1$, $p = .02$, and organizational deviance, $\Delta\chi^2(3) = 13.5$, $p < .01$. The constrained models were then compared to combined models that included the twin-specific environmental parameter, T, decreasing degrees of freedom by one. None of the combined models showed increased fit with the additional parameter, suggesting differences between sample parameter estimates were not due to twins having more similar environments than nontwin siblings. Given that reduced fit from free to constrained models was not due to twin-specific environmental influences, follow-up analyses were conducted for CWB and its facets to see if the discrepancy in fit was due to differences in phenotypic variance (i.e., the raw ACE estimates might differ simply because the trait variance differs in the two samples). This was done by constraining the standardized parameter estimates to be equal in the twin and nontwin sibling samples but allowing the overall variance to be free, increasing degrees of freedom by two compared to the free models. Model fit did not significantly change compared to the free models, $\Delta\chi^2 < 2$ in all three models, and standardized estimates shifted by not more than .04 from those in the free models (see Table A.21 and A.22 for fit statistics and standardized parameter estimates for CWB and its facets). This suggests that drop in fit from the free to the constrained models was due to differences in phenotypic variance (see Table 1.4) between samples rather than to differences in proportion of variance in a phenotype accounted for by genetic and environmental variance. Taken as a whole, such findings in model fit suggest the constrained model standardized variance component estimates are acceptable, and that the combined model including twin-specific environmental variance does not improve model fit for CWB and OCB phenotypes.

Table 1.9 presents the standardized ACE parameter estimates and confidence intervals:

the twin sample, the SIBS sample, the con- strained twins and SIBS samples, and the combined twin and nontwin sibling samples with the twin-specific effects. Twin-specific effects (T) and shared environment (C) were not different from zero for either CWB, OCB, or their facets. Given the model fit described above, we focus on the constrained estimates (i.e., estimates derived using both the twin and nontwin sibling sample and including estimates for additive genetic, shared environment, and unique environment effects). In constrained models, additive genetic influences ranged from .21 to .41, with larger estimates for CWB (.39 [.24, .48]), and its interpersonal (.41 [.27, .50]), and organizational (.34 [.18, .45]) deviance facets, than for OCB (.22 [.03, .39]), and its conscientious initiative (.21 [.02, .36]), organizational (.26, [.07, .37]), and interpersonal (.22 [.02, .37]) facets.

Discussion

Our analysis of familial resemblance in OCB and CWB found that: (a) OCB and CWB were modestly to moderately heritable (a^2 = .21 to .41); (b) there was no evidence of the shared environment contributing to either OCB or CWB; (c) CWB was more heritable than OCB; and (d) couples were minimally similar in their nontask behavior. The finding that OCB and CWB were heritable supported Hypothesis 1, consistent with a large body of research showing at least some degree of heritability in a wide range of behavioral traits (Polderman et al., 2015). However, as noted earlier, how heritable traits are varies, and the effect sizes have implications for how behavioral traits and their origins are viewed (Plomin et al., 2016). Even though a high heritability does not mean that a behavioral (or even physical) trait is not malleable (e.g., using eyeglasses to correct for poor vision), it may be that highly heritable traits are more difficult to change than weakly heritable traits. Consistent with this view, Tesser (1993) showed experimentally that less heritable attitudes were more easily swayed by social influence than highly heritable social attitudes. Personality traits such as Conscientiousness have been shown to be moderately to strongly heritable (Matteson et al., 2013; Vernon et al., 2008) and such traits can be difficult to change (Hudson et al., 2018; Roberts et al., 2017). Our findings of moderate heritability for CWB (a^2 = .39) might suggest that CWB would be challenging to change via organizational factors (e.g., norms and values). The comparatively weak heritability estimates identified for OCB (a^2 = .22) would then imply that OCB might be more easily changed through organizational initiatives (e.g., a program to implement organizational justice). We found support for our second hypothesis, that CWB would be more heritable than OCB, though our CWB heritability estimates were lower than those found by Stanek et al. (2017). That environmental factors accounted for more variance in OCB than CWB is also consistent with research showing greater organizational influences on OCB than CWB (O'Brien & Allen, 2007). From a practical standpoint, in the presence of

organizational constraints, selecting on the predictors of behaviors less amenable to external influence during applicant selection may be a strategic course of action (e.g., integrity testing for CWB; Ones & Viswesvaran, 2001).

For both CWB and OCB nonshared environmental factors contributed more than genetic factors did. Although our results do not tell us what the specific environmental contributors are, previous research has shown that positive and negative experiences with coworkers (Miner et al., 2005), job characteristics (Chiu & Chen, 2005), perceptions of fairness (Konovsky & Organ, 1996), and experiences of workplace incivility (Penney & Spector, 2005) are associated with nontask performance. Any of these experiences might lead to the lack of sibling similarity (i.e., nonshared environmental variance) identified in the present study. Factors that lead siblings to engage in different rates of nontask performance may also extend outside the work environment to social norms among friends, norms in their affiliated groups (e.g., engagement with religious groups and their accompanying mores), or other nonwork pressures (e.g., stressful home environment). However, no evidence of spousal influence operating through the nonshared environment was identified in the present study.

It is important to clarify that applicants' preexisting individual differences and organizational factors that influence employee behavior (e.g., company culture, m anagerial practices, promotions, or demotions) coexist and operate additively (or in some cases interactively; see Fine et al., 2016). Thus, the heritability of an organizationally relevant behavioral trait, whether it be CWB, OCB, or job satisfaction, in no way suggests that organizational intervention does not influence employee behavior. Supporting this, even genetically identical MZ twins do not engage in the same degree of CWB or OCB.

Hypothesis 3 was not supported—we found no effect of the shared environment for OCB and only limited evidence for CWB. Some phenotypes, such as college attainment (Anderson et al., 2020; Freese & Jao, 2017; McGue et al., 2017), alcohol misuse (Stanek et al., 2017), and externalizing behaviors (Hicks et al., 2013; Plomin et al., 2016) have been consistently found to be influenced by shared environmental factors. However, many traits appear largely uninfluenced by the shared environment (Turkheimer, 2000), and for traits where there is evidence of shared environmental effects in childhood these effects appear to largely diminish by adulthood (Knafo & Plomin, 2006; Tucker-Drob & Briley, 2014). While adoptive siblings were not similar on their nontask performance ($r = -.13$ to $-.02$) and biometric estimates of the proportion of variance attributable to the shared environment were zero or near-zero, adoptive parent–offspring resemblance suggested the possibility of minor shared environmental effects. Specifically, we observed a small but significant association between parents and their adoptive offspring on CWB

($r = .15$) but not OCB ($r = -.01$). This parent–offspring effect was specific to organizational deviance ($r = .18$) rather than interpersonal deviance ($r = .05$). Note that a parent–offspring correlation of .18 is not inconsistent with biometric estimates for c^2 that are not significantly different from zero. This is because the parent–offspring contribution to c^2 is given by the square of the parent–offspring correlation, which in this case would only be .18*.18~3%, a value that would be difficult to detect statistically given the size of our samples. Regardless, it appears that parental behaviors or attitudes can have a small effect on the CWB of their adult offspring. Further support for the minimal environmental effect associated with growing up together comes from our finding no evidence of a twin environmental effect in nontask behavior. Twin-specific environment effects show a mixed presence in the literature. Phenotypes such as cognitive ability (Koeppen-Schomerus et al., 2003) and substance use (Rhee et al., 2003) have been partially accounted for by twin-specific effects. However, Matteson et al. (2013) found little to no effect for twin- specific environment in a number of personality traits.

We hypothesized that late-life couples (mother–father pairs who on average should be married longer than the midlife twin-spouse/ partner pairs) would be more similar in their nontask behavior than midlife couples (who on average should be partnered or married more recently than the late-life mother–father pairs). However, Hypothesis 4 was not supported. Similar effect sizes in late-life and midlife couples did not suggest that spouses/partners influenced each other such that they became more similar to each other. The correlations between partners and spouses are consistent with assortative mating. This has several implications to our interpretation of the biometric modeling results. First, as spouses/partners do not become more like one another over time, the partner or spouse does not appear to be a source of the notable nonshared environ- mental influences identified for both OCB and CWB. Second, an assumption of the biometric model is that assortative mating is not present, but we find small spouse/partner correlations. The existence of assortative mating typically results in an overestimate of the shared environment, however little to no evidence was found for the shared environment for CWB or OCB, limiting any concerns assortative mating may have had on the model estimates.

Educational attainment showed inconsequential associations with OCB and organizational deviance, but a moderate and negative association with interpersonal deviance. If educational attainment can be used as a proxy to occupational attainment, then our findings suggest that nontask performance is not strongly tied to a specific level of occupational attainment. Such findings suggest that community samples are appropriate for studying CWB and OCB in general (i.e., when not focusing on specific forms of CWB, such as cyberloafing, expense

falsification).

Several limitations to our research design and sample should be taken into account when interpreting the results and considering the generalizability of this study. First, our sample was drawn from Minnesota, a U.S. state with lower unemployment rates and higher rates of educational attainment than many other U.S. states (Minnesota Department of Employment & Economic Development, 2021; United States Census Bureau, n.d.). The occupational distribution of our participants may not be representative of the larger United States. There may also be differences in familial resemblance by U.S. state (e.g., if high outbound moving in some states leads to greater likelihood family members moving to different states, which in turn leads to lower levels of familial resemblance) that are not captured by this sample. We did not have access to the number of years spouses were married or partners were together. It is possible that spousal or partner effects occur early in marriage or cohabitation, such that effects would only be seen by comparing newly partnered couples against mid- or long-term couples. Unfortunately, the data available in this study are unable to test this.

Internal consistency reliability was acceptable for the CWB and OCB composite measures and for the majority of the facets, but interpersonal citizenship (OCB-I) had low reliability ($\alpha = .54$ in the twins-spouse/partners sample and .57 in the SIBS offspring-parents sample). Unreliability can lead to inflated estimates of the unique environment (E, which includes measurement error), and correspondingly attenuate estimates of both the additive genetic effects (A) and shared environmental effects (C). Correcting for measurement unreliability would have a limited impact on the findings that CWB was more heritable than OCB at the composite level, but it would increase the point estimates for A and C. In addition to point estimate shifts, correction for measurement unreliability would also make OCB-I the most heritable facet of OCB.

Participants reported on their work behaviors outside of a workplace setting, such that they should have had limited motivation to inaccurately report their behaviors (e.g., self-presentation; Schlenker, 2012). Additionally, meta-analytic studies have shown little difference in mean self- versus other-OCB ratings (Carpenter et al., 2014), and slightly higher self-reported CWB than other- reported CWB means (Berry et al., 2012). Inaccurate reporting could occur due to distorted remembrance or inaccurate weighting (e.g., putting more emphasis on more recently engaged in behaviors) of nontask performance. Parents reporting on more distant work history may be at particular risk for misremembrance. Issues of low base rate and limited variance in CWB have been a point of discussion (e.g., Greco et al., 2015). CWB ranges in severity (e.g., Bragg & Bowling, 2018; Gruys & Sackett, 2003) and behaviors are not endorsed at equal rates. For instance, Spector et al. (2006) reported a high endorsement for taking extended breaks

(61.6%) but low endorsement for threatening coworkers with violence (2.8%). Similarly, in the present study, the item assessing misuse of time had a significantly higher mean than the item about using substances at work in all four samples (Appendix A Table A.26). The present study does not address whether the degree of CWB severity (see Fine & Edward, 2017) has an impact on the heritability. Future research is encouraged to examine whether severe CWB is more heritable (e.g., similar to psychopathology; see Hicks et al., 2013), while minor offenses (e.g., extended breaks) are more strongly related to company norms or lack of consequences.

It is important to highlight the possibility of gene–environment correlation. Gene–environment correlation is "the differential exposure of genotypes [i.e., the genetic code of individuals] to environments" (Plomin et al., 1977, p. 310), or, less formally, when individuals with certain genetic predispositions (e.g., a genetic predisposition toward leadership) are exposed to environments that enhance the presentation (i.e., phenotype) of that genetic predisposition (e.g., management places the individual in a leader- ship role; the individual seeks out leadership positions in an organization). In the case of CWB, it is possible that individuals predisposed to engaging in counterproductive behavior select working environments with lax enforcement policies and little supervision. Alternatively, the naturally helpful employee whose OCB is rewarded through praise or promotion may increase their OCB because of such reinforcement. Unfortunately, the present study does not model possible gene–environment correlations and thus we cannot say if, or to what degree, gene–environment correlations impact nontask performance, which, if present, would increase reported heritability (see Beam & Turkheimer, 2013, for simulation example).

Sample attrition from intake to later follow-ups may limit representativeness of the sample to the larger employed population. Twins who participated in follow-up four were similar to twins who did not participate in this follow-up in their initial trait Aggression and (self) Control (Cohen's d = .04 and .09 respectively; see Appendix A Table A.25), but had slightly fewer externalizing symptoms (Cohen's d = .17). Nontwin siblings showed more marked differences between the intake scores of those who participated in follow-up three compared to those who did not. Siblings who participated had higher Control (Cohen's d = .26), lower Aggression (Cohen's d = .29) and fewer symptoms of externalizing (Cohen's d = .27) at their initial assessment than siblings who did not participate in follow-up three. We expect differences between the employed and nonemployed population (e.g., employed individuals may be more conscientious than nonemployed individuals). Twins who reported being employed in the last 3 years in follow-up four had slightly higher Control scores (Cohen's d = .04), and slightly lower Aggression and Externalizing (Cohen's d = .08 and .14, respectively) at their

initial assessment than twins who were not employed at follow-up four. Employed, nontwin siblings reported a similar pattern of higher Control (Cohen's $d = .20$), lower Aggression (Cohen's $d = .02$), and lower externalizing (Cohen's $d = .20$) at their initial assessment compared to nonemployed siblings. These findings suggest that, in general, attrition effects appear to be minimal.

It is worth stating that heritability is not static (Plomin et al., 2016). Heritability and environmentally are proportions of variance that account for variance in a phenotype. Thus, a lack of variance in either the genotype or the environment (e.g., environment X is the same for all individuals within a population), means that the other will be entirely responsible for variance in that phenotype (e.g., any differences observed in the phenotype will be due to variance in the genotype). When a population experiences more shared experiences over time, environmental variance decreases. Within the same phenotype (e.g., cognitive ability, Plomin & Deary, 2015) heritability can increase over time, or, in the case of job satisfaction, decrease over time (Li et al., 2016). Heritability may also differ by groups or populations. For instance, there have been male and female differences in the additive genetic estimate of entrepreneurship (e.g., van der Loos et al., 2013, see Arvey et al., 2016 for a review). Nonetheless, while there is no direct reason to believe that heritability should increase or decrease with new to seasoned employees—especially as development in individual differences such as personality stabilize into adulthood (Caspi et al., 2005; Hopwood et al., 2011; Roberts et al., 2001)—it is possible and deserves to be examined in future research.

Previous family studies have looked at counterproductive and prosocial behaviors in nonwork contexts, such as criminal behavior (Kendler et al., 2015), antisocial behavior (Hicks et al., 2013; Koenig et al., 2007), aggressiveness (Rushton et al., 1986), and altruism (Koenig et al., 2007; Rushton et al., 1986). However, counterproductive or prosocial behaviors within a work setting, where behaviors may be constrained by organizational influences such as security cameras or promotion metrics, may be driven from very different degrees of genetic and environmental variance. Interestingly, our estimate of heritability for CWB ($a^2 = .39$) is near the range of estimates for aggression and antisocial behavior ($a^2 = .40$ to .50s; Hicks et al., 2013; Koenig et al., 2007; Rushton et al., 1986). Such findings along with previous work (e.g., Stanek et al., 2017) suggest that CWB is related to other forms of aggressive or antisocial behavior, and that application of the nonwork counterproductivity literature to workplace behavior may be appropriate. Heritability estimates for altruism differed notably between Koenig et al. (2007) and Rushton's et al. (1986) studies ($a^2 = .10$ and .56, respectively), making comparisons challenging. The present study adds to the literature by directly assessing the heritability and

environmentality of CWB and OCB. These results place CWB and OCB within the larger nomological net of prosocial and counterproductive behaviors by providing a comparable set of statistics (i.e., a^2, c^2, e^2) to use in traits across work and nonwork domains, and by providing insight into the degree to which differences in nontask performance are due not to organizational factors, but to individual differences in a tendency toward these behaviors.

The goal of this article was to gain insight into possible sources of the individual differences in nontask performance. Our findings, alongside previous research, provide evidence for stable, genetically rooted variation in the engagement in both counterproductive and citizenship behaviors at work. The importance of nonshared experiences has also been highlighted here—individuals with the same genome and raised in the same household are far from identical in their nontask performance. The influence of friends, colleagues, organizational practices, or values may drive such differences in behavior between related individuals. These findings offer additional insight for theory and practice regarding the differential nature (individual differences) and nurture (including organizational factors) influences on counterproductive and citizenship behavior. Given the importance of nontask performance in organizational success, understanding the origins of such behaviors has implications for how organizations may choose to promote or discourage such behavior sets via selection or organizational modification.

Postscript

Acknowledgements

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Supplementary materials

Supplementary materials for this project can be found in Appendix A.

Table 1.4. Descriptive Statistics

Sample*	Twin sample	Partners of twins	SIBS sample	Parents of SIBS
Overall N	1012	528	708	536
Female N (%)	513 (58.1%)	220 (41.7%)	336 (54.7%)	306 (57.0%)
Age M(SD)	40.9 (2.5)	41.8 (4.7)	31.8 (2.7)	64.8 (4.8)
Range	35.8-47.8	29.4 – 59.7	25.7 – 40.6	52.5 – 77.5
College Degree or higher N (%)	533 (54.6%)	289 (54.7%)	496 (70.1%)	351 (65.5%)
Workplace behavior				
OCB M(SD)	44.9 (7.0)	44.2 (7.2)	44.2 (6.8)	46.0 (6.2)
Range	24-60	24-60	24-60	28-60
α	.85		.84	
Range possible 0-60				
OCB Conscientious Initiative M(SD)	14.3 (3.2)	14.0 (3.3)	14.2 (3.2)	14.5 (2.8)
Range	5-20	4-20	5-20	6-20
α	.80		.79	
Range possible 0-20				
OCB Organizational M(SD)	14.5 (3.2)	14.3 (3.2)	14.3 (3.1)	15.1 (2.9)
Range	5-20	5-20	5-20	6-20
α	.78		.78	
Range possible 0-20				
OCB Interpersonal M(SD)	16.1 (2.2)	15.9 (2.3)	15.7 (2.2)	16.4 (2.1)
Range	10-20	9-20	9-20	10-20
α	.54		.57	
Range possible 0-20				
CWB M(SD)	6.7 (5.4)	7.0 (5.5)	8.3 (6.1)	6.0 (4.9)
Range	0-24	0-24	0-28	0-21
α	.84		.86	
Range possible 0-76				
CWB Interpersonal M(SD)	2.7 (2.8)	2.9 (3.1)	3.3 (3.2)	2.0 (2.3)
Range	0-12	0-13	0-14	0-9
α	.82		.82	
Range possible 0-28				
CWB Organizational Mean (SD)	4.0 (3.4)	4.0 (3.6)	5.0 (3.9)	3.9 (3.4)
Range	0-15	0-15	0-18	0-14

α	.78	.80
Range possible 0-48		

Note: CWB = Counterproductive work behaviors; OCB = Organizational citizenship behaviors. *M* = Mean; *SD* = Standard deviation. *Sample size ranges from 1011-1012 in the Twins sample, 516-528 in the Partners sample, 704 to 708 in the Parents sample, and 535 to 536 in the SIBS Offspring sample. See Appendix A Table A.23 for complete breakdown of missingness. Alpha calculated for combined twins-partners sample and sibling-parents sample.

Table 1.5. Correlations in twins (lower diagonal) and partners (upper diagonal)

	SEX†	Age†	Edu.	CWB	CWB-ID	CWB-OD	OCB	OCB-CON	OCB-OC	OCB-IC
SEX†		-.14	.13	-.25	-.31	-.12	.11	.07	.04	.21
AGE†	-.43		.00	-.01	.01	-.04	.01	-.01	-.00	.05
Edu.	.14	-.13		-.13	-.21	-.00	.06	.05	.07	.02
CWB	-.27	.16	-.16		.77	.84	-.34	-.26	-.23	-.37
CWB-ID	-.27	.18	-.23	.83		.31	-.18	-.08	-.11	-.31
CWB-OD	-.21	.09	-.05	.88	.48		-.37	-.34	-.28	-.30
OCB	.11	-.05	.09	-.32	-.19	-.35		.85	.87	.73
OCB-CON	.08	-.02	.05	-.23	-.10	-.28	.86		.58	.42
OCB-OC	.07	-.04	.08	-.23	-.11	-.27	.86	.58		.51
OCB-IC	.14	-.08	.09	-.35	-.30	-.31	.70	.44	.43	

Note: Edu = Education, CWB = Counterproductive work behavior, ID = Interpersonal deviance, OD = Organizational deviance, OCB = Organizational citizenship behavior, CON = Conscientiousness Initiative, OC = Organizational citizenship, IC = Interpersonal citizenship. SEX = biserial correlation, 1 = Male, 2 = Female. Twins N 1010– 1012. Partners N 516 – 528. †The male twin cohort was collected three years in advance of the female twin cohort, such that there is an inflated association between age and variables associated with sex in the twin sample. Standard error no greater than .001 in the twins sample and .002 in the partner sample. Twin correlations with a magnitude equal to or greater than .07 are statistically significant at $p<.05$. Partner correlations with a magnitude equal to or greater than .09 are statistically significant at $p<.05$.

Table 1.6. Correlations in SIBS offspring (lower diagonal) and SIBS parents (upper diagonal)

	SEX	Age	Edu.	CWB	CWB-ID	CWB-OD	OCB	OCB-CON	OCB-OC	OCB-IC
SEX		-.17	-.08	-.22	-.27	-.14	.17	.14	.08	.19
AGE	.10		.30	-.06	-.11	-.03	-.02	-08	.04	-.03
Edu.	.19	.05		-.02	-.08	.02	.05	-.01	.10	.01
CWB	-.31	-.04	-.15		.81	.92	-.37	-.28	-.26	-.37
CWB-ID	-.33	-.02	-.26	.83		.52	-.28	-.17	-.18	-.35
CWB-OD	-.21	-.05	-.02	.89	.50		-.36	-.30	-.26	-.31
OCB	.16	.01	.03	-.33	-.17	-.40		.82	.83	.72
OCB-CON	.13	-.03	.05	-.26	-.10	-.33	.83		.50	.41
OCB-OC	.09	.04	.01	-.21	-.06	-.28	.83	.50		.43
OCB-IC	.19	.02	.02	-.36	-.30	-.34	.72	.42	.45	

Note: Edu = Education, CWB = Counterproductive work behavior, ID = Interpersonal deviance, OD = Organizational deviance, OCB = Organizational citizenship behavior, CON = Conscientiousness Initiative, OC = Organizational citizenship, IC = Interpersonal citizenship. SEX = biserial correlation 1 = Male, 2 = Female. Offspring N 703 – 708. Parents N 535 – 536. Standard error no greater than .001 in the SIBS offspring sample and .002 in the parent sample. Sibling correlations with a magnitude equal to or greater than .08 are statistically significant at $p<.05$. Parent correlations with a magnitude equal to or greater than .09 are statistically significant at $p<.05$.

Table 1.7. Familial Correlations on Nontask Performance [95% Confidence Intervals]

	OCB	**OCB-CON**	**OCB-OC**	**OCB-IC**	**CWB**	**CWB-ID**	**CWB-OD**
(N Pairs) Siblings							
MZ Twins (261-260)	.34 [.25, .43]	.31 [.22, .39]	.29 [.20, .38]	.32 [.23, .41]	.40 [.32, .48]	.40 [.32, .48]	.36 [.27, .44]
DZ Twins (130)	.17 [.04, .30]	.04 [-.09, .17]	.20 [.08, .33]	.10 [-.03, .23]	.20 [.07, .32]	.36 [.24, .47]	.01 [-.12, .14]
Nonadoptive Siblings (88)	.15 [-.06, .35]	.13 [-.08, .33]	.12 [-.09, .32]	.09 [-.12, .29]	.23 [.02. .42]	.24 [.04, .43]	.25 [.04, .44]
Adoptive Siblings (138-137)	.12 [-.05, .28]	.12 [-.04, .29]	-.00 [-.17, .16]	.13 [-.04, .29]	-.09 [-.25, .08]	-.13 [-.29, .04]	-.02 [-.18, .15]
Parent-Offspring							
Nonadoptive Parent and Offspring (203)	.14 [.00, .27]	.22 [.08, .35]	.07 [-.06, .21]	.10 [-.03, .24]	.16 [.02, .29]	.11 [-.03, .24]	.20 [.06, .33]
Adoptive Parent and Offspring (263)	-.01 [-.13, .11]	-.02 [-.14, .10]	-.00 [-.12, .12]	-.03 [-.15, .09]	.15 [.03, .26]	.05 [-.07, .17]	.18 [.06, .30]
Couples							
Mid-Life Couples (528-527)	.16 [.08, .24]	.14 [.05, .22]	.16 [.08, .25]	.13 [.04, .21]	.18 [.09, .26]	.11 [.02, .19]	.19 [.11, .27]
Late-Life Couples (201-200)	.11 [-.03, .24]	.13 [-.01, .27]	.12 [-.02, .25]	.02 [-.12, .16]	.16 [.03, .29]	.07 [-.07, .20]	.16 [.02, .29]

Note: OCB = Organizational Citizenship Behavior, CON = Conscientious Initiative, OC = Organizational Citizenship, IC = Interpersonal Citizenship, CWB = Counterproductive Work Behaviors, ID = Interpersonal Deviance, OD = Organizational Deviance. To account for sex differences, spouse/partner pairs are set up to as males/females. In the mid-life pairs, there were 16 same-sex couples and one spouse choose not to answer, in these cases the partners were placed in the opposite sex group of their respective twin partners.

Table 1.8. Fit statistics when ACE estimated separately and constrained equal in twin and adoption samples

Phenotype	-2LL	DF	AIC	$\Delta\chi^2$ (3) Free - Constrained	$\Delta\chi^2$ (1) Constrained – Combined	*p*
OCB						
Free (ACE)	11464.3	1711	8042.3			
Constrained (ACE)	11465.6	1714	8037.6	1.3		.73
Combined (ACET)	11465.6	1713	8039.6		0.0	1.0
OCB Conscientious Initiative						
Free (ACE)	8824.1	1712	5384.7			
Constrained (ACE)	8825.6	1715	5395.6	1.5		.68
Combined (ACET)	8825.6	1714	5397.3		0.0	1.0
OCB Organizational						
Free (ACE)	8808.2	1712	5384.7			
Constrained (ACE)	8810.2	1715	5380.2	2.0		.57
Combined (ACET)	8809.7	1714	53817		0.5	.48
OCB Interpersonal						
Free (ACE)	7469.3	1711	4047.3			
Constrained (ACE)	7471.2	1714	4043.2	1.9		.59
Combined (ACET)	7471.2	1213	4045.2		0.0	1.0
CWB						
Free (ACE)	10679.4	1712	7255.4			
Constrained (ACE)	10689.5	1715	7259.5	10.1		.02
Combined (ACET)	10689.5	1714	7261.5		0.0	1.0
CWB Interpersonal						
Free (ACE)	8427.3	1712	5003.3			
Constrained (ACE)	8437.4	1715	5007.4	10.1		.02

Combined (ACET)	8436.6	1714	5008.6		0.8	.37
CWB Organizational						
Free (ACE)	9162.4	1711	5740.4			
Constrained (ACE)	9175.9	1714	5747.9	13.5		<.01
Combined (ACET)	9175.9	1713	5749.9		0.0	1.0

Note: Free models: Twin and adoption ACE components estimated separately such that twins and SIBS may have different A, C, and E estimates; Constrained: Twin and adoption ACE components estimated simultaneously such that the A, C, and E, estimates are constrained to be the same in both samples. Combined: A, C, E components are estimated simultaneously such that these estimates are constrained to be the same in both samples, and a T parameter is added in the twin sample for twin-specific environmental variance.

Table 1.9. Biometric Estimates in Two Samples with Phenotypes Adjusted for Age and Sex

	A (additive genetic)	C (shared environment)	E (unique environment)	T (twin specific environment)
Organizational Citizenship Behavior				
Twins	.31 [.00, .42]	.01 [.00, .34]	.68 [.58, .79]	
SIBS	.12 [.00, .62]	.11 [.00, .25]	.77 [.36, .99]	
Constrained	22 [.03, .39]	.09 [.00, .23]	.69 [.60, .80]	
Combined	.22 [.00, .39]	.09 [.00, .23]	.69 [.60, .80]	.00 [.00, .24]
OCB Conscientious Initiative				
Twins	.27 [.05, .38]	.00 [.00, .19]	.73 [.62, .84]	
SIBS	.10 [.00, .61]	.11 [.00, .24]	.79 [.36, 1.0]	
Constrained	.21 [.02, .36]	.05 [.00, .19]	.74 [.63, .85]	
Combined	.21 [.00, .36]	.05 [.00, .19]	.74 [.63, .85]	.00 [.00, .15]
OCB Organizational				
Twins	.12 [.00, .38]	.16 [.00, .34]	.72 [.62, .83]	
SIBS	.24 [.00, .60]	.00 [.00, .16]	.76 [.40, 1.0]	
Constrained	.26 [.07, .37]	.02 [.00, .16]	.72 [.63, .83]	
Combined	.17 [.00, .37]	.01 [.00, .16]	.72 [.63, .83]	.10 [.00, .32]
OCB Interpersonal				
Twins	.29 [.00, .39]	.00 [.00, .26]	.71 [.61, .82]	
SIBS	.00 [.00, .42]	.11 [.00, .43]	.89 [.55, 1.0]	
Constrained	.22 [.02, .37]	.06 [.00, .19]	.73 [.62, .84]	
Combined	.22 [.00, .37]	.06 [.00, .19]	.73 [.62, .84]	.00 [.00, .24]
Counterproductive Work Behavior				
Twins	.35 [.09, .45]	.00 [.00, .24]	.65 [.55, .76]	
SIBS	.40 [.00, .80]	.00 [.00, .13]	.60 [.20, 1.0]	
Constrained	.39 [.24, .48]	.00 [.00, .09]	.61 [.52, .73]	
Combined	.39 [.15, .48]	.00 [.00, .09]	.61 [.52, .73]	.00 [.00, .20]
CWB Interpersonal				
Twins	.16 [.00, .46]	.20 [.00, .41]	.64 [.54, .79]	
SIBS	.42 [.00, .81]	.00 [.00, .09]	.58 [.19, 1.0]	
Constrained	.41 [.27, .50]	.00 [.00, .08]	.59 [.50, .70]	
Combined	.28 [.00, .49]	.00 [.00, .08]	.59 [.50, .70]	.12 [.00, .39]
CWB Organizational				
Twins	.30 [.13, .40]	.00 [.00, .12]	.70 [.60, .82]	
SIBS	.47 [.00, .91]	.03 [.00, .18]	.50 [.09, .99]	
Constrained	.34 [.18, .45]	.00 [.00, .10]	.66 [.55, .78]	
Combined	.34 [.17, .45]	.00 [.00, .10]	.66 [.55, .78]	.00 [.00, .11]

Note: OCB = Organizational citizenship behavior; CWB = Counterproductive workplace behavior. Free models: Twin and adoption ACE components estimated separately such that twins and SIBS may have different A, C, and E estimates; Constrained: Twin and adoption ACE components estimated simultaneously such that the A, C, and E, estimates are constrained to be the same in both samples. Combined: A, C, E, and T components are estimated simultaneously

such that these estimates are constrained to be the same in both samples. Given fit model fit (see Table 1.8), we focus on the results of the Constrained model.

STUDY 2

The relationships among counterproductive workplace behavior, organizational citizenship behavior, maladaptive personality and normative personality

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ABSTRACT

The Personality Inventory for the DSM-5 (PID-5) assesses variation in maladaptive, clinically relevant personality traits. The utility of these traits as tools for understanding counterproductive work behavior (CWB) and organizational citizenship behavior (OCB) remains unknown. We examined the association among PID-5 facet traits, Multidimensional Personality Questionnaire (MPQ, a normative trait measure), CWB, and OCB using participants from the Minnesota Twin and Family Study. Linear mixed models were used to examine the amount of variance accounted for in CWB and OCB by the personality traits. Our analysis revealed that (a) maladaptive personality traits accounted for a substantial proportion of variance in both CWB and OCB, (b) that maladaptive traits predicted CWB better than OCB, (c), normative personality traits accounted for comparable amounts of variance in both CWB and OCB, and finally (d), that maladaptive traits added predictive value even after accounting for normative traits, and vice versa. Taken together, these findings provide further evidence for the value of maladaptive personality in addition to, as opposed to a replacement for, normative personality for understanding organizationally relevant behaviors. Given the financial, social, and potentially reputational consequences associated with CWB and OCB to organizations, a further understanding of individual differences that underlie these workplace behaviors has implications in both research and practice.

CWB & OCB: NATURE & ANTECEDENTS

A substantial body of literature has been devoted to understanding the structure and antecedents of organizational citizenship behavior (OCB; extra-role behaviors that help maintain or improve the social and psychological work environment, Sackett et al., 2006) and counterproductive work behavior (CWB; behaviors that harm, or have the potential to harm, the legitimate interests of an organization or its members, Gruys & Sackett, 2003), together referred to as nontask performance. This is not surprising as OCB and CWB have financial consequences to organizations - both directly (e.g., theft, absenteeism) and indirectly (e.g., employees putting in additional effort to see a project completed on time; interpersonal abuse or sabotage; Mercado et al., 2018; Orr et al., 1989; Podsakoff et al., 2009). Predictors of CWB and OCB have included a range of both individual differences (e.g., personality, demographic) and organizational factors (e.g., justice, leader behaviors) (Dalal, 2005; Mercado et al., 2018; Podsakoff et al., 2009; Podsakoff et al., 2000). Personality as a predictor of nontask performance is well-established (Chiaburu et al., 2011; Grijalva & Newman, 2015; Lee et al., 2019; O'Boyle Jr. et al., 2012; Pletzer et al., 2019). However, there has traditionally been a focus on what can be considered normative personality (alternatively non-clinical, normal range, or adaptive) such as the Big-5 personality traits (Chiaburu et al., 2011; Pletzer et al., 2019). Krueger and Markon (2014) noted that personality traits are assumed to range from normative to maladaptive, though measures of traits frequently only assess a subsection of the full continuum. Additionally, most investigations of personality have focused on traits' normative ranges. Recent research has sought to assess the associations between nontask performance and maladaptive or "dark side" traits (Moore, 2019) via the Dark Triad measures (i.e., Machiavellianism, non-clinical Narcissism, non-clinical psychopathy; Jones & Paulhus, 2014; Paulhus & Williams, 2002). However, thus far there has been only limited research for CWB (Grijalva & Newman, 2015; O'Boyle Jr. et al., 2012), and even less for OCB (ex. Szabó et al., 2018; Szalkowska et al., 2015).

The Diagnostic and Statistical Manual for Mental Disorders (DSM; the standard tool for making psychiatric diagnoses in the United States, Association, 2013) now includes a trait-based personality assessment called The Personality Inventory for the DSM-5 (PID-5; Krueger et al., 2012; Krueger & Markon, 2014). The PID-5 was designed to extend our understanding of normative (i.e., non-clinical) personality traits into the maladaptive range of trait continua. The multi-dimensional model of maladaptive personality encompasses 25 facets that map to five higher order factors (i.e., Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism).The maladaptive personality traits are clinically relevant and may be associated with, but do not themselves constitute, formal personality disorders on their own (i.e., they can be used to describe personality in general as well as in clinical settings; Dunne et al., 2018).

The maladaptive personality domains represented in the PID-5 parallel the Big Five normative personality domains (i.e., Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness, see Table 2.10 for descriptions of both trait sets) and there is evidence that the two sets of traits reflect different regions of the same underlying latent trait dimensions (Gore & Widiger, 2013; Suzuki et al., 2015). However, the relationship between Psychoticism and Openness is less straightforward than the relationships between the other normative and maladaptive domains (DeYoung et al., 2012, 2016), with Psychoticism differentially related to the Openness (i.e., reflective of both aesthetic interests, fantasy and imagination) and Intellect (i.e., mental quickness and creativity) aspects of the Openness domain (DeYoung, 2015). DeYoung et al. (2016), noted that "psychoticism can be usefully interpreted as a maladaptive variant of openness that is unrelated or even negatively related to the unique variance of intellect" (p. 120).

In their review of the psychometric properties of the PID-5, including evidence of its validity, Al-Dajani et al., (2015) called for the PID-5 to be examined in regard to important life outcomes, including job performance. However, we were unable to identify any work examining the relationship between among the PID-5 traits, CWB, and OCB. It could be that normative traits adequately account for the stable individual differences associated with nontask performance. However, it may instead be the case that maladaptive traits provide insight into nontask performance that is not captured by the more traditionally assessed normative traits. Thus, the first goal of this study was to examine the association among facets of the PID-5, CWB and OCB.

CWB and OCB have been shown to be unique constructs, rather than opposite poles of a single spectrum (Fox et al., 2012; Sackett et al., 2006), with antecedents operating differently (i.e., direction and magnitude of effect) for the two behavior sets. For instance, while the traits Conscientiousness and Agreeableness have both shown moderate effects with both OCB and CWB (Dalal, 2005; Sackett et al., 2006), Openness and Extraversion are both associated with OCB, but offer comparatively little information for CWB (Berry et al., 2012; Chiaburu et al., 2011; Pletzer et al., 2019, 2021). Additionally, larger effects have been found between the two maladaptive traits Machiavellianism and non-clinical narcissism with CWB than with OCB (Grijalva & Newman, 2015; O'Boyle Jr. et al., 2012; Szabó et al., 2018, 2018). Such findings lead us to the second goal of this article, to examine whether personality traits, maladaptive and normative, are differentially related to OCB and CWB.

Summary of the current study

To understand the relationships among normative personality, maladaptive personality, and nontask performance, we examined the correlations among 25 facet traits from the five trait

domains of the PID-5, the lower order traits from the Multidimensional Personality Questionnaire (MPQ; Tellegen 1982) (see Table 2.11), and CWB and OCB using data from the Minnesota Center for Twin and Family Research. We then explored whether personality traits, both maladaptive and normative, were differentially related to OCB and CWB by using linear mixed models to examine amount of variance accounted for in CWB and OCB by the PID-5 traits and the MPQ traits.

Methods

Sample

Participants included male and female twins from both the younger cohort (initial assessment at the target age 11 years) and the older cohort (initial assessment at target age of 17 years) from the longitudinal Minnesota Twin and Family Study (Iacono et al., 1999; Iacono & McGue, 2002). Twins born between 1972 and 1984 in Minnesota were recruited from publicly available birth records and participants were followed every three to four years, with additional assessments currently ongoing. The Minnesota-statewide sample broadly reflects the states' population of the birth years sampled, with most of participants being white (95.8%). Data from the current study comes from two of three assessments, at target age 24 or 29, when the full MPQ was assessed, and a mid-life assessment (target age range mid-30s to 40s), when the PID-5 and nontask performance measures were assessed. Inclusion criteria for the current study included having been employed at some point in the past three years at the time of the latter assessment, having at least one nontask performance score, at least one PID-5 trait score, and at least one MPQ trait score. This yielded a sample of 650 participants who participated in this study. The majority of participants were female (55%). Participants were an average 29.4-years old (sd = 1.0, range = 22.6 to 31.9) at the time of the MPQ assessment and 40.7-years old (sd = 2.6, range = 35.8 to 45.7) when the PID-5 and nontask performance measures were assessed.

There are multiple factors that could contribute to members of the original sample not being included in the current study (e.g., employment status). However, in terms of sample bias, a key concern is those who would have been eligible for the current study but declined to participate. To examine the potential for such sample bias, we compared target-age 17 MPQ trait scores of participants who participated in the latest assessment used in the current study compared to those who did not[4]. Small mean differences across the MPQ traits were observed at their target-age 17 assessment between those who participated in the age range mid-30s to 40s

[4] This analysis included individuals who had participated in the latest follow-up but who did not necessarily qualify for the current study, such as in cases where participants did not meet the employment criteria

assessment compared to those who did not (Cohen's *d* between .02 and .26) (see Appendix Table B.28). The largest (though still modest) difference between those who participated at the latest assessment compared to those who did not occurred for Stress Reaction (Cohen's *d* = .26), with those who participated in the later assessment reporting higher Stress Reaction than those who did not. Such findings suggested limited differences between those who did and those who did not participate in the later assessments, at least in regards to normative personality.

Measures

Organizational citizenship behavior (OCB)

OCB was measured via an adapted version of Laczo's, (2002) 15-item OCB measure used by Anderson et al., (2022), see Appendix A Table A14. This measure assesses the three facets of OCB outlined by Coleman and Borman (2000): Interpersonal support (e.g., "Was courteous and tactful with co-workers, even when busy or stressed"), organizational support (e.g., "Showed sincere pride and enthusiasm for the organization"), and conscientious initiative (e.g., "Found additional productive work to do when your normally scheduled duties were completed"). Participants were asked to rate the frequency in which they engaged in citizenship behaviors on a 5-point, frequency scale (0 = Never, to 4 = Always) during the past three years if they had been employed at any time during the past three years at the time of the assessment. In contrast, the original Laczo (2002) scale had participants rate their behaviors on a 4-point scale. Some items were also reworded. A composite OCB score was created by taking the sum of the items if the participants missed no more than two items, with scores pro-rated accordingly. Scores were winsorized at three standard deviations above and below the mean to handle extreme values, this affected 0.2% of the scores (i.e., one score). Internal consistency reliability was high (α=.84). OCB pre- and post-winsorization mean, standard deviation, and range can be found in Appendix B, Table B.29.

Counterproductive work behavior (CWB)

CWB was measured via an adapted version of Bennett and Robinson's (2000) 19-item CWB measure used by Anderson et al., (2022). This measure assess two facets of CWB, interpersonal deviance (e.g., "Made fun of someone at work") and organizational deviance (e.g., "Took property from work without permission"). Participants were asked to rate the frequency in which they engaged in deviant work behaviors on a 5-point, frequency scale (0 = Never, to 4 = Always) during the past three years if they had been employed at any time during the past three years at the time of the assessment. In contrast, the original Bennett and Robinson (2000) items were rated on a 7-point scale. Additionally, some items were slightly revised, including verb tense or adding "when not allowed" to the original item "Used an illegal drug or consumed

alcohol on the job". A comparison between the original items and the items used in the current study can be found in Appendix A. A composite CWB score was created by taking the sum of the items if the participants missed no more than two items, with scores pro-rated accordingly. Scores were winsorized at three standard deviations above and below the mean to handle extreme values, this affected 0.6% of the scores (i.e., four scores). Internal consistency reliability was high (α=.83). The CWB items can be found in Appendix A Table A15. CWB pre- and post-winsorization mean, standard deviation, and range can be found in Appendix B, Table B.29.

Normative Personality

Normative personality was measured via the 11 lower-order traits of the Multidimensional Personality Questionnaire: Absorption, Achievement, Aggression, Alienation, Control, Harm Avoidance, Social Closeness, Social Potency, Stress Reaction, Traditionalism, and Well-Being (MPQ; Tellegen, 1982; Tellegen & Waller, 2008). For a description of these scales and where they fall as approximate markers of the Big 5 (i.e., Agreeableness, Conscientiousness, Extraversion, Openness, Neuroticism) per Church, (1994), see Table 2.11. Scales were measured via the 198-item version of the questionnaire, with items rated on a four-point scale from 1= Definitely true to 4 = Definitely false. MPQ scores were taken primarily from the target age 29 assessment (98% of MPQ scores). Age 24 MPQ scores were used if participants either did not take the MPQ at age 29 or their assessment at age 24 had a greater number of available MPQ scores than the number of scores available at age 29 (i.e., if a participant skipped enough items such that a scale score was not computed).

Maladaptive Personality

Maladaptive Personality was measured via the 25 trait facets from the Personality Inventory for the DSM-5 (PID-5) via a 100-item abbreviated version (Maples et al., 2015) of the full 220-item assessment (Krueger et al., 2012). Definitions for each of the facets can be found in Krueger and Markon's (2014) Table 1 (see also American Psychiatric Association, 2013). The 100 items were selected based on Item Response Theory and the list of items included can be found in Maples' et al. (2015) online supplement. See Krueger's et al., (2012) online supplement for the full list of items. Each facet was measured via four items taken from the larger scale. Items were rated on a 4-point Likert-type scale from 0 = "Very false or often false" to 3 = "Very true or often true". Facet scales were scored as the mean value, per standard scoring practices (Krueger et al., 2012), if participants missed no more than one item in that scale, with scores prorated accordingly. The median internal consistency reliability for the abbreviated scales was α = .79, and internal consistency reliability ranged from α = .55 (Irresponsibility) to .88 (Distractibility), the full list of reliability coefficients can be found in Appendix B Table B.31.

Analytic Strategy

Correlations between nontask performance and the personality traits were calculated using the *rcorr* function from the *Hmisc* package, version 4.6.0 (Harrell Jr. & Dupont, 2021) in *RStudio*, version 4.1.2 (RStudio Team, 2020), see Figure 2.1 (see also Appendix B Table B.33). Correlations between the PID-5 traits and the MPQ traits are included in Appendix B, Table B.30. Linear mixed models were run using the *lme4* package, version 1.1.28 (Bates et al., 2015) and extension *lmeTest,* version 3.1.3. (Kuznetsova et al., 2017) via the *lmer* function, which can handle family clustering via a random intercept. Marginal R^2 (i.e., amount of variance explained by the fixed effects, here forth R^2) was computed via the *r.squaredGLMM* function in the *MuMIn* package, version 1.43.17 (Barto´n, 2020). For both CWB and OCB, four regression models were run: A demographic model (i.e., age and sex), a model including the 11 MPQ traits in addition to the demographic variables, a model including the 25 PID-5 trait facets and the demographic variables, and a model including both sets of personality traits in addition to the demographic variables. For each of these models, marginal R^2 was calculated (see Figure 2.2). Regression coefficients for the two full models (i.e., the 11 MPQ traits, 25 PID-5 traits, and demographics) are presented in the Appendix, Table B.32.

Results

Correlations between the personality traits (both normative and maladaptive) and nontask performance ranged from negligible to moderate, see Figure 2.1. Normative personality traits, in aggregate, accounted for similar proportions of variance in both CWB and OCB[5], with normative traits and demographics (i.e., sex and age), accounting for 22.0% of variance in CWB and 20.1% of the variance in OCB (see Figure 2.2). In contrast, the maladaptive personality traits in aggregate accounted for a greater proportion of variance in CWB than OCB[6], with maladaptive traits and demographics, accounting for 29.4% of the variance in CWB and 14.7% of the variance in OCB.

The design of the current study does not allow us to directly evaluate the relative value of normative and maladaptive personality as predictors of CWB and OCB. First, because the normative and maladaptive personality assessments occurred at different waves. Second, due to the range of content covered by the two personality inventories. We do not claim to cover the full range of normative and maladaptive personality here. However, we conducted additional analysis

[5] Analyses excluding age and sex covariates show MPQ traits accounted for 18.7% of the variance in CWB, and 19.3% of the variance in OCB.

[6] Analysis excluding age and sex covariates show PID-5 traits accounted for 25.9% of the variance in CWB, and 12.7% of the variance in OCB.

using the MPQ and PID-5 inventories to provide further insight into the relationships among normative personality traits, maladaptive personality traits, and nontask performance.

The results of our regression analysis showed that the two personality inventories accounted for unique variance in both CWB and OCB over and above the alternate personality inventory (see Figure 2.2). As a next step, we explored the unique contribution of each of the personality traits as predictors of nontask performance after accounting for all traits of the opposing personality inventory. To do this we took the residuals of each trait after regressing each of the traits on all other traits of the opposing inventory (e.g., the residuals of Perseveration regressed on all of the 11 MPQ traits; the residuals of Traditionalism regressed on all of the 25 PID-5 traits). We then examined the correlations between the residualized traits and nontask performance (see Figure 2.3; see also Appendix B Table B.33). From an absolute value standpoint, this allowed us to examine which of the maladaptive traits were most strongly associated with nontask performance *after* accounting for the normative traits. For instance, traits such as Perseveration continued to be moderately and positively associated with CWB even after accounting for normative personality (r = .25, 95% CI [.17, .33]), was Perseveration continued to have a small, and negative association with OCB (r-.14, 95% CI [-.22, -.06]). We were also able to examine the *change* in magnitude between traits and nontask performance once the alternate inventory was accounted for. Differences between the raw and residualized correlations ranged between Δr .00 and .22 across bot the normative and maladaptive traits, and eleven traits went from statistically significant to statistically insignificant for CWB and 17 did so for OCB.

Next, we conducted follow-up analyses using a subset of MPQ scales (i.e., seven of the 11 scales) that had been assessed at the same time as nontask performance. These analyses included 645 of the participants used in the primary analyses who had also completed the MPQ-subset at the target age range 30s-40s assessment. This analysis provided additional insight into the degree to which the two personality inventories accounted for additional variance over each while partially accounting for time as a confounding factor. We regressed CWB and OCB on the seven MPQ scales measured concurrently with nontask performance, the four scales prospectively measured relative to nontask performance and demographic factors. The amount of variance accounted for in CWB and OCB both increased with the use of the seven concurrent scales in place of the seven prospective scales (ΔR^2 = 8.5% and 7.1%, respectively). We then expanded these two regression models to include the PID-5 traits. This allowed up to compare the amount of variance in nontask performance accounted for by the PID-5, the MPQ, and the combination of the two inventories. The results suggested that the MPQ traits and PID-5 traits, accounted for similar amounts of variance in CWB (R^2= 30.5% and 29.4%, respectively –

including variance accounted for by demographic factors), and that both inventories continued to account for additional variance over and above each other (R^2 in combined PID-5 and MPQ model = 35.6%). The MPQ traits accounted for more variance in OCB than the PID-5 traits did (R^2= 27.2% and 14.7%, respectively – including variance accounted for by demographic factors), and both scales continued to account for additional variance over and above each other (R^2 in combined PID-5 and MPQ model = 31.3%). Correlations between MPQ traits at the two time-points and correlations between the concurrently assessed MPQ and nontask performance are provided in Appendix B Table B.34 and B.35, respectively. The R^2 for the regression models including both the prospectively measured (relative to the assessment of nontask performance) MPQ scales and the concurrently measured PID-5 scales for both CWB and OCB are provided in Appendix B Figure B.7.

Discussion

Our analysis of normative personality, maladaptive personality, and nontask performance revealed that (a) maladaptive personality traits accounted for a notable proportion of variance in both CWB and OCB, (b) that maladaptive traits predicted CWB better than OCB, (c), normative personality traits accounted for comparable amounts of variance in both CWB and OCB, and finally (d), that maladaptive traits added predictive value even after accounting for normative traits, and vice versa. Taken together, these findings provide further evidence for the value of maladaptive personality in addition to, as opposed to a replacement for, normative personality for understanding organizationally relevant behaviors.

Just as not all normative personality traits are associated with CWB and OCB in equal magnitude (Chiaburu et al., 2011; Mercado et al., 2018; Mount et al., 2006; Pletzer et al., 2021), the association between the 25 maladaptive traits of the PID-5 showed varying degrees of association with nontask performance. Each of the 25 maladaptive traits was significantly associated with CWB, with correlations ranging from small, (i.e., r = .11 for Intimacy Avoidance) to moderate (i.e., r = .34 for Hostility). On the other hand, OCB had near zero correlations with some of the PID-5 traits such as Rigid Perfectionism, a maladaptive continuation of high Conscientiousness, and Unusual Beliefs and Experiences, a facet of the Psychoticism domain. However, OCB had moderate, negative correlations with other traits, such as with Perseveration (a lower order trait of Negative Affect) and Anhedonia (a lower order trait of Detachment) (r = -.23 and -.24, respectively). Such findings paint an interesting picture for the relationship between nontask performance and normative and maladaptive traits. In some cases, the pattern between normative and maladaptive traits with nontask performance was highly consistent. For instance, Agreeableness has been found to be negatively associated with CWB (Mercado et al., 2018;

Pletzer et al., 2019), and our findings reflected this with both normative personality traits (e.g., moderate and positive association between Aggression and CWB) and maladaptive traits (e.g., moderate and positive association with Deceitfulness and CWB). In contrast, Openness has tended to show only small associations with CWB, while the current findings show CWB moderately and positively associated with the facets of Psychoticism.

In aggregate, normative personality traits accounted for variance in CWB and OCB comparably well. However, maladaptive traits, in aggregate, accounted for more variance in CWB than they did for OCB. We speculate two possibilities here. First, it is possible that maladaptive traits provide greater insight into antisocial behaviors, including those that take place at work, than they do for prosocial behaviors. Antisocial and prosocial behaviors may stem from two unique domains. Certainly there is evidence that antisocial and altruistic behaviors are independent tendencies (Krueger et al., 2001). Alternatively (or perhaps additionally), it is possible that OCB is more strongly a product of the environment (e.g., workplace culture), such that individual differences on the whole predict OCB less well than they do CWB. Recent work by Anderson et al. (2022) provided evidence that CWB is more heritable than OCB (i.e., that a greater proportion of variance in CWB, compared to OCB, is accounted for by genetic variance) and conversely that a greater proportion of variance in OCB, compared to variance in CWB, is accounted for by environmental variance (which would include, but is not limited to, experiences in the workplace). Before moving on from such speculations, we wish to reiterate a caution to the reader. The design of the current study does not allow us to draw strong comparisons between the maladaptive traits of the PID-5 with the normative traits of the MPQ given the different longitudinal timepoints at which the traits were measured.

There are several limitations to the current study that should be considered when interpreting the results and considering generalizability. First, our sample was drawn from Minnesota, a U.S. state with higher rates of educational attainment and lower rates of unemployment than many other U.S states (U.S. Bureau of Labor Statistics, 2019; World Population Review, 2021). The occupational distribution of the participants in the current study may not be representative of the United States employed population as a whole. Additionally, concerns of sample attrition naturally arise in longitudinal research. However, attrition analyses, as noted earlier, revealed limited differences in normative personality at target-age 17 between those who completed the latest follow-up included in the current study and those who did not.

A particularly important consideration from an applied industrial/organizational standpoint is the consequence-free nature of the self-report measures. Participants in this study are part of a long-running, longitudinal study with no benefits or negative consequences (e.g., employment

opportunities) for responses trending a particular direction. While such scenarios do not preclude the exaggeration or diminution of self-reported behaviors and tendencies, it would be reasonable to expect participants would respond to questions differently in high stakes situations. We encourage additional research examining maladaptive traits in applied, organizational settings where participants may be more reticent about behaviors and tendencies in the workplace.

A number of authors have voiced opportunities as well as concerns with using the PID-5 in organizational settings (Christiansen et al., 2014; Dilchert et al., 2014; Guenole, 2014; Melson-Silimon et al., 2019). The use of clinical measures of personality may offer additional insight into drivers of workplace behavior. However, legitimate concerns surrounding the incorporation of such measures into organizations, including into selection systems, from both legal and applicant experience perspectives, have been brought forward. The clinical nature of the PID-5 assessment, much like that of the Minnesota Multiphasic Personality Inventory (MMPI), sets the assessment under the category of a medical examination per the Americans with Disabilities Act (ADA) (Melson-Silimon et al., 2019), thus limiting its use in selection systems to a contingency assessment post job-offer (i.e., for use only after an applicant has been offered a job, with the applicant's performance on the measure a contingency for employment). However, it should be noted that assessments such as the MMPI have played roles in organizations beyond applicant selection. For instance, the United States military has employed the MMPI as an aid in occupational placement decisions, including special duty training assignments (Butcher et al., 1990; Dorfman & Leonard, 2001). The inclusion of maladaptive trait assessments in employment settings will need to be guided by the amount of risk and responsibility embedded in the organization or role (e.g., for financially or legally defensible purposes). We look forward to future research on the costs and benefits of measuring maladaptive traits in work settings.

The current study offers insight into the relationship between maladaptive personality and nontask performance. Importantly, initial findings suggest that maladaptive traits may play a unique role in the manifestation of nontask performance, particularly CWB. Given the financial, social, and potentially reputational consequences associated with CWB and OCB to organizations, broadening our understanding of the individual associated with these two sets of work behaviors have important implications for both research (e.g., further illuminating the nomological net between individual differences and nontask performance) and practice (e.g., via development of organizational interventions). We encourage and look forward to additional research further examining the role of maladaptive traits and normative traits in nontask performance.

Postscript

Acknowledgements

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Supplementary materials

All supplementary materials for this project can be found in Appendix B.

Table 2.10. Description of PID-5 Domains and Big-Five Personality Domains

Big Five Domain Definition* Normative portion of the trait's continuum	PID-5 Domain Definition** Maladaptive portion of the trait's continuum
Conscientiousness: Marked by the two aspects industriousness (e.g., being hard working and dependable) and orderliness (e.g., being detailed oriented and tidy).	**Disinhibition**: Marked by pursuit of immediate gratification, impulsive behavior, and disregard of consequences.
Agreeableness: Marked by the two aspects compassion (e.g., a concern and care for others via warmth or sympathy) and politeness (e.g., being likable and conflict adverse).	**Antagonism:** Marked by an enhanced view of one's own importance paired with a callous antipathy towards others.
Neuroticism: Marked by the two aspects volatility (e.g., a lack of stability or calmness, easily angered/agitated) and withdrawal (a lack of happiness/presence of sadness, presence of non-clinical anxiety or depression).	**Negative Affect:** Marked by high and frequent negative emotions such as anxiety, and their corresponding personal or interpersonal behaviors.
Extraversion: Marked by the two aspects enthusiasm (e.g., friendliness and positive emotion) and assertiveness (e.g., talkativeness and ambition).	**Detachment:** Marked by a withdrawal of social engagement in a range of interpersonal settings and limited affective experience an expression.
Openness/Intellect: Marked by the two aspects intellect (e.g., mental quickness, creativity) and openness (e.g., degree of aesthetic interest, fantasy, and imagination).	**Psychoticism:** Marked by behaviors and thought patterns or content that are culturally incongruent, odd, eccentric or unusual.

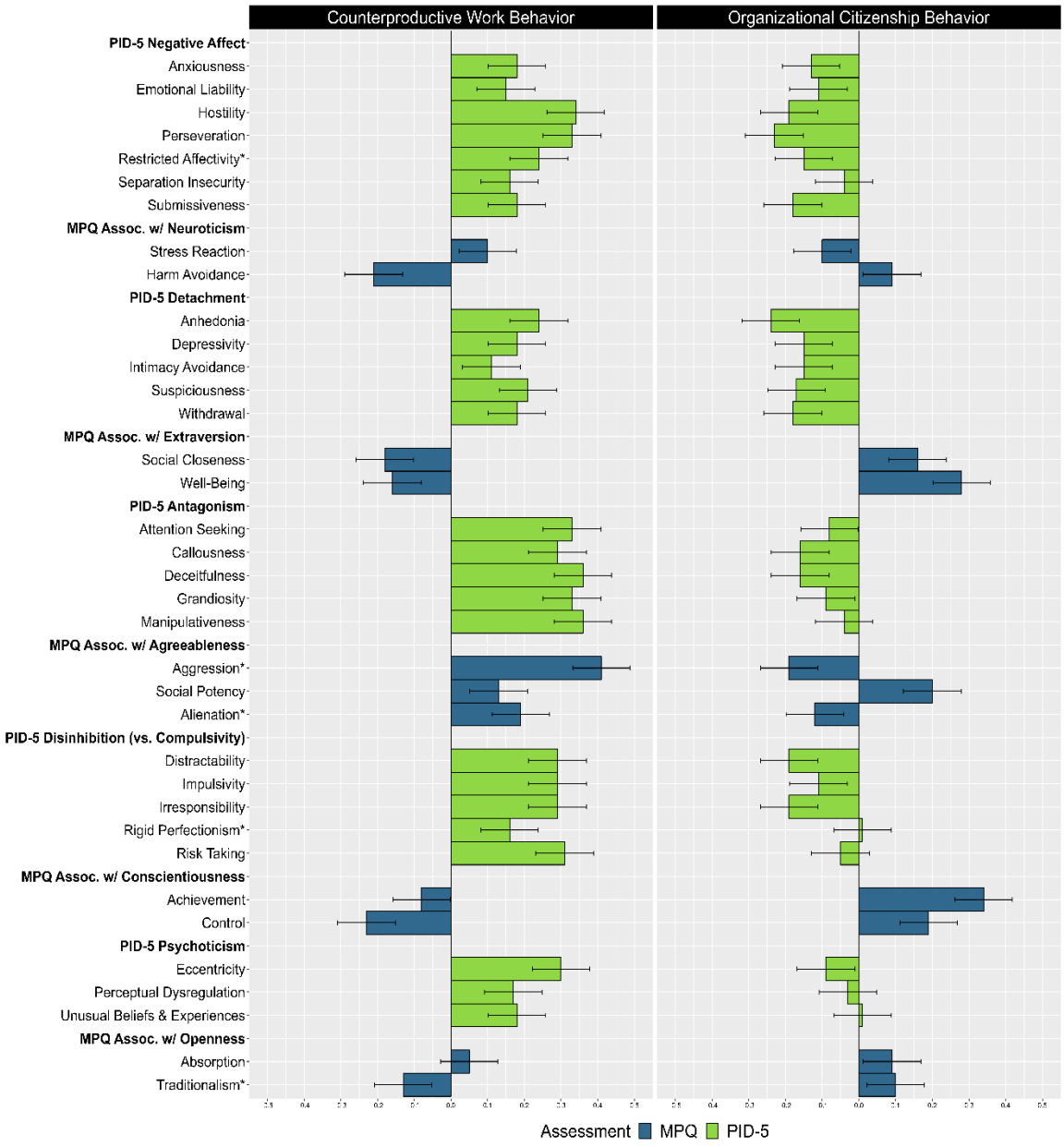
Note. *See DeYoung et al., 2007; **Association, 2013; Krueger & Markon, 2014

Table 2.11. Lower Order Trait Descriptions of the Multidimensional Personality Questionnaire Traits

MPQ Trait	MPQ Shortened Definition	Big Five Marker
Social closeness*	Marked by sociability. Values and enjoys close interpersonal ties.	**Extraversion**
Well-being	Marked by a cheerful/happy disposition. Enjoys what (s)he does and is an optimist.	
Aggression*†	Marked by physical and/or emotional aggressiveness. Enjoys engaging in aggression against others.	**Agreeableness**
Social potency	Marked by forcefulness and decisiveness. Enjoys social influence, leadership roles, and being the center of attention.	
Alienation†	Marked by beliefs that others want to harm him/her. Sense of being victimized.	
Achievement*	Marked by hard work and self-drive. Enjoyment in working hard and sets high standards.	**Conscientiousness**
Control* (vs. impulsivity)	Marked by being cautious, careful, sensible, and reflective. Enjoys planning activities in detail.	
Stress Reaction*	Marked by being tense and nervous, feeling vulnerable or easily upset.	**Neuroticism**
Harm avoidance	Marked by aversion to participating in dangerous activities. Preference for safe activities or experiences even if such tasks/events are tedious or aggravating.	
Traditionalism*†	Marked by endorsing high moral standards and religious values. Value for conventional propriety and good reputation.	**Openness**
Absorption *	Marked by responsiveness to evocative signs or sounds, can become deeply engaged in own imaginings or thoughts, experiences of states of altered awareness	

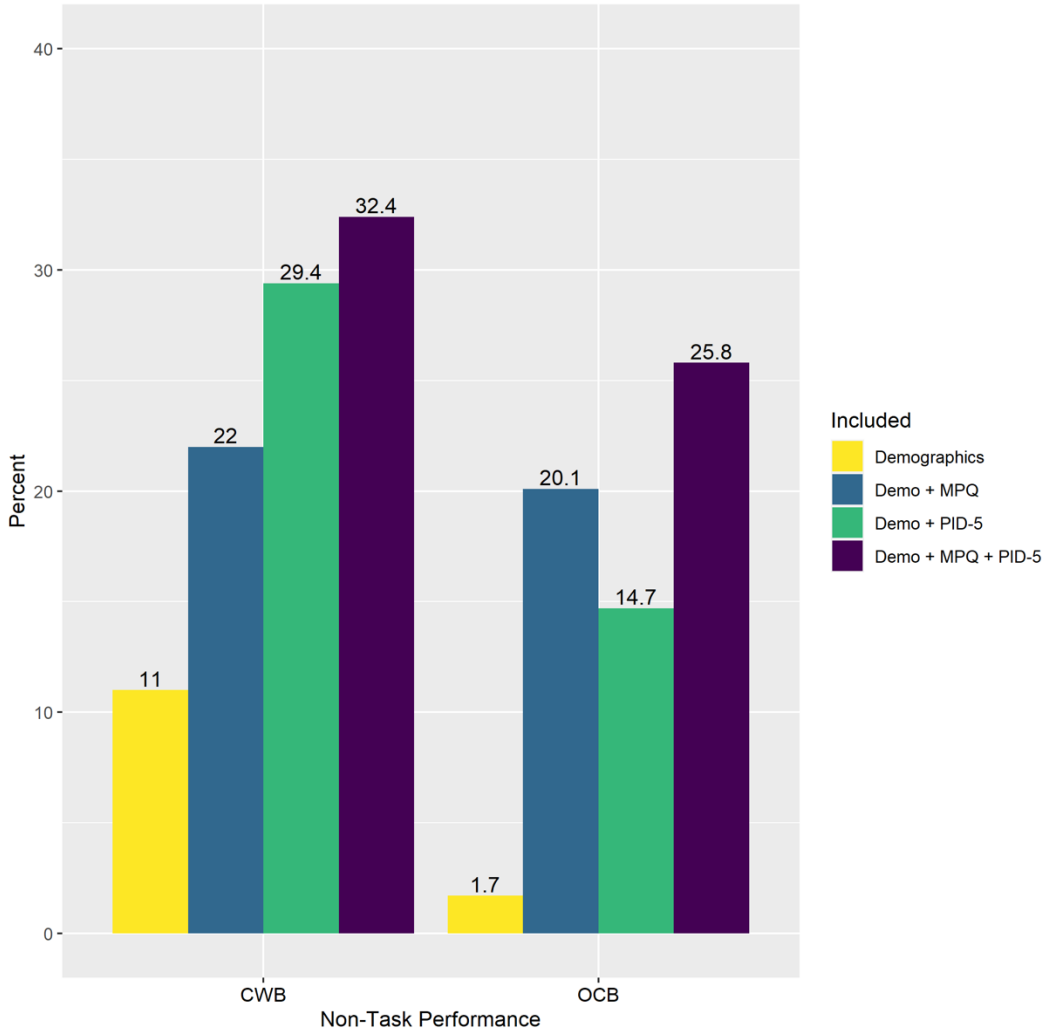
Note: Shortened descriptions of MPQ traits from Tellegen and Waller (2008). MPQ traits as markers of Big 5 traits per Church (1994). The "best" markers for the Big Five traits noted with * (Church, 1994, pg. 907), †Indicators of the opposite poles of the respective domains/traits.

Figure 2.1 Correlations (95% CI) between personality traits and nontask performance



Note. *Indicators of the opposite poles of the respective domains. N for correlations ranges from 649-650, with one participant missing a score on Restricted Affectivity. Assoc. w/. = Associated with

Figure 2.2. Percent of variance (R^2) accounted for in CWB and OCB by normative and maladaptive personality traits



Note. CWB = Counterproductive work behavior, OCB = Organizational citizenship behavior. Demo = demographics which includes age and sex. N = 649

Figure 2.3 Correlations (95% CI) between the residuals of personality traits regressed on traits of the opposing personality inventory and nontask performance

Note. *Indicators of the opposite poles of the respective domains. N for correlations ranges from 649-650. Assoc. w/. = Associated with. Residualized traits are the residuals of each trait after regressing each of the traits on all other traits of the opposing inventory (e.g., the residuals of Perseveration regressed on all of the 11 MPQ traits; the residuals of Traditionalism regressed on all of the 25 PID-5 traits).

STUDY 3

Associations among adolescent disinhibition, adolescent prosociality, counterproductive workplace behavior and organizational citizenship workplace behavior: A prospective study

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ABSTRACT

Previous research has examined associations between adolescent factors and counterproductive work behavior (CWB), but organizational citizenship behavior (OCB) and adolescent prosociality have been neglected in this area of study, such that the larger structure among adolescent prosociality and disinhibition, CWB and OCB remains unclear. We prospectively explored the relationships among these adolescent factors and later adult work behavior using data from the Sibling Interaction and Behavior Study, a longitudinal study that follows pairs of siblings from adolescence into adulthood. Structural equation modeling was conducted to examine the associations among general disinhibition which included measures of overt and relational interpersonal aggression, externalizing symptom counts (i.e., attention-deficit hyperactivity disorder, oppositional defiant disorder and conduct disorder), aggressive orientation, antisocial attitudes, and delinquent behavior, alongside adolescent prosociality, which included sibling prosocial behavior, peer prosocial behavior, and prosocial attitudes, and both CWB and OCB. Analysis revealed that (a) CWB was associated with both the presence of adolescent disinhibition and a lack of adolescent prosociality, (b) OCB was positively associated with adolescent prosociality, but was insignificantly related to adolescent disinhibition, and that (c) adolescent prosociality was strongly and negatively associated with adolescent disinhibition. Taken together, these findings provide further insight into the nuances within the nomological net of prosocial and disinhibited behaviors and attitudes.

CWB & OCB: NATURE & ANTECEDENTS

Organizations benefit from understanding their employees' prosocial and antisocial work behaviors, as these behaviors impact organizational function and finances (Mercado et al., 2018; Ones & Dilchert, 2013; Orr et al., 1989; Rotundo & Sackett, 2002). Psychology broadly has invested in understanding these two behavioral domains, both within and outside an organizational context (e.g., employee theft, McNees et al., 1980, psychopathology, Am. Psychiatr. Assoc., 1952; Blashfield et al., 2014; civic engagement, Adler & Goggin, 2005). Researchers have explicitly examined whether seemingly opposing behavior sets, such as altruism and antisocial behavior (Krueger et al., 2001) lie at opposite ends of a single continuum (e.g., similar to the personality trait continuum Agreeableness-Antagonism; Blain et al., 2021; Sleep et al., 2018) or represent separate, but negatively correlated behavioral domains. Krueger et al. (2001) found that altruism and antisocial behavior were virtually uncorrelated, and had different magnitudes of association with a variety of personality traits (e.g., [self] Control was moderately and negatively associated with antisocial behavior, but had a small and non-significant association with altruistic behavior). Similarly, Sackett et al., (2006) found that counterproductive work behavior (CWB; i.e., behaviors that detract from the legitimate goals or values of the organization; Gruys & Sackett, 2003) and organizational citizenship behavior (OCB; i.e., those positive behaviors not associated with core job tasks that aid in the smooth running of the organization; Borman & Motowildo, 1993; Organ, 2018) were separate behavioral domains. CWB and OCB were only moderately and negatively correlated with each other and had different patterns of association with a variety of personality traits (Dalal, 2005; Sackett et al., 2006).

Many of the behaviors engaged in by adults have developmental origins in childhood or adolescence. For instance, Johnson et al., (2007) found that adolescent girls who displayed a troubled personality trajectory (e.g., marked by high aggression and low [self] control) were less likely to complete a college degree and more likely to struggle with substance use and antisocial behaviors than other girls in adulthood were. Work behaviors and outcomes can also be predicted from child and adolescent factors. Roberts et al., (2007) found that personality traits such as aggression and a lack of (self) control at age 18 were associated with later engagement in counterproductive work behaviors at age 26. Similarly, retrospective reports of school-related issues were positively associated with counterproductive behaviors at work (Stanek et al., 2017). Boys who displayed disruptive behaviors in childhood were at greater risk for periods of unemployment and lower earnings as adults, compared to boys without such behavioral problems (Healey et al., 2004; Vergunst et al., 2019).

The link between disinhibited adolescent behaviors and later adult deviant behaviors (e.g., CWB), may be accounted for, at least in part, by a general tendency towards disinhibition. Researchers have identified an overarching externalizing spectrum, marked by a trend towards disinhibition, that ties together a range of problematic behaviors such as substance abuse and antisocial behavior in adults (Farmer et al., 2009; Krueger et al., 2005, 2007, 2021). The externalizing spectrum has also been identified in adolescence, marked by substance use problems as well as behavioral disorders: oppositional defiant disorder (ODD: i.e., defiant and disobedient behavior directed towards authority figures), conduct disorder (CD; i.e., violating the rights of others, including physical aggression and rule breaking), and attention-deficit hyperactivity disorder (ADHD, i.e., inattention, motor restlessness and impulsivity) (Bezdjian et al., 2011; Blanco et al., 2015).

Such findings lead us to hypothesize the following:

Hypothesis 1. A general factor of adolescent disinhibition including behaviors (i.e., interpersonal and delinquent), disruptive disorder clinical symptoms (e.g., conduct disorder symptoms), and aggressive and antisocial opinions and attitudes will be positively related to later adult CWB.

Like disinhibited behavior, prosocial behavior encompasses a wide range of behaviors (Eisenberg & Spinrad, 2014). Prosocial behaviors can include civic engagement (Adler & Goggin, 2005; Doolittle & Faul, 2013), altruism (Eagly, 2009; Rushton et al., 1981), or OCB (Borman & Motowildo, 1993; Organ, 2018; Williams & Anderson, 1991), and may be community (or organizationally) directed or interpersonally directed. Unfortunately, no overarching or hierarchical models like those developed for disinhibited behaviors have been explored for prosocial behavior to our knowledge. Moreover, research has found only small associations between different domains of prosocial behaviors (e.g., OCB and civic engagement, Cohen & Vigoda, 2000; OCB and altruism, Emmerik et al., 2005; interpersonal prosocial behavior and community volunteering, Fraser, 2021). However, prosocial behaviors in childhood or adolescence have been associated with less substance use (Carlo et al., 2007) higher earnings (Vergunst et al., 2019), and greater civic engagement (Taylor et al., 2018) later in life. Thus, we hypothesis the following:

Hypothesis 2. A general factor of adolescent prosociality including interpersonal peer behaviors, interpersonal sibling behaviors, and prosocial attitudes will be positively related to later adult OCB.

As noted earlier, prosocial and antisocial behaviors in adulthood do not appear to be opposing ends of the same spectrum, but rather unique domains such that individuals can, and do,

engage in both behavioral sets. In adults, antisocial and altruistic behaviors had a near zero correlation (Krueger et al., 2001), while CWB and OCB are moderately and negatively associated with each other (Dalal, 2005). Even in childhood and adolescence, the association between prosocial behavior (including helping and sharing), had only a small negative association with indirect aggression (e.g., social exclusion, rumor spreading), and a moderate and negative association with overt aggression (e.g., hitting; yelling) (Card et al., 2008). Given this, we hypothesize the following:

Hypothesis 3. Adolescent disinhibition will have a negligible relationship with adolescent prosociality.

And:

Hypothesis 4A. The association between adolescent disinhibition and OCB will be negligible and,

Hypothesis 4B. The association between adolescent prosociality and CWB will be negligible.

Summary of the current study. We examined the associations among CWB, OCB, a general factor of adolescent disinhibition and a general factor of adolescent prosociality using data from the Sibling Interaction and Behavior Study, a longitudinal study of adopted and non-adopted individuals. Structural equation modeling was conducted using OpenMx. Indicators of general disinhibition assessed in adolescence included overt and relational interpersonal aggression, externalizing symptom counts (i.e., attention-deficit hyperactivity disorder, oppositional defiant disorder and conduct disorder), aggressive orientation, antisocial attitudes, and delinquent behavior (see Figure 3.4). Adolescent prosociality included sibling prosocial behavior, peer prosocial behavior, and prosocial attitudes.

Methods

Sample

Participants in the current study came from the Sibling Interaction and Behavior Study (SIBS), a longitudinal family study initiated in 1998 that follows pairs of adoptive and non-adoptive siblings and their rearing parents. The original sample included 1232[7] offspring from 617 families (208 nonadoptive sibling pairs, 285 adoptive sibling pairs, and 124 mixed sibling pairs, where one sibling was adopted and the other was biologically related to his or her rearing parents). Adoptive and mixed families were systematically ascertained from three large adoption agencies in Minnesota, and nonadoptive families from Minnesota state birth records. All

[7] Two offspring from two different adoptive families were deemed ineligible due to exclusion criterion; see McGue et al., (2007) for additional details.

adoptions were closed and no data was collected from the birth parents of the adoptive offspring. For additional information on the ascertainment and recruitment of the SIBS sample, see McGue et al., (2007). Nonadoptive participants broadly reflected Minnesota's population in racial demographics at the time of their births, with almost all nonadoptive offspring being White. However, adoptive offspring participants were raised by parents with a higher than average socioeconomic status (SES; measured via a combination of educational attainment, income, and occupational status) for the state of Minnesota. The majority of the adoptive offspring were East Asian (66%), followed by 21% being White, and the remaining 13% another ethnicity (see McGue et al., 2007 for additional details).

Data from the current study come from the SIBS first and second assessments (in adolescence), and the fourth assessment (in adulthood). Seven hundred and sixty-nine offspring completed the fourth assessment, which ran from 2018 through 2021. To be included in the current study, participants had to have at least one score in adolescence, been employed at some point in the past three years at the time of the fourth assessment, and have at least one non-task work performance score. Six-hundred and eighty-seven participants (60% female) met these criteria. Mean (sd, range) age was 14.7 years (1.8, 10.7 to 18.8 years) at the first assessment, 18.0 (1.9, 13.7 to 23.9) at the second assessment, and 31.6 years (2.5, 25.7 to 38.0) at the fourth assessment.

Sample attrition was assessed by comparing the adolescent behaviors and attitudes of SIBS participants who completed the fourth assessment compared to those who did not (see Appendix C Table C.45). SIBS participants who completed the fourth assessment, compared to those who did not, had statistically significantly, at $p<.05$, fewer externalizing symptoms, less aggressive orientations, less antisocial attitudes, fewer delinquent behaviors, and less interpersonal aggression. However, the effect sizes were small (Relational Aggression $d = .14$ 95%CI [.02, .26]) to moderate (Overt Aggression $d = .38$ 95%CI [.25, .51])[8]. SIBS participants who completed the fourth assessment, compared to those who did not, also reported engaging in significantly more peer-directed prosocial behaviors ($d = .17$, 95% CI [.05, .29]) and holding more prosocial attitudes ($d = .29$, 95% CI [.17, .41]), but not have significantly more prosocial relationships with their siblings. Taken together, participants who continued to participate in the longitudinal study were, compared to those who dropped out, more prosocial and less disinhibited in adolescence.

Measures

[8] Note, mean differences calculated on self-reported scores pre-winsorization as winsorization occurred in the final sample.

Clinical symptoms, opinions/attitudes, delinquent behavior, and prosocial sibling behavior were only used if the participant was under age 19 at the time of assessment. Interpersonal peer behaviors (i.e., relational aggression, overt aggression, and prosocial behavior) were only assessed at the second assessment and participants were asked to refer to their last three years of high school if they had graduated or left high school.

We employed the Minnesota Center for Twin and Family Research, which includes the SIBS study missingness guideline for calculating scale scores. Under this guideline, participants can miss 10% or one (whichever is greater) of the items for a given scale and still have a score calculated with scores prorated accordingly using the person mean[9]. Alpha internal consistency reliabilities are given for self-reported scales using listwise deletion in the *alpha* function from the *psych* package (Revelle, 2016).

Disinhibited Adolescent Behaviors and Attitudes

Antisocial Attitudes and *Aggressive Orientation* were measured via their respective scales from the larger Adolescent Opinions and Attitudes survey, which was developed by staff at the Minnesota Twin Family Study (Burt, 2014). Antisocial attitudes (e.g., If I were really stuck, I might try to copy an answer from someone else's test at school) and aggressive orientation (e.g., If a person challenges you, you have to be ready to fight back) were each the sum of eight self-report items rated on a four-point scale from 1 = disagree a lot, to 4 = agree a lot. The antisocial attitudes and aggressive orientation scales had good reliability, α=.87 and α=.87, respectively. All scores were taken at the first assessment. The full scale can be found in Appendix C, Table C.36.

Delinquent Behavior was measured via an adapted version of the Delinquent Behavior Inventory (Gibson, 1967; see Taylor et al., 2000). The scale included 36, self-report items (e.g., driving a car or motorcycle without a license or learner's permit) rated on a three point-scale: 0 = No, 1 = Yes, once, 2 = Yes, more than once). The scale showed good reliability, α=.85. All scores were taken at the first assessment. The full scale can be found in Appendix C, Table C.37.

Relational and *Overt Interpersonal Aggression* were measured via Crick and Grotpeter's (1995) five-item scales. Participants were asked to rate how often they engaged in relational aggression (e.g., How often did you spread rumors or gossip about another student to make others not like him/her anymore?) and overt aggression (e.g., How often did you hit another student?) on a five-point scale from, from 0= Never to 4 = All the time. Both the relational and overt aggression scales showed good reliability, α=.78 and α=.79, respectively. All scores were taken at the second assessment. The full scales can be found in the Appendix C, Table C3.38.

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[9] For each row: Prorated Score = (Raw score of items answered / Number of items answered) x Number of items in scale

Attention-deficit hyperactivity disorder (ADHD), conduct disorder (CD), and *oppositional defiant disorder (ODD)* were measured at the first assessment using semi-structured, clinical interviews based on the fourth edition of Diagnostic and Statistical Manual for Mental Disorders (DSM-IV, American Psychiatric Association, 2013). Both participants and their mothers were interviewed by trained interviewers, and then symptoms over the participants' lifetimes were decided as present, subthreshold, or absent in a consensus review by at least two trained diagnosticians. Consensus was evaluated separately for the mother and offspring (i.e., participant) reports. Mother and offspring reports were then combined using a standard, 'best-estimate' approach where for each symptom the maximum value between the mother and offspring report was used. Each symptom was coded as 1= Present, .5 = subthreshold, or 0 = absent. See King et al., (2004) for a more detailed description of the clinical assessment collection protocol. Symptom counts for each disorder were then summed, and the symptom counts log transformed (after adding one) to handle the positive skew in the data. The symptoms for each disorder can be found in Appendix C, Table C.39.

Prosocial Adolescent Behaviors, Attitudes/Opinions

Prosocial Attitudes and Opinions were measured via the prosocial attitudes scale from the larger Adolescent Opinions and Attitudes survey developed by staff at the Minnesota Twin Family Study. The scale included 10 self-report items (e.g., I know I can get what I want by working hard; I'd like to help out [volunteer] at a community center or at my church or synagogue) rated on a four-point scale from 1 = disagree a lot, to 4 = agree a lot. The scale had good reliability, α=.76. All scores were taken at the first assessment. The full scale can be found in Appendix C, Table C.36.

Prosocial Interactions with Siblings were measured via three-items from the Sibling Relationship Questionnaire (Furman & Buhrmester, 1985). Items (e.g., How much do you and this sibling cooperate with each other?) were self-reported on a five-point scale from 1 = hardly at all to 5 = extremely much. Scores were only calculated if all three items were answered. The scale had good reliability, α=.76. Scores were taken at the first assessment when available, or, if unavailable, from second assessment if the participant was under 19 years old at the time of the second assessment. The full scale can be found in Appendix C, Table C.40.

Peer Prosocial Behavior was measured via Crick and Grotpeter's (1995) five-item scale. Participants were asked to rate how often they engaged in prosocial behaviors (e.g., How often did you try to cheer up other students who felt upset or sad?) on a five-point scale from, from 0= Never to 4 = All the time, in the past three years *or* to report on their last three years of high school if they had graduated high school or left high school. The scale showed good reliability,

α=.88. All scores were taken at the second assessment. The full scales can be found in Appendix C, Table C.38.

Non-Task Work Performance

Participants were only asked to complete the non-task performance measures if they had been employed or self-employed full or part time at any time in the past three years.

Organizational citizenship behavior was measured via an adapted version of Laczo's, (2002) 15-item OCB scale used by Anderson et al., (2022). This scale measured the three facets of OCB described by Borman and Motowildo (1993): interpersonal support (e.g., Was courteous and tactful with co-workers, even when busy or stressed), organizational support (e.g., Showed sincere pride and enthusiasm for the organization), and conscientious initiative (e.g., Found additional productive work to do when your normally scheduled duties were completed). Items were self-reported on a 5-point scale from 0 = Never to 4 = Always, compared to the original 4-point scale. Some items were also slightly reworded. An overall OCB score was created by summing the 15 items and participants were allowed to miss up to two items, with scores prorated accordingly. Internal consistency reliability was high, α = .84. The full scale can be found in Appendix A Table A.14.

Counterproductive work behavior was measured a slightly re-worded version of Bennett and Robinson's (2000) 19-item scale (see Anderson et al., 2022). This scale measured both interpersonal deviance (e.g., Made fun of someone at work) and organizational deviance (e.g., Took property from work without permission). Items were rated on a 5-point, frequency scale from 0 = Never to 4 = Always, compared to the original scale which used a 7-point scale. Minor re-wording included changes such as took" in place of "taken," or adding "when not allowed" to the end of the item "Used an illegal drug or consumed alcohol on the job". The CWB composite was the sum of all 19 items and participants were allowed to miss up to two items on the composite with scores prorated accordingly. Internal consistency reliability was high, α = .86. The full scale can be found in Appendix A Table A.15.

Analytic Strategy

To minimize the effect of extreme scores, composite scale scores were winsorized at three standard deviations above and below the mean for self-report scales (see Appendix C Table C.41 for pre- and post- winsorization values). Winsorization affected between 0% to 2% of the scores for a given scale. Clinical symptom counts were log-transformed after adding one to each score. Percent of missing data for each scale can be found in Appendix C Table C.42. Pairwise correlations were run using the *apaTables* package, version 2.0.8 (Stanley, 2021) in Rstudio, *R* version 4.1.2 (RStudio Team, 2020). Sex differences for both adolescent and adult behaviors

were examined using the *stats* package, version 4.1.2 (R Core Team, 2013) for significance testing, *lsr* package, version 0.5.2 (Navarro, 2015) for Cohen's d, and the *psych* package, version 2.1.9 for Cohen's d confidence intervals (Revelle, 2016).

Structural equation modeling was conducted using OpenMx (Boker et al., 2011; Boker et al., 2021). All models were fit to raw data using full information maximum likelihood, which allowed us to make use of all available data (see Appendix C Table C.4 for percentage of missing data for each scale). Prior to analyses, adolescent and adult scores were adjusted for age at assessment and sex by regressing each scale onto age and sex and taking the residuals (see Appendix C Table C.43 for regression results). Regressions were run using the *lm* function from the *stats* package, version 4.1.2 (R Core Team, 2013), and the residuals were standardized and used in the subsequent models. A two-factor model was developed. Both CWB and OCB were modeled as manifest variables, with their factor loading set to 1.0 (see Figure 3.4). An adolescent prosocial latent factor had loadings on the three prosocial indicators (i.e., prosocial peer behaviors, sibling behaviors, and opinions and attitudes). An adolescent disinhibition latent factor had loadings on the eight disinhibition indicators (i.e., the three symptom sets, delinquent behaviors, relational aggression, overt aggression, antisocial attitudes, and aggressive orientation). Correlations among each of the latent factors and manifest variables were also estimated.

Results

Mean differences between men and women are presented in Table 3.12. The correlation matrix among disinhibited and prosocial behaviors and attitudes (*not* adjusted for age and sex) is presented in Table 2.13. Correlations among disinhibited and prosocial behaviors and attitudes adjusted for age and sex are presented in Appendix C, Table C.44.

The results of the proposed two-factor model are presented in Figure 3.5. Model fit was poor (RMSEA = .099, AIC = 23158.9) so this base model was extended to include three measurement factors that captured the added associations among variables measured using the same instrument (i.e., an interpersonal peer factor, a clinical symptoms measurement factor, and an opinions/attitudes factor), see Appendix C Figure C.8. The measurement factors improved model fit (RMSEA = .065, AIC = 22906.2). However, the loading from the interpersonal peer factor to the prosocial peer behavior indicator was small (-.06 95% CI [-.18, .06]), and the loading to the overt interpersonal aggression indicator was greater than one (1.14, 95% CI [-.55, 2.83]; i.e., a Heywood case; see Chen et al., 2001; Rindskoph, 1984). Dropping prosocial peer behavior as an indicator of the peer behavior measurement factor decreased fit somewhat ($\Delta\chi^2$ (1) = 4.74, p=.03). However, it replaced the Heywood case observed for the overt interpersonal aggression

indicator with a proper solution (.63, 95% CI [-4.07, 5.33][10]), and the loadings in the reduced model (Figure 3.6) were otherwise similar to the full model (Figure C.8), with good model fit (RMSEA = .065, AIC 22908.9). Thus, we move forward with the slightly reduced model (Figure 3.6) as our model of choice. This model also showed significantly better fit than the initial two-factor model (i.e., Figure 3.5) ($\Delta\chi^2$ (8) = 266.0, p <.01), and the loadings across the indicators and between the latent factors showed only limited differences (i.e., differences in loadings ranged from .00 to .07).

The correlation between CWB and OCB was moderate and negative (-.30, 95% CI [-.38, -.22]), while the correlation between adolescent disinhibition and adolescent prosociality was large and negative (-.55, 95% CI [-.63, -.47]). Adolescent prosociality and adolescent disinhibition had similar associations with CWB, albeit in the opposite directions (-.27 95% CI [-.37, -.17] and .29 95% CI [.21, .37], respectively). In contrast, OCB had a moderate and positive association with adolescent prosociality (.25 95% CI [.15, .35]), but only a small and non-significant correlation with adolescent disinhibition (-.07, 95% CI [-.15, .01]).

Discussion

Our analysis of adolescent behaviors and attitudes and later adult non-task workplace performance revealed that (a) counterproductive work behavior was associated with both the presence of adolescent disinhibition and a lack of adolescent prosociality, (b) organizational citizenship behavior was positively associated with adolescent prosociality, but was insignificantly related to adolescent disinhibition, and that (c) adolescent prosociality was strongly and negatively associated with adolescent disinhibition. Taken together, these findings provide further insight into the nuances within the nomological net of prosocial and disinhibited behaviors and attitudes.

Our hypothesis that a general factor of adolescent disinhibition would be positively related to later adult CWB was supported. The correlation between CWB and adolescent disinhibition was moderate in size, which was consistent with other studies looking at adolescent predictors of CWB (Roberts et al., 2007; Stanek et al., 2017). Curiously, our hypothesis that CWB would be unrelated to adolescent prosocial behavior was not supported. The association between the CWB and both the adolescent prosociality and adolescent disinhibition factors were very similar in magnitude, albeit in opposite directions (i.e., -.27 and .30, respectively). This

[10] In the reduced model (i.e., Fig. 3.6) both the overt interpersonal and relational aggression factor loadings had large standard errors such that their 95% confidence intervals both included zero. However, dropping the latent factor for peer aggression significantly reduced model fit ($\Delta\chi^2$ (2) = 119.68, p <.01) as was thus retained.

stands in contrast to the associations between adolescent factors and OCB, with a moderate and positive effect identified between OCB and adolescent prosociality, but a non-significant (95% CI including zero) correlation between OCB and adolescent disinhibition. Certainly, there are cases of more and less balanced predictors of non-task performance. For instance, some studies have found similar effect sizes (in the opposing directions) for CWB and OCB with the personality traits Agreeableness and Conscientiousness (Anglim et al., 2018; Dalal, 2005), while Extraversion appears to be more strongly associated with OCB than with CWB (Dalal, 2005; Sackett et al., 2006). Interestingly, Dalal et al. (2005) found positive affect to be associated with both CWB and OCB, while negative affect was associated with CWB but not OCB. Similarly, Anderson et al. (Under review) found that normative traits in aggregate accounted for similar amounts of variance in both CWB and OCB, but that maladaptive traits accounted for notably more variance in CWB than they accounted for in OCB. In total, these findings provide further evidence for CWB and OCB as unique components of nontask performance, with CWB related to negative and pathological factors in a way that OCB does not.

Our hypothesis that prosociality and disinhibition in adolescence would show little to no relationship was unsupported. Unlike the (lack of) relationship identified between altruism and antisocial behavior in adults (Krueger et al., 2001), or even the negative and moderate correlation between CWB and OCB (see also Dalal, 2005), adolescent prosociality and disinhibition were strongly and negatively correlated (r=-.55). It is possible that the strong correlation between the prosocial and disinhibition factors was due, at least in part, to age related factors. Vrieze (2012) found that differing forms of substance use (e.g., alcohol, marijuana) were more strongly correlated in adolescence than adulthood, as adults tended to narrow the range of their substance use. Perhaps similarly, adolescents are more like to “experiment” with a wider variety of both prosocial and disinhibited behaviors, leading to strong associations between prosociality and disinhibition in adolescence that attenuate in adulthood. We encourage future research to further explore the relationship between prosociality and disinhibition in both adolescence and adulthood to better understand the nuances between these domains.

In developing the model for this paper, several adjustments were made to the originally specified model to balance fit statistics (i.e., moving from the two-factor model presented in Figure 3.5 to a model including the addition of three measurement factors, Figure C.8) and proper solutions among the factor loadings (i.e., moving from the model presented in Figure C.8 to Figure 3.6). Moving through the evolution of these three models, the relationships among CWB, OCB, adolescent prosociality and adolescent disinhibition remained relatively stable. In particular, the correlations between CWB and adolescent disinhibition, and between CWB and

adolescent prosociality differed only .01 across the three models. Similarly stable correlations were observed between OCB and adolescent disinhibition, and OCB and adolescent prosociality with a maximum difference of .02 across the three models. Such findings suggest robustness in the estimates between non-task performance and the adolescent factors.

Several limitations exist in the design of the current study that limit its generalizability. First, our sample was drawn from Minnesota, a U.S. state with higher rates of educational attainment and lower unemployment than many other U.S. states (U.S. Bureau of Labor Statistics, 2019; World Population Review, 2021). Additionally, results from our attrition analysis would suggest that those who continued to participate in the longitudinal study were more prosocial and less disinhibited as adolescents relative to those who did not continue to participate, further restricting generalizability.

We do not claim to have captured the full realm of adolescent disinhibited and prosocial behaviors, attitudes, and opinions. While disinhibition was assessed using both interpersonally directed and non-interpersonally directed behaviors, our assessment of prosocial behaviors was more limited in scope, focusing on interpersonally directed prosocial behaviors (i.e., peer and sibling). We encourage future research to further explore the realm of adolescent prosocial behavior, including adolescent-appropriate forms of behaviors such as volunteerism and civic engagement.

Our prospective examination of the relationships among adolescent disinhibition, adolescent prosociality, and non-task performance moves forward our understanding of the structure of disinhibition and prosociality broadly and provides an additional line of evidence that CWB and OCB are unique constructs, rather than opposite poles of the same continuum, using a unique longitudinal design infrequently employed in industrial/organizational research. We provided additional insight into the developmental origins of CWB and OCB, building on the work of Le et al., (2014), Roberts et al., (2007) and Stanek et al., (2017). Of particular interest, we found that CWB was predicted by both the presence of adolescent disinhibited behaviors as well as a lack of adolescent prosocial behavior. This suggests that interventions addressing both domains of adolescent behavior and attitudes may more completely address goals of discouraging later adult counterproductivty in work settings, and perhaps beyond work settings (see Stanek et al. 2017). Given the relationship between OCB and adolescent prosociality, promoting prosocial behaviors in adolescence may act as a double boon.

Postscript

Acknowledgements

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Supplementary materials

Supplementary materials for this project can be found in Appendix C.

Table 3.12. Standardized means (*SD*) in male and female participants

Variables	Mean (*SD*) Male (*N* = 264 - 277)	Mean (*SD*) Female (*N* = 389 - 410)	Cohen's *d* [95% CI]	*t*(*df*)=, *p*
Adolescent Prosocial				
Prosocial: Sibling	-0.07 (1.0)	0.05 (1.0)	-0.12 [-0.28, 0.03]	*t*(595.95)=-1.60, .11
Prosocial: Attitudes	-0.24 (1.1)	0.16 (0.9)	-0.41 [-0.57, -0.26]	*t*(510.16)=-5.09, <.01
Prosocial: Peers	-0.38 (1.0)	0.26 (0.9)	-0.66 [-0.83, -0.50]	*t*(561.32)=-8.31, <.01
Adolescent Disinhibited				
ADHD SX	0.27 (1.1)	-0.18 (0.9)	0.46 [0.30, 0.62]	*t*(504.69)=5.63, <.01
ODD SX	-0.00 (1.0)	0.00 (1.0)	-0.00 [-0.16, 0.15]	*t*(572.24)=-0.05, .96
CD SX	0.29 (1.1)	-0.20 (0.9)	0.51 [0.35, 0.67]	*t*(481.03)=6.21, <.01
Antisocial Attitudes	0.02 (1.0)	-0.02 (1.0)	0.04 [-0.11, 0.19]	*t*(615.75)=0.53, .60
Aggressive Orientation	0.48 (1.0)	-.0.32 (0.8)	0.87 [0.70, 1.03]	*t*(496.06)=10.62, <.01
Delinquent Behaviors	.023 (1.1)	-0.16 (0.9)	0.40 [0.24, 0.56]	*t*(504.86)=4.92, <.01
Relational Aggression	0.04 (1.1)	-0.03 (1.0)	0.06 [-.09, 0.22]	*t*(527.47)=0.80, .43
Overt Aggression	0.42 (1.2)	-0.28 (0.7)	0.74 [0.57, 0.91]	*t*(393.66)=8.51, <.01
Adult Work Behavior				
CWB	0.36 (1.1)	-0.25 (0.8)	0.64 [0.48, 0.80]	*t*(468.33)=7.73, <.01
OCB	-0.21 (1.1)	0.14 (0.9)	-0.35 [-0.51, -0.20]	*t*(545.39)=-4.41, <.01

Note. Scales were standardized in the combined male and female sample. CWB = Counterproductive work behavior, OCB = Organizational citizenship behavior, ADHD = Attention deficit hyperactivity disorder, ODD = Oppositional defiant disorder, CD = Conduct disorder, SX = Symptoms

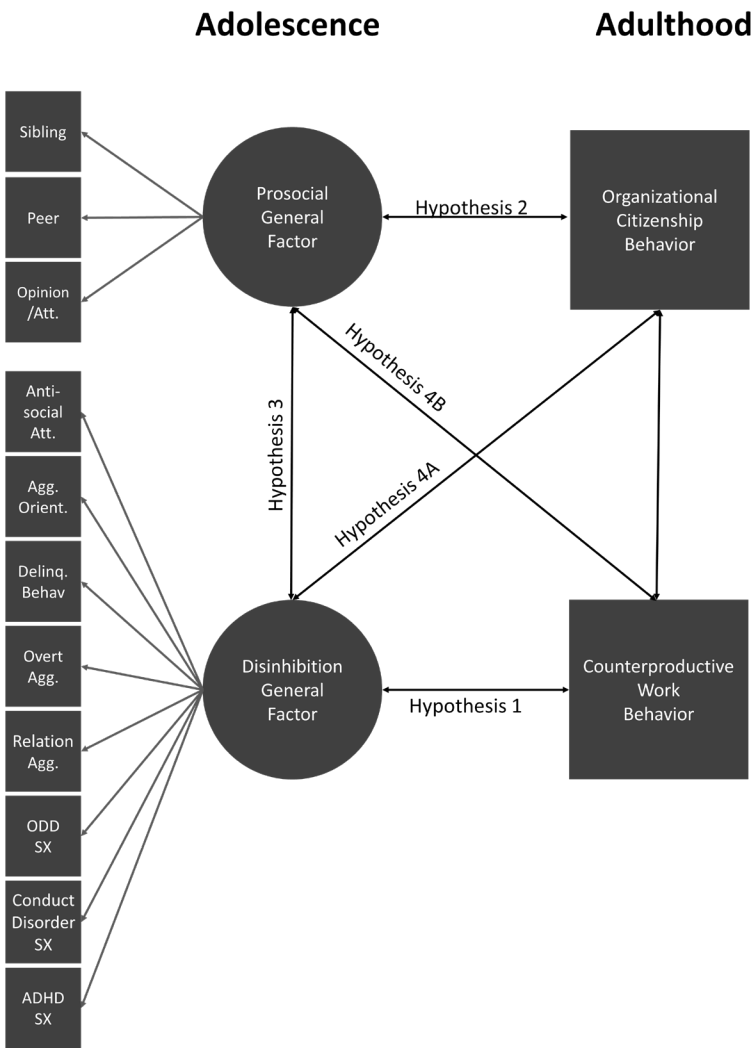
Table 2.13. Correlations between adolescent and adult behavior and attitudes

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Adolescent Prosocial												
1. Prosocial: Sibling												
2. Prosocial Attitudes	.25**											
3. Prosocial: Peers	.16**	.36**										
Adolescent Disinhibited												
4. ADHD SX	-.03	-.17**	-.13**									
5. ODD SX	-.15**	-.31**	-.15**	.35**								
6. Conduct Disorder SX	-.11**	-.32**	-.18**	.36**	.49**							
7. Antisocial Attitudes	-.09*	-.48**	-.16**	.14**	.34**	.41**						
8. Aggressive Orientation	-.10**	-.46**	-.27**	.28**	.33**	.39**	.50**					
9. Delinquent Behaviors	-.06	-.44**	-.19**	.30**	.36**	.53**	.74**	.56**				

10. Relational Aggression	-.05	-.16**	-.08*	.16**	.17**	.22**	.27**	.27**	.28**			
11. Overt Aggression	-.04	-.24**	-.23**	.29**	.23**	.33**	.17**	.50**	.33**	.49**		
Adult Work												
12. CWB	-.09*	-.26**	-.20**	.24**	.15**	.21**	.21**	.25**	.24**	.17**	.32**	
13. OCB	.14**	.21**	.25**	-.08*	-.05	-.09*	-.06	-.10**	-.06	-.02	-.09*	-.33**

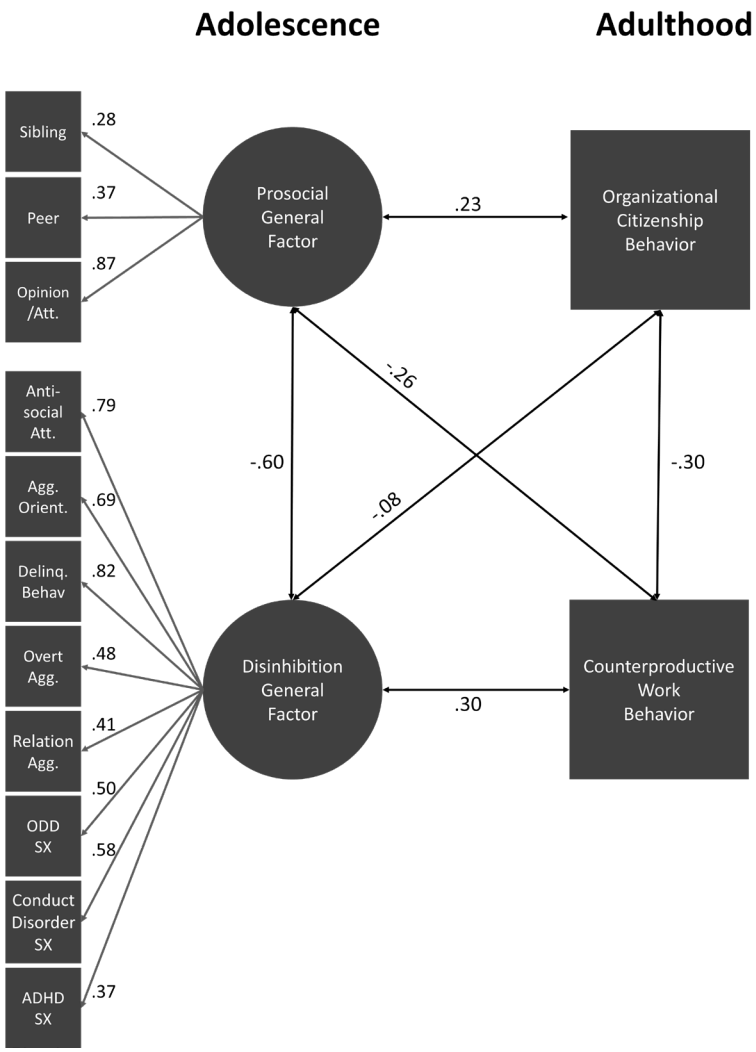
Note. N ranges from 642 – 687. CWB = Counterproductive work behavior, OCB = Organizational citizenship behavior, ADHD = Attention deficit hyperactivity disorder, ODD = Oppositional defiant disorder, SX = Symptoms. * indicates $p < .05$. ** indicates $p < .01$. Correlation standard errors range from .03 - .04. Conservative standard errors using the number of family units (N ranges from 444 – 471) rather than individuals range from .03 to .05.

Figure 3.4. Theoretical model of disinhibition, prosociality, and non-task performance



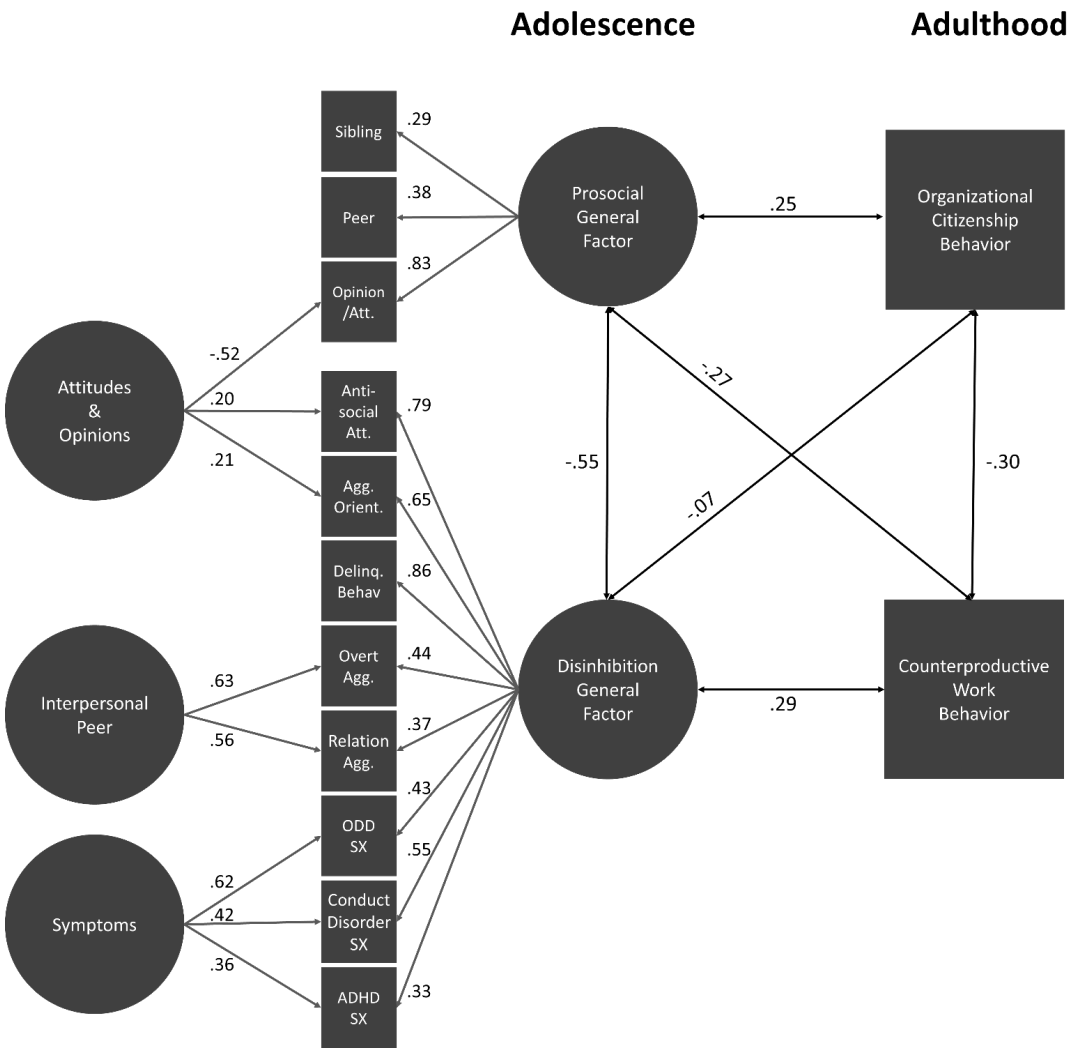
Note. Org. = Organizational, OCB = Organizational citizenship behavior, CWB = Counterproductive work behavior, Att. = Attitudes, Agg. = Aggressive/Aggression, Orient = Orientation, Delinq. = Delinquent, Behav. = Behavior, Relation = Relational, ODD = Oppositional Defiant Disorder, SX = symptoms, ADHD = Attention Deficit-Hyperactivity Disorder.

Figure 3.5. Two-factor model of disinhibition, prosociality, and non-task performance



Note. Org. = Organizational, OCB = Organizational citizenship behavior, CWB = Counterproductive work behavior, Att. = Attitudes, Agg. = Aggressive/Aggression, Orient = Orientation, Delinq. = Delinquent, Behav. = Behavior, Relation = Relational, ODD = Oppositional Defiant Disorder, SX = symptoms, ADHD = Attention Deficit-Hyperactivity Disorder.

Figure 3.6. Reduced five-factor model of disinhibition, prosociality, and non-task performance with measurement factors



Note. Org. = Organizational, OCB = Organizational citizenship behavior, CWB = Counterproductive work behavior, Att. = Attitudes, Agg. = Aggressive/Aggression, Orient = Orientation, Delinq. = Delinquent, Behav. = Behavior, Relation = Relational, ODD = Oppositional Defiant Disorder, SX = symptoms, ADHD = Attention Deficit-Hyperactivity Disorder.

Conclusions

Taken together, the studies presented in this dissertation provide unique insight into the origins of nontask performance using designs and samples infrequently employed in the classic I/O literature: familial resemblance, maladaptive individual differences, and longitudinal modeling of prosocial and disinhibited behaviors and attitudes. Each study employed a community sample or samples where participants self-reported their engagement in both CWB and OCB, as well as on a host of prospective and current measures including, but not limited to personality, psychopathology, and non-work prosocial behaviors. Here, I briefly review the major findings of these three studies, as well as describe where future research might build on the current work to further our understanding of how CWB and OCB fit within the larger scope of individual differences both within and outside the organizational context.

In Study 1, I investigated familial resemblance among eight types of familial dyads: monozygotic twins (n=261), dizygotic twins (n=130), nonadoptive siblings (n=88), adoptive siblings (n=138), nonadoptive parent-offspring pairs (n=203), adoptive parent-offspring pairs (n=263), mid-life couples (n=528) and late-life couples (n=201)[11]. The similarity among family members' engagement in CWB and OCB was assessed to estimate the degree to which preexisting individual differences (i.e., genetic variability) and the environment (i.e., environmentality) accounted for variation in these behaviors. We found that degree of familial resemblance for nontask performance increased with increasing genetic relationship (e.g., monozygotic twins were more similar in both their CWB and their OCB than dizygotic twins were, Table 1.7), highlighting the role of genetic variability. Nonetheless, genetically identical individuals correlated only moderately in their workplace behavior (OCB r = .34, CWB r = .40) bringing forth the complementary, and comparatively larger, role of environmental differences. Note here that environmental differences should not be interpreted as solely organizational differences experienced by individuals. The non-shared environmental effects on nontask performance *may* include non-work factors concurrent to, or prospective of (e.g., childhood experiences), nontask performance. I used biometric methods to estimate heritability and environmentality of nontask performance using data from the twin and non-twin siblings simultaneously (Boker et al., 2011). Analyses revealed that CWB was more heritable (a^2 = .39) than OCB (a^2 = .22), suggesting citizenship behavior is comparatively more environmentally influenced than counterproductive behavior, a finding consistent with research showing greater organizational influences on OCB than CWB (O'Brien & Allen, 2007). Finally, I explored

[11] *Note* sample overlap, such that a monozygotic twin could also be a child in a parent-offspring dyad as well as a member of a mid-life spouse pair.

spouse/partner similarity in mid-life and late-life couples to examine whether spousal influence was a source of non-work, environmental variance identified in CWB and OCB. However, spouse/partner similarity for nontask behavior was modest and did not vary between midlife and late-life couples, suggesting spousal influence on nontask performance is limited.

The goal of Study 2 was to explore some of possible individual difference that contribute to the heritability effects in nontask performance identified in Study 1. To do this, I expanded on previous work examining personality traits and nontask performance, which has historically emphasized relationships with normative traits (e.g., Berry et al., 2012; Chiaburu et al., 2011; Mercado et al., 2018), by examining the relationship between nontask performance and maladaptive personality traits. I used the 25 facet traits of the Personality Inventory for the DSM-5 (PID-5), a personality inventory that assesses variation in maladaptive, clinically relevant personality traits that do not themselves constitute, formal personality disorders on their own (i.e., they can be used to describe personality in general as well as in clinical settings; Dunne et al., 2018; Krueger et al., 2012; Krueger & Markon, 2014). I also included the 11 lower-order traits from the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2008), a measure of normative personality traits, to lend initial insight into the value of maladaptive traits over and above normative traits in accounting for variation in non-task performance. In a sample of over 600 participants from the Minnesota Twin Family Study who had taken the MPQ, PID-5, and non-task performance measures, I examined both correlations among the measures, as well as conducted a series of linear mixed models. Correlations among the personality traits and non-task performance revealed that CWB had small to moderate, significant relationships with each of the maladaptive traits, from a correlation of r=.11 between CWB and Intimacy Avoidance (a facet of Detachment – alternatively maladaptively low Extraversion) to r=.36 between CWB and both Deceitfulness and Manipulativeness (both facets of Antagonism – alternatively maladaptively low Agreeableness) (see Figure 2.1). On the other hand, correlations between the maladaptive traits and OCB ranged from negligible (r= .01 with Rigid Perfection, a facet of Disinhibition-Compulsivity domain – alternatively maladaptively high Conscientiousness) to negative and moderate (r=-.24 with Anhedonia, a facet of Detachment – alternatively maladaptively low Extraversion). Additionally, while the normative traits accounted for similar amounts of variance in both CWB and OCB, maladaptive traits accounted for an additional 10.4% and 5.7% of variance over and above the normative traits and demographic factors, respectively (see Figure 2.2). Taken together, these findings provide evidence for the value of maladaptive personality in addition to, as opposed to a replacement for, normative personality for understanding organizationally relevant behaviors. Additionally, the asymmetrical nature of the correlations

between the traits and the two non-task behavior sets provides further evidence that CWB and OCB are separate constructs rather than opposing sides of the same continuum (see Sackett et al. 2006), with CWB overlapping with personality dysfunction in a way that OCB does not.

In Study 3, I prospectively examined the relationship between adolescent prosociality, adolescent disinhibition, and nontask performance to further illuminate the nomological net of prosocial and disinhibited behaviors, building on the work of those such as Stanek et al. (2017). Like Study 2, Study 3 also sought to identify potential individual differences that might have relevance to work performance and clarify the structure of nontask performance. However, this final study focused on behaviors and attitudes further removed in time from the workplace behavior to better our understanding of prosocial and disinhibited proclivities in adolescence as potential origins of OCB and CWB. In this study, we employed a sample of over 600 participants from the Sibling Interaction and Behavior Study who completed a variety of adolescent measures on topics including interpersonal peer behavior, sibling behaviors, delinquent behaviors, attitudes/opinions, and psychopathology, as well as non-task performance measures in adulthood years later. I used structural equation modeling to model latent adolescent disinhibition, latent adolescent prosociality, and their relationships between each other, and with CWB and OCB (see Figure 3.6). As expected, adolescent disinhibition was moderately and positively associated with CWB (r =.29) but negligibly associated with OCB (r = -.07), while adolescent prosociality was positively and moderately associated with OCB (r = .25). Contrary to expectation, adolescent prosociality was negatively and moderately associated with CWB (r = -.27). Such results parallel the findings of Dalal et al. (2005), who found positive affect to be associated with both CWB and OCB (negative and positive relationships, respectively), while negative affect was associated with positively CWB but negligibly associated with OCB. Such results highlight two key points of interest. First, there appears to be a doubling down on possible risks of CWB in the presence of a negative or low (or absent) positive. Second, asking about previous prosocial behaviors (which may be less challenging to applicants or incumbents sense of self – though perhaps equally or more falsifiable than responses to antisocial behaviors) may be useful when trying to assess both CWB and OCB in the face of limited resources.

The findings of Study 2 that further delineated the discrete structure of CWB and OCB (see Dalal et al. 2005 and Sackett et al., 2006) were supported by the results of Study 3. In both studies, those normative traits (in aggregate) or prosocial general factor had similar magnitudes of effect with CWB and OCB. In contrast, both studies identified maladaptive individual differences (i.e., adult maladaptive personality and a general factor of disinhibition, which included psychopathology, delinquency, interpersonal aggression, antisocial and aggressive attitudes and

opinions) as has having a notably stronger association with CWB than with OCB. Together, these findings present a curious but consistent symmetry between normative/adaptive factors[12] and both forms of nontask performance, but asymmetry between maladaptive factors and forms of nontask performance. This convergence of evidence for the structure of CWB and OCB as unique components of nontask performance using both prospective and contemporaneous predictors builds on previous work that has emphasized normative traits in the study of nontask performance (Chiaburu et al., 2011, Dalal et al., 2005), and a focus on CWB, rather than OCB, when examining the relationships with adolescent factors (Le et al., 2014; Roberts et al., 2007, Stanek et al., 2017).

Limitations

There are several limitations across the three studies that should be taken into consideration when interpreting the results and considering generalizability, particularly the use of community samples, self-report measures, and the sample demographics. Both studies included in this dissertation (i.e., MTFS and SIBS) are community samples. No restrictions (or statistical controls) were included regarding organizational type, employee role, or job tenure. Thus, in these three dissertation studies, I provide empirical findings for questions regarding how X and nontask performance are related in general (i.e., in a community) *not* how X is related to engagement in nontask performance among employees in similar roles or in a particular type or organization. While it is possible that similar effects would be identified in a community sample as they would for members of a given occupation (e.g., grocery store baggers, law enforcement officers), it is also possible to identify different effects when looking at specific groups versus community samples. For instance, if Group A has high cognitive ability and high CWB, and cognitive ability and CWB are negatively correlated in this sample, and group B has low cognitive ability and low CWB, also negatively correlated, then in a combined "community sample" CWB and cognitive ability could become positively correlated.

Participants self-reported on their own CWB and OCB in a low stakes environment (i.e., there were no occupational consequences for their responses). There are both benefits (e.g., knowledge of one's own behavior that colleagues or supervisors might not have) and drawbacks (e.g., exaggeration, misremembrance) to self-repot data. Meta-analytic studies would suggest relatively similar self- and other- report results for OCB and CWB in regards to relationships with other correlates (Berry et al., 2012; Carpenter et al., 2014), though mean CWB was found to be

[12] Note this does not preclude specific normative factors to have different effects with CWB and OCB (e.g., Achievement had a much stronger relationship with OCB [r=.34] than it did with CWB [r=-.08] in Study 2).

higher in self-report than other-report data (Berry et al., 2012). A notable exception to the similarity in effects with common correlates in self- and other- reports of nontask performance appears to be the relationship between CWB and OCB. A meta-analysis conducted by Dalal (2005) showed a significantly stronger, negative relationship between CWB and OCB when these behaviors were other-rated than when they were self-reported, suggesting the presence of a halo effect in other-reports for these behavior sets. In regards to assessment setting, individuals may be especially at risk for bending the truth when reporting on socially undesirable characteristics (e.g., CWB, maladaptive traits) and socially desirable characteristics (e.g., OCB, non-work prosocial behaviors) in high stakes environments (e.g., the job application process), compared to low stakes environments (e.g., as part of a larger survey with no risks to their employment). Given these conditions, the magnitude of the effects identified between nontask performance and the array of individual differences explored here may not be observed in alternate settings.

The MTFS and SIBS samples were both drawn from Minnesota, a U.S. state with lower unemployment rates and higher rates of educational attainment than many other U.S. states (U.S. Bureau of Labor Statistics, 2019; World Population Review, 2021). The Minnesota-statewide samples broadly reflect the states' population of the birth years sampled, with most of participants being white, with the exception of the adoptive SIBS offspring, the majority of whom were East Asian. Thus, our sample is not representative of the United States as a whole. The generalizability of the results to other areas of the United States, and certainly to non-U.S. countries, may be limited.

Final Remarks and Future Directions

In combination, these three studies provide deeper insight into the origins of non-task performance by describing the degree to which differences in CWB and OCB are genetically influenced, exploring if maladaptive traits account for some of the observed differences in non-task performance, and finally by placing CWB and OCB in a larger scope of prosocial and disinhibited behaviors. Each of these studies improves our understanding of CWB and OCB, but should also be viewed as springboards for additional research. The results of Study 1 raise questions regarding what factors are included in non-shared environment, which accounts for the majority of the variance in both CWB and OCB, that play the largest roles in non-task performance, bearing in mind that these factors could occur within or outside the organization, and prospectively or concurrently with non-task performance. Study 2 prompts the exploration of maladaptive traits in high stakes settings. Additionally, even in maladaptive traits are deemed unusable for applicant screening purposes due to their tie to psychopathology and hence medical testing (see Melson-Silimon et al., 2019), it is possible that the exploration of interventions that

might be particularly effective for dealing with incumbents high on these maladaptive traits to discourage CWB indirectly could be valuable to organizations and their members. Finally, Study 3 highlights the need for additional work in the area of prosocial behaviors, both prospective and concurrent to non-task performance, given the link between prosciality and both CWB and OCB, alongside previous research emphasizing disinhibited behaviors (Le et al., 2014; Roberts et al., 2007; Stanek et al., 2017). Pursuing these lines of research would provide valuable insight into nontask performance relevant to both theory and practice.

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APPENDICIES

Appendix A: Supplementary material for *Familial resemblance, citizenship, and counterproductive work behavior: A combined twin, adoption, parent-offspring, and spouse approach*

Table A.14. OCB Items used in MTFS and SIBS and Original Items

MTFS and SIBS Items based on Laczo's (2002) scale Items on a five-point frequency scale, 0 = Never, 4 = Always	Items from Laczo (2002) Items on a 4-point frequency scale, 1 = Never, 4 = Frequently
Conscientious Initiative	
Found additional productive work to do when your normally scheduled duties were completed	Find additional productive work to do when your normally scheduled duties are completed
Looked for opportunities to learn new knowledge and skills from others at work and from new and challenging job assignments	Look for and create opportunities to develop your knowledge and skills
Persisted with unusually high levels of effort, determination and stamina to complete work tasks successfully despite very difficult conditions or obstacles	Persist with unusually high levels of effort, determination, and stamina to complete work tasks successfully despite very difficult conditions or obstacles that might seem insurmountable
Asked for additional or more challenging work assignments	Not request additional or more challenging work assignments (R)
Consistently completed work on or ahead of time, even when deadlines seemed impossibly short	Consistently complete work on time or ahead of time, even when deadlines seem impossibly short
Organizational Support	
Stayed with the organization despite hardship	Show determination to stay with the organization despite hardships
Showed sincere pride and enthusiasm for the organization	Show sincere pride and enthusiasm for the organization
Actively embraced the organization's missions and objectives	Actively embrace the organization's missions and objectives
Talked with others outside of work about the organization's positive features	Not talk about the organization's features to people outside of work (R)
Offered constructive suggestions for work-place improvement	Refrain from offering suggestions for organizational improvement (R)

Interpersonal Support	
Refused to take on a job assignment because it was the responsibility of another co-worker (R)	Willingly offer to help others by teaching them necessary knowledge or skills
Was courteous and tactful with co-workers, even when busy or stressed	Be courteous and tactful, even when especially busy or stressed
Volunteered to help a co-worker meet a difficult deadline	Help others with assignments or tasks only when asked to do so (R)
Purposefully held back information that would have helped a co-worker (R)	Have information that would be useful to others, but not pass it on (R)
Went out of my way to congratulate others at work for their achievements	Not go out of your way to show consideration for others at work (R)

Note: (R) denotes reverse scored item

Laczo, R. M. (2002). *An examination of the dimensionality of nontask performance* [Ph.D., University of Minnesota]. http://search.proquest.com/dissertations/docview/276614591/abstract/DD425E2C331845EAPQ/1

Table A.15. CWB Items used in MTFS and SIBS and Original Items

MTFS and SIBS Items based on Bennet and Robbinson (2000); Items on a five-point frequency scale, 0 = Never, 4 = Always	Items from Bennett and Robinson (2000) Items on a 7-point frequency scale (1) = "Never", (7) = "Daily"
Interpersonal Deviance	
Made fun of someone at work	Made fun of someone at work
Said something hurtful to someone at work	Said something hurtful to someone at work
Made an ethic, religious or racial remark at work	Made an ethnic, religious, or racial remark at work
Cursed at someone at work	Cursed at someone at work
Played a mean prank on someone at work	Played a mean prank on someone at work
Acted rudely toward someone at work	Acted rudely toward someone at work
Publically embarrassed someone at work	Publically embarrassed someone at work
Organizational Deviance	
Took property from work without permission	Taken property from work without permission
Spent too much time fantasizing, daydreaming, or surfing the internet instead of working	Spent too much time fantasizing or daydreaming instead of working
Falsified a receipt to get reimbursed for more money than spent on a business expense	Falsified a receipt to get reimbursed for more money than you spent on business expenses
Took an additional or longer break than is acceptable at your workplace	Taken an additional or longer break than is acceptable at your workplace
Came in late to work without permission	Come in late to work without permission
Littered your work environment	Littered your work environment
Failed to follow your boss's instructions	Neglected to follow your boss's instructions
Intentionally worked slower than you could have worked	Intentionally worked slower than you could have worked
Discussed confidential company information with an unauthorized individual	Discussed confidential company information with an unauthorized person
Used an illegal drug or consumed alcohol on the job when not allowed	Used an illegal drug or consumed alcohol on the job
Put little effort into your work	Put little effort into your work

Dragged out work in order to get overtime	Dragged out work in order to get overtime

Bennett, R. J., & Robinson, S. L. (2000). Development of a measure of workplace deviance. *Journal of Applied Psychology*, *85*(3), 349–360. https://doi.org/10.1037/0021-9010.85.3.349

Table A.16. Regressions to for control age and sex

Twins CWB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 6.65417 3.26997 2.035 0.0421 * IDSEX -2.76230 0.36576 -7.552 9.57e-14 *** AGE_FU4 0.10704 0.07287 1.469 0.1421
Twins CWB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 1.08032 1.70574 0.633 0.527 IDSEX -1.36238 0.19080 -7.141 1.78e-12 *** AGE_FU4 0.09083 0.03801 2.390 0.017 *
Twins CWB Organizational	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 5.837441 2.091186 2.791 0.00535 ** IDSEX -1.394138 0.233949 -5.959 3.5e-09 *** AGE_FU4 0.008942 0.046595 0.192 0.84785
Twins OCB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 42.97305 4.37899 9.813 < 2e-16 *** IDSEX 1.59612 0.48981 3.259 0.00116 ** AGE_FU4 -0.01516 0.09758 -0.155 0.87655
Twins OCB Conscientious	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 12.30601 2.00604 6.134 1.23e-09 *** IDSEX 0.59656 0.22439 2.659 0.00797 ** AGE_FU4 0.02562 0.04470 0.573 0.56665
Twins OCB Org Support	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 14.18460 2.01052 7.055 3.2e-12 *** IDSEX 0.46334 0.22489 2.060 0.0396 * AGE_FU4 -0.01062 0.04480 -0.237 0.81
Twins OCB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 16.16955 1.34118 12.056 < 2e-16 *** IDSEX 0.55428 0.15002 3.695 0.000232 *** AGE_FU4 -0.02308 0.02989 -0.772 0.440049
Partners CWB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 13.36799 2.28201 5.858 8.38e-09 *** IDSEX -2.87907 0.47491 -6.062 2.60e-09 *** AGE_FU4 -0.05573 0.04962 -1.123 0.262
Partners CWB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 6.80502 1.25705 5.413 9.51e-08 *** IDSEX -1.99659 0.26161 -7.632 1.13e-13 ***

	AGE_FU4 -0.02536 0.02733 -0.928 0.354
Partners CWB Organizational	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 6.91917 1.52220 4.546 6.84e-06 *** IDSEX -0.86760 0.31679 -2.739 0.00638 ** AGE_FU4 -0.04056 0.03310 -1.225 0.22098
Partners OCB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 40.00899 3.08392 12.973 < 2e-16 *** IDSEX 1.70100 0.64180 2.650 0.00829 ** AGE_FU4 0.04476 0.06706 0.667 0.50478
Partners OCB Conscientious	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 13.070381 1.412924 9.251 <2e-16 *** IDSEX 0.525476 0.294047 1.787 0.0745 . AGE_FU4 0.004056 0.030722 0.132 0.8950
Partners OCB Org Support	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 14.031318 1.374247 10.210 <2e-16 *** IDSEX 0.196428 0.285997 0.687 0.493 AGE_FU4 0.001459 0.029882 0.049 0.961
Partners OCB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 12.92728 0.94429 13.690 < 2e-16 *** IDSEX 0.99176 0.19652 5.047 6.25e-07 *** AGE_FU4 0.03847 0.02053 1.874 0.0615 .
SIBS CWB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 15.18369 2.66070 5.707 1.7e-08 *** IDSEX -3.85984 0.45142 -8.550 < 2e-16 *** AGE_FU3 -0.02241 0.08249 -0.272 0.786
SIBS CWB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 6.20734 1.38035 4.497 8.06e-06 *** IDSEX -2.19944 0.23419 -9.392 < 2e-16 *** AGE_FU3 0.01981 0.04279 0.463 0.643
SIBS CWB Organizational	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 8.99539 1.72423 5.217 2.39e-07 *** IDSEX -1.64286 0.29253 -5.616 2.81e-08 *** AGE_FU3 -0.04384 0.05345 -0.820 0.412
SIBS OCB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 41.23508 3.07330 13.417 < 2e-16 *** IDSEX 2.27476 0.52049 4.370 1.43e-05 *** AGE_FU3 -0.02199 0.09526 -0.231 0.818

SIBS OCB Conscientious	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 14.36600 1.43284 10.026 < 2e-16 *** IDSEX 0.88393 0.24310 3.636 0.000297 *** AGE_FU3 -0.04869 0.04442 -1.096 0.273415
SIBS OCB Org Support	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 12.31448 1.41607 8.696 <2e-16 *** IDSEX 0.52246 0.24025 2.175 0.030 * AGE_FU3 0.03578 0.04390 0.815 0.415
SIBS OCB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 14.335513 0.984404 14.563 < 2e-16 *** IDSEX 0.860317 0.166718 5.160 3.21e-07 *** AGE_FU3 -0.001313 0.030513 -0.043 0.966
Parents CWB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 17.45634 3.02954 5.762 1.41e-08 *** IDSEX -2.36724 0.42293 -5.597 3.49e-08 *** AGE_FU3 -0.11985 0.04376 -2.739 0.00638 **
Parents CWB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 9.09475 1.36230 6.676 6.18e-11 *** IDSEX -1.34350 0.19018 -7.064 5.07e-12 *** AGE_FU3 -0.07649 0.01968 -3.887 0.000114 ***
Parents CWB Organizational	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 8.22731 2.10710 3.905 0.000107 *** IDSEX -1.02677 0.29416 -3.491 0.000522 *** AGE_FU3 -0.04127 0.03044 -1.356 0.175705
Parents OCB	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 42.216432 3.917202 10.777 < 2e-16 *** IDSEX 2.080926 0.544077 3.825 0.000146 *** AGE_FU3 0.008187 0.056569 0.145 0.884975
Parents OCB Conscientious	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 15.48902 1.79976 8.606 < 2e-16 *** IDSEX 0.71963 0.24998 2.879 0.00415 ** AGE_FU3 -0.03293 0.02599 -1.267 0.20573
Parents OCB Org Support	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 11.86833 1.81796 6.528 1.55e-10 *** IDSEX 0.55187 0.25250 2.186 0.0293 *

	AGE_FU3 0.03702 0.02625 1.410 0.1591
Parents OCB Interpersonal	Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 14.976375 1.285971 11.646 < 2e-16 *** IDSEX 0.806681 0.179526 4.493 8.6e-06 *** AGE_FU3 0.002374 0.018576 0.128 0.898

Note: Age in years. Sex 1 = Male, 2 = Female. Example code: residuals(lm(CWB_WINSOR ~ IDSEX + AGE), Data.Frame, na.action = na.exclude) on winsorized scores

Table A.17. Descriptive statistics for nontask behavior across samples and sex in winsorized scores

Mean (SD) / Sample N	OCB	OCB Conscientious	OCB Org. Support	OCB Interpersonal	CWB Mean	CWB Interpersonal	CWB Org.
MZ Males (244)	43.8 (7.7)	13.9 (3.4)	14.1 (3.5)	15.7 (2.3)	8.1 (5.8)	3.5 (3.2)	4.6 (3.6)
MZ Females (341-340)	45.5 (6.6)	14.5 (3.1)	14.7 (3.1)	16.3 (2.0)	5.3 (4.6)	2.0 (2.2)	3.3 (3.0)
DZ Males (126)	44.3 (6.7)	14.1 (3.1)	14.3 (3.0)	15.8 (2.1)	8.9 (5.9)	3.7 (3.2)	5.2 (3.8)
DZ Females (172)	45.6 (6.9)	14.6 (3.2)	14.6 (3.1)	16.4 (2.0)	5.6 (4.8)	2.0 (2.4)	3.6 (3.1)
Nonadopt Sibs Male (115)	42.9 (6.8)	13.9 (3.0)	14.0 (3.2)	15.0 (2.4)	10.3 (6.4)	4.2 (3.3)	6.0 (4.0)
Nonadopt Sibs Female (155)	45.0 (6.6)	14.4 (3.2)	14.4 (3.1)	16.0 (2.1)	6.7 (5.0)	2.5 (2.4)	4.2 (3.4)
Adoptive Sibs Male (133)	42.8 (7.5)	13.5 (3.2)	13.9 (3.3)	15.3 (2.2)	10.9 (7.4)	5.0 (4.1)	6.0 (4.6)
Adoptive Sibs Female (211-210)	45.2 (6.3)	14.7 (3.2)	14.6 (2.9)	16.0 (2.1)	6.8 (5.0)	2.4 (2.5)	4.4 (3.4)
Twin Spouse Male (307)	43.6 (7.3)	13.8 (3.2)	14.2 (3.3)	15.5 (2.3)	8.1 (5.7)	3.7 (3.4)	4.4 (3.6)
Twin Spouse Female (220)	45.2 (6.9)	14.3 (3.4)	14.5 (3.0)	16.5 (2.0)	5.3 (4.6)	3.4 (2.0)	3.5 (3.4)
Sibs Parents Male (230)	44.8 (6.1)	14.0 (2.8)	14.9 (2.9)	2.0 (2.0)	7.2 (5.0)	2.7 (2.5)	4.5 (3.3)

Sibs Parents Female (306 – 305)	46.9 (6.1)	14.8 (2.8)	15.3 (2.8)	16.7 (2.1)	5.0 (4.6)	1.5 (1.9)	3.5 (3.3)

MZ Female one missing CWB-OD; Adopted Female SIB missing OCB and OCB_IC; Female Parent missing OCB, OCB_TASK, and OCB_O

Table A.18. Descriptive statistics pre-winsorized scores

Sample*	Twin sample	Partners of twins	SIBS sample	Parents of SIBS
N	1012	528	708	536
Workplace behavior*				
OCB Mean (SD) N Range possible 0-60**	44.9 (7.0) 1012	44.2 (7.2) 528	44.2 (6.8) 707	46.0 (6.2) 535
OCB-CON 0-20	14.3 (3.2) 1012	14.0 (3.3) 528	14.2 (3.2) 708	14.5 (2.8) 535
OCB-O 0-20	14.5 (3.2) 1012	14.3 (3.2) 528	14.3 (3.1) 708	15.1 (2.9) 535
OCB-I 0-20	16.1 (2.2) 1012	15.9 (2.3) 528	15.7 (2.2) 707	16.4 (2.1) 536
CWB Mean (SD) N Range possible 0-76**	6.7 (5.6) 1012	7.0 (5.5) 528	8.4 (6.6) 708	6.0 (5.0) 536
CWB-I Range 0-28	2.7 (3.0) 1012	2.9 (3.2) 528	3.4 (3.4) 708	2.0 (2.3) 536
CWB-O 0-48	4.0 (3.5) 1011	4.1 (3.7) 528	5.0 (4.2) 708	4.0 (3.4) 536

NOTE: Does not reflect missing data in some columns. One partner of twin missing sex and 12 in this sample are missing age. *Workplace behavior scores prorated (i.e., mean filled) if participants missed a maximum of two questions, no sex or age adjustments in these scores). One SIBS participant and one parent participant are missing OCB scores. –CON = Conscientious Initiative, -O = Organizational, -I = Interpersonal

** **Data has NOT been winsorized**

Table A.19. Familial Resemblance on Nontask Performance Correlation and 95% Confidence Intervals

Values NOT winsorized. No adjustment for age/sex. Data NOT winsorized.

	OCB	CWB
N PAIRS	Siblings	
MZ Twins (261/261)	.34	.37
	[.23, .44]	[.26, .47]
DZ Twins (130/130)	.17	.18
	[-.01, .33]	[.01, .34]
Nonadoptive Siblings (88/88)	.15	.24
	[-.06, .35]	[.03, .43]
Adoptive Siblings (137/138)	.12	-.06
	[-.05, .28]	[-.22, .11]
	Parent-Offspring	
Non-adoptive Parent Offspring	.14	.14
(203/203)	[.00, .27]	[.01, .28]
Adoptive Parent Offspring	-.01	.15
(263/263)	[-.13, .11]	[.03, .27]
	Spouses	
Mid-Life Partners (528/528)	.14	.10
	[.06, .23]	[.01, .18]
Late-Life Partners (200/201)	.11	.15
	[-.03, .24]	[.01, .28]

NOTE. ICC not used for twins in this table.

Composite parental OCB and CWB scores were computed by taking the mid-parent average after eliminating the mother-father mean difference (i.e., a value of 2.3 was added to each mother's CWB score and a value of 2.1 was added to each father's OCB score). In cases where only one parent reported CWB or OCB, that score (also adjusted for mother/father mean difference) was used in place of a mid-parent average.

Table A.20. Pre and Post Winsorized Scores

	PRE-Winsorize			POST-Winsorize			% of Scores changed (N)
	Min	Mean (SD)	Max	Min	Mean (SD)	Max	
TWINS Sample							
CWB	0	6.7 (5.6)	40	0	6.7 (5.4)	24	0.1% (8)
CWB-ID	0	2.7 (3.0)	27	0	2.7 (2.8)	12	1.0% (12)
CWB-OD	0	4.0 (3.5)	23	0	4.0 (3.4)	15	0.7% (7)
OCB	21	44.9 (7.0)	60	24	44.9 (7.0)	60	0.2% (2)
OCB-CON	5	14.3 (3.2)	20	5	14.3 (3.2)	20	0.0% (0)
OCB-IC	7	16.1 (2.2)	20	10	16.1 (2.2)	20	0.2% (2)
OCB-OC	1	14.5 (3.2)	20	5	14.5 (3.2)	20	0.2% (2)
PARTNERS Sample							
CWB	0	7.0 (5.5)	29	0	7.0 (5.5)	24	0.9% (5)
CWB-ID	0	2.9 (3.2)	21	0	2.9 (3.1)	13	0.8% (4)
CWB-OD	0	4.1 (3.7)	21	0	4.0 (3.6)	15	0.4% (2)
OCB	24	44.2 (7.2)	60	24	44.2 (7.2)	60	0.0% (0)
OCB-CON	3	14.0 (3.3)	20	4	14.0 (3.3)	20	0.2% (1)
OCB-IC	9	15.9 (2.3)	20	9	15.9 (2.3)	20	0.0% (0)
OCB-OC	3	14.3 (3.2)	20	5	14.4 (3.2)	20	0.2% (1)
SIBS OFFSPRING Sample							
CWB	0	8.34 (6.4)	48	0	8.3 (6.1)	28	1.7% (12)
CWB-ID	0	3.4 (3.4)	24	0	3.3 (3.2)	14	0.8% (6)
CWB-OD	0	5.0 (4.2)	28	0	5.0 (3.9)	18	1.8% (13)
OCB	20	44.2 (6.8)	60	24	44.2 (6.8)	60	0.3% (2)
OCB-CON	5	14.2 (3.2)	20	5	14.2 (3.2)	20	0.0% (0)
OCB-IC	8	15.7 (2.2)	20	9	15.7 (2.2)	20	0.4% (3)
OCB-OC	3	14.3 (3.1)	20	5	14.3 (3.1)	20	0.4% (3)
PARENTS Sample							
CWB	0	6.0 (5.0)	28	0	6.0 (4.9)	21	0.4% (2)
CWB-ID	0	2.0 (2.3)	13	0	2.0 (2.3)	9	0.7% (4)

CWB-OD	0	4.0 (3.4)	18	0	3.9 (3.4)	14	0.6% (3)
OCB	28	46.0 (6.2)	60	28	46.0 (6.2)	60	0.0% (0)
OCB-CON	5	14.5 (2.8)	20	6	14.5 (2.8)	20	0.2% (1)
OCB-IC	10	16.4 (2.1)	20	10	16.4 (2.1)	20	0.0% (0)
OCB-OC	5	15.1 (2.9)	20	6	15.1 (2.9)	20	0.2% (1)

Note. CWB = Counterproductive work behavior, ID = Interpersonal deviance, OD = Organizational deviance, OCB = Organizational citizenship behavior, CON = Conscientious Initiative, IC = Interpersonal conscientiousness, OC = Organizational conscientiousness

Table A.21. Fit Statistics for model standardized parameter estimates constrained between twins and non-twin sibling models

Phenotype	-2LL	*DF*	AIC	$\Delta\chi^2$ (2)	*p*
CWB					
Free (ACE)	10679.4	1712	7255.4		
Standardized Est. Con.	10679.4	1714	7251.4	0	1
CWB_ID					
Free (ACE)	8427.3	1712	5003.3		
Standardized Est. Con.	8428.5	1714	5000.5	1.2	.55
CWB_OD					
Free (ACE)	9162.4	1711	5740.4		
Standardized Est. Con.	9163.3	1713	5737.3	.9	.64

Standardized Est. Con. = Model where the standardized estimates are constrained to be equal in the twin and adoption samples.

A.22. ACE estimated in semi-constrained model

	A (additive genetic)	C (shared environment)	E (unique environment)
		CWB	
	.35 [.20, .45]	.00 [.00, .10]	.65 [.55, .76]
		CWB-ID	
	.38 [.27, .47]	.00 [.00, .10]	.62 [.53, .73]
		CWB-OD	
	.31 [.14, .41]	.00 [.00, .11]	.69 [.59, .81]

Note. CWB = Counterproductive work behavior, ID = Interpersonal deviance, OD = Organizational deviance

Table A.23. Percent of missing data (N) for each category

Sample	Twin sample	Partners of twins	SIBS sample	Parents of SIBS
Overall N	1012	528	708	536
Sex	0% (0)	0.2% (1)	0% (0)	0% (0)
Age	0% (0)	2.3% (12)	0% (0)	0% (0)
Education	0.1% (1)	0.2% (1)	0.6% (4)	0% (0)
Workplace behavior				
OCB Mean (SD)	0% (0)	0% (0)	0.1% (1)	0.2% (1)
OCB Conscientious Initiative	0% (0)	0% (0)	0% (0)	0.2% (1)
OCB Organization	0% (0)	0% (0)	0% (0)	0.2% (1)
OCB Interpersonal	0% (0)	0% (0)	0.1% (1)	0% (0)
CWB	0% (0)	0% (0)	0% (0)	0% (0)
CWB Interpersonal	0% (0)	0% (0)	0% (0)	0% (0)
CWB Organizational	0.1% (1)	0% (0)	0% (0)	0% (0)

Note. CWB = Counterproductive work behavior, OCB = Organizational citizenship behavior

Table A.24. Twin and sibling correlations by sex

	OCB	**OCB-CON**	**OCB-OC**	**OCB-IC**	**CWB**	**CWB-ID**	**CWB-OD**
(N Pairs)							
Female MZ Twins (153-154)	.39 [.28, .50]	.37 [.25, .48]	.29 [.16, .40]	.39 [.28, .50]	.42 [.30, .52]	.32 [.19, .43]	.40 [.28, .50]
Male MZ Twins (107)	.26 [.12, .39]	.21 [.06, .35]	.29 [.14, .42]	.21 [.07, .35]	.30 [.16, .43]	.39 [.26, .51]	.26 [.11, .39]
Female DZ Twins (75)	.10 [-.08, .27]	.09 [-.09, .26]	.13 [-.05, .29]	-.00 [-.18, .17]	.10 [-.08, .27]	.31 [.14, .46]	.00 [-.18, .18]
Male DZ Twins (55)	.27 [.07, .44]	.00 [-.20, .20]	.32 [.13, .49]	.23 [.03, .41]	.11 [-.09, .30]	.28 [.09, .45]	.01 [-.19, .20]
Female Nonadoptive Siblings (29)	.21 [-.17, .53]	.30 [-.07, .60]	.11 [-.27, .45]	.29 [-.08, .60]	-.03 [-.39, .34]	-.17 [-.50, .21]	.21 [-.17, .54]
Male Nonadoptive Siblings (17)	.20 [-.31, .62]	.22 [-.29, .63]	.09 [-.40, .55]	.06 [-.43, .53]	.62 [.19, .84]	.76 [.44, .91]	.22 [-.29, .63]
Opposite-Sex Nonadoptive Siblings (42)	.10 [-.21, .39]	.00 [-.30, .31]	.15 [-.16, .43]	-.04 [-.34, .26]	.10 [-.21, .39]	.08 [-.23, .38]	.16 [-.15, .44]
Female Adoptive Siblings (59-60)	.07 [-.19, .32]	.08 [-.18, .33]	-.02 [-.27, .23]	.24 [-.02, .47]	-.13 [-.37, .13]	-.24 [-.46, .02]	-.04 [-.29, .21]
Male Adoptive Siblings (26)	-.31 [-.62, .09]	-.15 [-.51, .26]	-.33 [-.64, .06]	-.04 [-.42, .36]	-.36 [-.66, .03]	-.25 [-.58, .15]	-.37 [-.66, .02]
Opposite-Sex Adoptive Siblings (52)	.33 [.06, .55]	.24 [-.03, .48]	.20 [-.08, .45]	.04 [-.23, .31]	-.05 [-.32, .22]	-.08 [-.34, .19]	.04 [-.23, .31]

Note. CWB = Counterproductive work behavior, ID = Interpersonal deviance, OD = Organizational deviance, OCB = Organizational citizenship behavior, CON = Conscientious Initiative, IC = Interpersonal conscientiousness, OC = Organizational conscientiousness, MZ = Monozygotic, DZ = Dizygotic

Table A.25. Sample Representativeness Attrition Analysis

Intake Personality and Externalizing Differences in Those Who Participated in Follow-Up and Not, and Employed or Not

Traits Measured at Intake	*†Twins Participated Follow-Up 4 (Overall N = 1066)	†Twins not in Follow-Up 4 (Overall N = 464)	Cohen's *d, t*(*df*), *p*
Trait Aggression	43.7 (8.6)	43.3 (9.1)	*d*=.04, *t*(800.2)=0.6, *p*=.57
Trait Control	46.2 (7.0)	46.8 (7.2)	*d*=.09, *t*(815.5)=-1.4, *p*=.156
Externalizing Symptoms (logged)	1.7 (0.7)	1.8 (0.7)	*d*=.17, *t*(1275.3)=-3.3, *p*<.001
	†Twins in Follow-Up 4 Employed**	†Twins in Follow-Up 4 not employed***	
Trait Aggression	43.6 (8.5)	44.3 (10.2)	*d*=.08, *t*(27.0)=-0.3, *p*=.752
Trait Control	46.2 (7.1)	45.9 (6.1)	*d*=.04, *t*(30.1)=0.2, *p*=.836
Externalizing Symptoms (logged)	1.7 (0.7))	1.6 (0.8)	*d*=.14, *t*(71.7)=0.9, *p*=.354
	*SIBS Participated Follow-Up 3 (Overall N 769)	SIBS not in Follow-Up 3 (Overall N 463)	
Trait Aggression	37.9(10.0)	40.9(11.0)	*d*=.29, *t*(879.8)=-4.8, *p*<.001
Trait Control	47.3(8.4)	45.1(8.5)	*d*=.26, *t*(933.76)=4.4, *p*<.001
Externalizing Symptoms (logged)	1.6 (0.8)	1.8 (0.8)	*d*=.27, *t*(958.4)=-4.6, *p*<.001
	SIBS in Follow-Up 3 Employed** (Overall N 708)	SIBS in Follow-Up 3 not employed*** (Overall N 60)	
Trait Aggression	37.8 (10.0)	38.1 (10.1)	*d*=.02, *t*(67.9)=-0.2, *p*=.87
Trait Control	47.4 (8.4)	45.7 (7.8)	*d*=.20, *t*(68.3)=1.6, *p*=.12
Externalizing Symptoms (logged)	1.6 (0.8)	1.7 (0.8)	*d*=.20, *t*(64.2)=-1.4, *p*=.16

*Participated in this follow-up regardless of employment status. **Employed and met the other criteria for this manuscript ***Not employed can be either not employed or missing response to employment item. †Only twins from the 17-yo cohort are included here.

Trait Aggression and trait Control from the Multidimensional Personality Questionnaire (MPQ; Tellegen). Childhood externalizing symptoms (+1 then logged to handle right skew), based on Diagnostic and Statistical Manuel of Mental Disorders (DSM) criteria.

Table A.26. Mean (SD) for individual OCB and CWB items in the four samples

	Items / Mean (SD)	Twins (N = 1011 - 1012)	Partners of Twins (N 528)	SIBS Offspring (N 707-708)	SIBS Parents (N 528)
	OCB – Conscientious initiative				
1	Found additional productive work to do when your normally scheduled duties were completed	3.1 (0.8)	3.0 (0.9)	2.9 (0.8)	3.1 (0.7)
2	Looked for opportunities to learn new knowledge and skills from others at work and from new and challenging job assignments	3.0 (0.8)	3.0 (0.8)	3.1 (0.8)	3.1 (0.7)
3	Persisted with unusually high levels of effort, determination and stamina to complete work tasks successfully despite very difficult conditions or obstacles	3.0 (0.8)	3.0 (0.8)	2.9 (0.8)	3.0 (0.8)
4	Asked for additional or more challenging work assignments	2.3 (1.0)	2.2 (1.1)	2.5 (1.0)	2.3 (0.9)
5	Consistently completed work on or ahead of time, even when deadlines seemed impossibly short	2.9 (0.8)	2.9 (0.8)	2.8 (0.8)	2.9 (0.8)
	OCB – Organization support				
6	Stayed with the organization despite hardship	3.1 (0.9)	3.0 (0.9)	2.9 (0.9)	3.1 (0.8)
7	Showed sincere pride and enthusiasm for the organization	3.0 (0.8)	3.0 (0.8)	2.9 (0.8)	3.2 (0.7)
8	Actively embraced the organization's missions and objectives	3.1 (0.8)	3.0 (0.8)	3.0 (0.8)	3.2 (0.7)
9	Talked with others outside of work about the organization's positive features	2.6 (1.0)	2.6 (1.0)	2.7 (0.9)	2.9 (0.9)
10	Offered constructive suggestions for work-place improvement	2.7 (0.9)	2.7 (0.9)	2.7 (0.9)	2.8 (0.8)
	OCB – Interpersonal support				
11	Refused to take on a job assignment because it was the responsibility of another co-worker (R)	3.2 (0.7)	3.2 (0.8)	3.1 (0.7)	3.2 (0.7)
12	Was courteous and tactful with co-workers, even when busy or stressed	3.3 (0.7)	3.2 (0.7)	3.2 (0.7)	3.4 (0.6)
13	Volunteered to help a co-worker meet a difficult deadline	2.9 (0.8)	2.8 (0.8)	2.8 (0.8)	2.8 (0.8)
14	Purposefully held back information that would have helped a co-worker (R)	3.8 (0.5)	3.8 (0.6)	3.7 (0.6)	3.8 (0.5)
15	Went out of my way to congratulate others at work for their achievements	2.9 (0.9)	2.9 (0.9)	2.9 (0.8)	3.1 (0.7)

	CWB – Interpersonal Deviance				
1	Made fun of someone at work	0.8 (0.9)	0.9 (0.9)	1.0 (0.9)	0.6 (0.7)
2	Said something hurtful to someone at work	0.4 (0.6)	0.4 (0.6)	0.5 (0.7)	0.4 (0.6)
3	Made an ethic, religious or racial remark at work	0.2 (0.5)	0.3 (0.6)	0.3 (0.6)	0.2 (0.4)
4	Cursed at someone at work	0.5 (0.8)	0.5 (0.8)	0.5 (0.9)	0.2 (0.5)
5	Played a mean prank on someone at work	0.2 (0.5)	0.2 (0.5)	0.2 (0.5)	0.1 (0.3)
6	Acted rudely toward someone at work	0.5 (0.6)	0.5 (0.6)	0.6 (0.7)	0.4 (0.5)
7	Publically embarrassed someone at work	0.1 (0.4)	0.2 (0.4)	0.2 (0.4)	0.1 (0.3)
	CWB – Organizational Deviance				
8	Took property from work without permission	0.2 (0.5)	0.2 (0.5)	0.3 (0.5)	0.3 (0.6)
9	Spent too much time fantasizing, daydreaming, or surfing the internet instead of working	0.9 (0.8)	0.9 (0.8)	1.1 (0.9)	0.6 (0.7)
10	Falsified a receipt to get reimbursed for more money than spent on a business expense	0.0 (0.2)	0.0 (0.2)	0.0 (0.2)	0.0 (0.2)
11	Took an additional or longer break than is acceptable at your workplace	0.6 (0.8)	0.7 (0.7)	0.8 (0.8)	0.7 (0.7)
12	Came in late to work without permission	0.4 (0.7)	0.5 (0.7)	0.6 (0.8)	0.5 (0.7)
13	Littered your work environment	0.1 (0.7)	0.1 (0.5)	0.2 (0.5)	0.2 (0.5)
14	Failed to follow your boss's instructions	0.4 (0.6)	0.4 (0.6)	0.5 (0.6)	0.5 (0.6)
15	Intentionally worked slower than you could have worked	0.5 (0.6)	0.5 (0.7)	0.6 (0.7)	0.3 (0.5)
16	Discussed confidential company information with an unauthorized individual	0.2 (0.4)	0.2 (0.4)	0.2 (0.5)	0.2 (0.4)
17	Used an illegal drug or consumed alcohol on the job when not allowed	0.1 (0.3)	0.0 (0.2)	0.1 (0.4)	0.0 (0.2)
18	Put little effort into your work	0.5 (0.6)	0.5 (0.6)	0.6 (0.7)	0.4 (0.5)
19	Dragged out work in order to get overtime	0.1 (0.3)	0.1 (0.3)	0.2 (0.4)	0.1 (0.3)

Note. All items on a 5-point scale from 0 = Never to 4 = Always. R = reverse scored item

Comparing CWB item 9 (misuse of time) and item 17 (alcohol or drugs) mean difference test included in discussion section

Twins: $t(1011)=30.7$; twin partner/spouses: $t(527)=23.2$; siblings: $t(707)=27.3$; parents $t(535)=19.6$

Table A.27. Dependent Groups Non-Overlapping Correlations

Monozygotic Twins correlation matrix

	MZ Twin 1. CWB	MZ Twin 2. CWB	MZ Twin 1. OCB	MZ Twin 2. OCB
MZ Twin 1. CWB				
MZ Twin 2. CWB	.40			
MZ Twin 1. OCB	-.29	-.15		
MZ Twin 2. OCB	.11	-.29	.34	

Δ between CWB*r* and OCB*r* = .06 95%CI for Δ between *r*s = [-.08, .20]), *p*=.40

Dizygotic Twins correlation matrix

	DZ Twin 1. CWB	DZ Twin 2. CWB	DZ Twin 1. OCB	DZ Twin 2. OCB
DZ Twin 1. CWB				
DZ Twin 2. CWB	.20			
DZ Twin 1. OCB	-.39	-.03		
DZ Twin 2. OCB	-.01	-.32	.17	

Δ between CWB*r* and OCB*r* = .03 95%CI for Δ between *r*s = [-.19, .25]), *p*=.79

Non-Adoptive siblings correlation matrix

	NAD Younger CWB	NAD Older CWB	NAD Younger OCB	NAD Older OCB
NAD Younger CWB				
NAD Older CWB	.23			
NAD Younger OCB	-.26	-.15		
NAD Older OCB	-.13	-.47	.15	

Δ between CWB*r* and OCB*r* = .08 95%CI for Δ between *r*s = [-.19, .35]), *p*=.56

Adoptive siblings correlation matrix

	AD Younger CWB	AD Older CWB	AD Younger OCB	AD Older OCB
AD Younger CWB				
AD Older CWB	-.09			
AD Younger OCB	-.33	-.14		
AD Older OCB	-.01	-.30	.12	

Δ between CWB*r* and OCB*r* = -.21 95%CI for Δ between *r*s = [-.42, .02]), *p*=.06

Non-Adoptive Parent-Offspring

	Mid-Parent CWB	NAD Offspring CWB	Mid-Parent OCB	NAD Offspring OCB
Mid-Parent CWB				
NAD Offspring CWB	.16			
Mid-Parent OCB	-.37	-.06		
NAD Offspring OCB	-.15	-.37	.14	

Δ between CWB*r* and OCB*r* = .02 95%CI for Δ between *r*s = [-.16, .20]), *p*=.82

Adoptive Parent-Offspring

	Mid-Parent CWB	AD Offspring CWB	Mid-Parent OCB	AD Offspring OCB
Mid-Parent CWB				
AD Offspring CWB	.15			
Mid-Parent OCB	-.40	.02		
AD Offspring OCB	-.13	-.36	-.01	

Δ between CWB*r* and OCB*r* = .16 95%CI for Δ between *r*s = [.00, .32]), *p*=.05

Mid-Life Couples

	Husband CWB	Wife CWB	Husband OCB	Wife OCB
Husband CWB				
Wife CWB	.18			
Husband OCB	-.33	-.11		
Wife OCB	-.13	-.29	.16	

Δ between CWB*r* and OCB*r* = .02 95%CI for Δ between *r*s = [-.09, .13]), *p*=.73

Late-Life Couples

	Husband CWB	Wife CWB	Husband OCB	Wife OCB
Husband CWB				
Wife CWB	.16			
Husband OCB	-.43	.01		
Wife OCB	-.18	-.25	.11	

Δ between CWB*r* and OCB*r* = .05 95%CI for Δ between *r*s = [-.13, .23]), *p*=.59

Using cocor package function cocor.dep.groups.nonoverlap(r.jk, r.hm, r.jh, r.jm, r.kh, r.km, n)

Where r.jk used for comparison and r.hm used for comparison

Reports Pearson and Filon's z (1898) & Zou's (2007) confidence interval

Appendix B: Supplementary material for ***The relationships among maladaptive and normative personality traits, counterproductive and organizational citizenship workplace behavior***

Table B.28. Attrition Analysis

Target **Age 17** MPQ Scale	**Participated in Target Age 30s-40s Assessment** Mean (*SD*) *N*	**Did Not Participate in Target Age 30s-40s Assessment** Mean (*SD*) *N*	Cohen's *d* 95% CI	*t*(*df*), *p*
Traditionalism	51.9 (7.1) 1016	51.8 (6.7) 1433	.02 [-.06, .10]	*t*(2101.8)= -0.45, *p*=.65
Stress Reaction	44.7 (9.0) 1021	42.4 (9.2) 1447	.26 [.18, .34]	*t*(2228.6) = -6.30, *p*<.01
Absorption	43.9 (9.3) 1020	42.2 (9.3) 1446	.19 [.11, .27]	*t*(2194.1) = -4.6, *p*<.01
Aggression	38.2 (9.5) 1021	37.5 (9.9) 1447	.07 [-.01, .15]	*t*(2245.8) = -1.8, *p*=.07
Social Potency	45.4 (8.0) 1020	45.7 (8.3) 1448	.04 [-.04, .12]	*t*(2232.6) = 0.9, *p*=.36
Alienation	36.0 (8.2) 1021	34.7 (8.8) 1449	.15 [.07, .23]	*t*(2287.5) = -3.6, *p*<.01
Achievement	48.6 (8.0) 1020	49.2 (8.4) 1445	.06 [-.02, .14]	*t*(2252.6) = 1.6, *p*=.12
Control	47.2 (7.5) 1021	47.7 (7.4) 1445	.06 [-.02, .14]	*t*(2192.5) = 1.5, *p*=.12
Harm Avoidance	46.3 (10.4) 1019	46.6 (10.6) 1450	.03 [-.05, .11]	*t*(2213.3) = 0.7, *p*=.48
Social Closeness	54.1 (8.6) 1024	54.4 (8.2) 1450	.04 [-.04, .12]	*t*(2138.6) = 0.9, *p*=.37
Well-Being	54.8 (8.0) 1020	55.5 (7.9) 1443	.09 [.01, .17]	*t*(2170.5) = 2.1, *p*=.04

Note. Attrition analysis compares those who participated in the target age 30s-40s assessment compared to those who did not – compares their MPQ scores at target age-17.

Table B.29. Pre and Post Winsorized Scores

	PRE-Winsorize			POST-Winsorize			% of Scores changed (N)
	Min	Mean (SD)	Max	Min	Mean (SD)	Max	
CWB	0.0	6.6 (5.5)	40.0	0.0	6.6 (5.4)	23.0	0.6% (4)
OCB	22.0	45.1 (6.9)	60.0	24.0	45.1 (6.9)	60.0	0.2% (1)

Note. Winsorized 3 standard deviations above and below the mean

Table B.30. Correlations between MPQ and PID-5 Scales

MPQ PID-5	Stress Reaction	Harm Avoidance	Social Closeness	Well-Being	Aggression	Social Potency	Alienation	Achieve-ment	Control	Traditionalism	Absorption
Anxiousness	0.57**	0.08	-0.18**	-0.29**	0.11**	-0.12**	0.26**	-0.13**	-0.01	-0.06	0.13**
Emotional Lability	0.47**	0.02	-0.12**	-0.23**	0.09*	-0.07	0.26**	-0.13**	-0.15**	-0.12**	0.16**
Hostility	0.39**	-0.13**	-0.24**	-0.31**	0.37**	0.00	0.26**	-0.18**	-0.17**	-0.12**	0.04
Perseveration	0.40**	-0.09*	-0.27**	-0.28**	0.21**	-0.07	0.29**	-0.12**	-0.15**	-0.04	0.13**
Restricted Affect	-0.02	-0.27**	-0.42**	-0.23**	0.30**	-0.03	0.13**	-0.02	-0.08*	-0.04	-0.02
Separation Insecurity	0.30**	0.05	0.02	-0.21**	0.10*	-0.02	0.25**	-0.13**	-0.07	0.06	0.08
Submissive	0.26**	0.02	-0.09*	-0.17**	0.09*	-0.14**	0.07	-0.14**	-0.04	-0.05	0.04
Anhedonia	0.38**	-0.11**	-0.28**	-0.45**	0.24**	-0.08*	0.29**	-0.15**	-0.14**	-0.13**	0.06
Depressivity	0.32**	-0.10*	-0.25**	-0.33**	0.25**	-0.08	0.28**	-0.14**	-0.16**	-0.16**	0.12**

Intimacy Avoidance	0.16**	-0.07	-0.29**	-0.21**	0.13**	-0.12**	0.15**	-0.11*	-0.03	-0.09*	0.00
Suspicious	0.32**	-0.12**	-0.23**	-0.27**	0.28**	0.00	0.50**	-0.06	-0.12**	-0.01	0.15**
Withdrawal	0.32**	-0.12**	-0.54**	-0.37**	0.14**	-0.22**	0.21**	-0.11*	-0.01	-0.12**	0.06
Attention Seeking	0.10*	0.17**	0.01	0.01	0.23**	0.36**	0.11**	0.01	-0.21**	-0.11**	0.17**
Callous	0.08	-0.17**	-0.33**	-0.20**	0.34**	0.02	0.24**	-0.08*	-0.12**	-0.12**	0.03
Deceitful	0.20**	-0.09*	-0.18**	-0.15**	0.35**	0.12**	0.24**	-0.05	-0.19**	-0.11*	0.12**
Grandiosity	0.09*	-0.17**	-0.18**	-0.07	0.30**	0.19**	0.21**	0.01	-0.11*	-0.09*	0.07
Manipulativeness	0.04	-0.19**	-0.08*	0.01	0.35**	0.37**	0.12**	0.06	-0.11**	-0.07	0.13**
Distractibility	0.36**	-0.10*	-0.18**	-0.24**	0.22**	-0.03	0.25**	-0.14**	-0.25**	-0.08*	0.17**
Impulsivity	0.18**	-0.18**	-0.10*	-0.12**	0.30**	0.11*	0.28**	-0.08*	-0.46**	-0.06	0.19**
Irresponsibility	0.25**	-0.16**	-0.16**	-0.20**	0.24**	-0.01	0.26**	-0.12**	-0.29**	-0.17**	0.11**
Rigid Perfectionism	0.23**	-0.06	-0.15**	-0.14**	0.21**	0.07	0.22**	0.12**	0.07	0.10*	0.06

Risk Taking	0.02	-0.43**	-0.19**	-0.05	0.39**	0.17**	0.22**	0.09*	-0.34**	-0.08*	0.16**
Eccentricity	0.27**	-0.25**	-0.32**	-0.16**	0.23**	0.00	0.28**	-0.01	-0.19**	-0.17**	0.33**
Perceptual Dysregulation	0.23**	-0.10*	-0.14**	-0.10*	0.17**	0.03	0.25**	-0.03	-0.14**	-0.05	0.27**
Unusual Beliefs / Experiences	0.23**	-0.16**	-0.20**	-0.07	0.26**	0.03	0.29**	0.00	-0.22**	-0.10*	0.34**

Note. Standard errors range from .03 to .04. * p <.05, ** p<.01.

Table B.31. Alpha internal consistency reliability for the PID-5 4-Item scales

Scale (Four item scales)	Internal Consistency Reliability (Cronbach's alpha)
Anhedonia	0.83
Anxiousness	0.85
Attention Seeking	0.86
Callous	0.64
Deceitful	0.71
Depressivity	0.83
Distractibility	0.88
Eccentricity	0.87
Emotional Lability	0.83
Grandiosity	0.74
Hostility	0.79
Impulsivity	0.81
Intimacy Avoidance	0.85
Irresponsibility	0.55
Manipulativeness	0.70
Perceptual Dysregulation	0.56
Perseveration	0.77
Restricted Affectivity	0.79
Rigid Perfectionism	0.82
Risk Taking	0.79
Separation Insecurity	0.73
Submissiveness	0.79
Suspiciousness	0.66
Unusual Beliefs and Experiences	0.64
Withdrawal	0.84

Table B.32. Regression coefficients from regressing CWB and OCB, separately, onto the 36 personality traits and three demographic variables

Personality Traits	Counterproductive Work Behavior *B* [95% CI]	Organizational Citizenship Behavior *B* [95% CI]
PID-5 Negative Affect		
Anxiousness	0.03 [-0.07, 0.14]	-0.04 [-0.14, 0.07]
Emotional Liability	-0.06 [-0.17, 0.04]	-0.02 [-0.13, 0.09]
Hostility	0.11* [0.01, 0.21]	0.07 [-0.03, 0.17]
Perseveration	0.13* [0.02, 0.24]	-0.21** [-0.32, -0.10]
Restricted Affectivity†	-0.05 [-0.14, 0.04]	0.01 [-0.09, 0.11]
Separation Insecurity	0.06 [-0.03, 0.15]	0.11* [0.02, 0.20]
Submissiveness	0.01 [-0.07, 0.09]	-0.04 [-0.13, 0.04]
MPQ Traits Associated with Neuroticism		
Stress Reaction	-0.05 [-0.15, 0.05]	0.06 [-0.04, 0.17]
Harm Avoidance	0 .00 [-0.09, 0.09]	0.03 [-0.07, 0.12]
PID-5 Detachment		
Anhedonia	0.01 [-0.10, 0.12]	-0.09 [-0.21, 0.02]
Depressivity	-0.03 [-0.13, 0.07]	0.10 [-0.01, 0.21]
Intimacy Avoidance	-0.04 [-0.12, 0.04]	-0.03 [-0.11, 0.05]
Suspiciousness	-0.07 [-0.17, 0.03]	-0.11* [-0.21, -0.01]
Withdrawal	-0.03 [-0.13, 0.08]	0.02 [-0.09, 0.13]
MPQ Traits Associated with Extraversion		
Social Closeness	-0.05 [-0.15, 0.05]	0.00 [-0.10, 0.11]
Well-Being	-0.01 [-0.11, 0.10]	0.09 [-0.01, 0.20]
PID-5 Antagonism		
Attention Seeking	0.07	-0.03

	[-0.02, 0.16]	[-0.12, 0.07]
Callousness	0.00	-0.02
	[-0.09, 0.10]	[-0.12, 0.08]
Deceitfulness	0.07	-0.08
	[-0.03, 0.17]	[-0.18, 0.02]
Grandiosity	0.06	0.01
	[-0.03, 0.15]	[-0.09, 0.10]
Manipulativeness	0.09	0.03
	[-0.01, 0.19]	[-0.07, 0.14]
MPQ Traits Associated with Agreeableness		
Aggression†	0.21**	-0.17**
	[0.11, 0.31]	[-0.28, -0.07]
Social Potency	0.00	0.14*
	[-0.09, 0.09]	[0.04, 0.24]
Alienation†	0.00	0.07
	[-0.10, 0.10]	[-0.04, 0.18]
PID-5 Disinhibition		
Distractibility	0.04	-0.02
	[-0.05, 0.13]	[-0.12, 0.07]
Impulsivity	0.02	0.04
	[-0.08, 0.11]	[-0.06, 0.14]
Irresponsibility	0.04	-0.03
	[-0.05, 0.13]	[-0.12, 0.07]
Rigid Perfectionism†	-0.09*	0.07
	[-0.18, -0.01]	[-0.02, 0.16]
Risk Taking	0.04	0.07
	[-0.05, 0.13]	[-0.03, 0.16]
MPQ Traits Associated with Conscientiousness		
Achievement	-0.05	0.22**
	[-0.13, 0.04]	[0.13, 0.30]
(Self) Control	0.02	0.10*
	[-0.07, 0.11]	[0, 0.19]
PID-5 Psychoticism		
Eccentricity	0.12*	0.02
	[0.02, 0.21]	[-0.08, 0.12]
Cognitive and Perceptual	-0.03	0.03
Dysregulation	[-0.12, 0.06]	[-0.06, 0.12]
Unusual Beliefs and Experiences	-0.03	0.08
	[-0.13, 0.06]	[-0.02, 0.17]
MPQ Traits Associated with Openness		
Absorption	-0.06	0.04
	[-0.14, 0.02]	[-0.04, 0.13]
Traditionalism†	-0.05	0.02

	[-0.13, 0.02]	[-0.06, 0.10]
Demographics		
Age - MPQ	0 .00	-0.01
	[-0.07, 0.08]	[-0.09, 0.07]
Age - PID-5	0.01	0.04*
	[-0.02, 0.05]	[0.00, 0.08]
Sex (1 = Man, 2 = Woman)	-0.23*	0.22*
	[-0.43, -0.03]	[0.01, 0.43]

Note. † Indicates the facet/lower order trait falls on the opposite pole of its respective trait domains. *p<.05, **p<.01. Multiple regression includes both personality scales, sex and age as covariates, and family clustering accounted for using a random intercept. Personality traits, CWB, and OCB were standardized. N = 649.

Table B.33. Correlations between personality traits and nontask performance (gray) and correlations between the residuals of each trait post regressing the given trait on all others traits of the other personality assessment and nontask performance (white)

	Counterproductive Work Behavior		Organizational Citizenship Behavior	
	Raw◊	Residuals	Raw	Residuals
Personality Traits	*r* [95% CI]	*r* [95% CI]	*r* [95% CI]	*r* [95% CI]
PID-5 Negative Affect				
Anxiousness	0.18** [0.10, 0.26]	0.15** [0.07, 0.23]	-0.13** [-0.21, -0.05]	-0.07 [-0.15, 0.01]
Emotional Liability	0.15** [0.07, 0.23]	0.12** [0.04, 0.20]	-0.11** [-0.19, -0.03]	-0.06 [-0.14, 0.02]
Hostility	0.34** [0.26, 0.42]	0.18** [0.10, 0.26]	-0.19** [-0.27, -0.11]	-0.05 [-0.13, 0.03]
Perseveration	0.33** [0.25, 0.41]	0.25** [0.17, 0.33]	-0.23** [-0.31, -0.15]	-0.14** [-0.22, -0.06]
Restricted Affectivity†	0.24** [0.16, 0.32]	0.10* [0.02, 0.18]	-0.15** [-0.23, -0.07]	-0.04 [-0.12, 0.04]
Separation Insecurity	0.16** [0.08, 0.24]	0.14** [0.06, 0.22]	-0.04 [-0.12, 0.04]	0.01 [-0.07, 0.09]
Submissiveness	0.18** [0.10, 0.26]	0.14** [0.06, 0.22]	-0.18** [-0.26, -0.10]	-0.10* [-0.18, -0.02]
MPQ Traits Associated with Neuroticism				
Stress Reaction	0.10* [0.02, 0.18]	0.00 [-0.08, 0.08]	-0.10* [-0.18, -0.02]	0.01 [-0.07, 0.09]
Harm Avoidance	-0.21** [-0.29, -0.13]	-0.06 [-0.14, 0.02]	0.09* [0.01, 0.17]	0.07 [-0.01, 0.15]
PID-5 Detachment				
Anhedonia	0.24** [0.16, 0.32]	0.12** [0.04, 0.20]	-0.24** [-0.32, -0.16]	-0.12** [-0.20, -0.04]
Depressivity	0.18** [0.10, 0.26]	0.06 [-0.02, 0.14]	-0.15** [-0.23, -0.07]	-0.02 [-0.10, 0.06]
Intimacy Avoidance	0.11* [0.03, 0.19]	0.03 [-0.05, 0.11]	-0.15** [-0.23, -0.07]	-0.06 [-0.14, 0.02]
Suspiciousness	0.21** [0.13, 0.29]	0.10* [0.02, 0.18]	-0.17** [-0.25, -0.09]	-0.11* [-0.19, -0.03]
Withdrawal	0.18** [0.10, 0.26]	0.09* [0.01, 0.17]	-0.18** [-0.26, -0.10]	-0.06 [-0.14, 0.02]
MPQ Traits Associated with Extraversion				
Social Closeness	-0.18** [-0.26, -0.10]	-0.07 [-0.15, 0.01]	0.16** [0.08, 0.24]	0.06 [-0.02, 0.14]
Well-Being	-0.16** [-0.24, -0.08]	-0.08 [-0.16, 0.00]	0.28** [0.20, 0.36]	0.16** [0.08, 0.24]

PID-5 Antagonism				
Attention Seeking	0.33**	0.23**	-0.08	-0.09*
	[0.25, 0.41]	[0.15, 0.31]	[-0.16, 0.00]	[-0.17, -0.01]
Callousness	0.29**	0.14**	-0.16**	-0.06
	[0.21, 0.37]	[0.06, 0.22]	[-0.24, -0.08]	[-0.14, 0.02]
Deceitfulness	0.36**	0.23**	-0.16**	-0.09*
	[0.28, 0.44]	[0.15, 0.31]	[-0.24, -0.08]	[-0.17, -0.01]
Grandiosity	0.33**	0.21**	-0.09*	-0.06
	[0.25, 0.41]	[0.13, 0.29]	[-0.17, -0.01]	[-0.14, 0.02]
Manipulativeness	0.36**	0.22**	-0.04	-0.04
	[0.28, 0.44]	[0.14, 0.30]	[-0.12, 0.04]	[-0.12, 0.04]
MPQ Traits Associated with Agreeableness				
Aggression†	0.41**	0.19**	-0.19**	-0.14**
	[0.33, 0.49]	[0.11, 0.27]	[-0.27, -0.11]	[-0.22, -0.06]
Social Potency	0.13**	0.03	0.20**	0.15**
	[0.05, 0.21]	[-0.05, 0.11]	[0.12, 0.28]	[0.07, 0.23]
Alienation†	0.19**	0.07	-0.12**	-0.04
	[0.11, 0.27]	[-0.01, 0.15]	[-0.20, -0.04]	[-0.12, 0.04]
PID-5 Disinhibition				
Distractibility	0.29**	0.20**	-0.19**	-0.10*
	[0.21, 0.37]	[0.12, 0.28]	[-0.27, -0.11]	[-0.18, -0.02]
Impulsivity	0.29**	0.17**	-0.11*	-0.02
	[0.21, 0.37]	[0.09, 0.25]	[-0.19, -0.03]	[-0.10, 0.06]
Irresponsibility	0.29**	0.18**	-0.19**	-0.09*
	[0.21, 0.37]	[0.10, 0.26]	[-0.27, -0.11]	[-0.17, -0.01]
Rigid Perfectionism†	0.16**	0.09*	0.01	0 .00
	[0.08, 0.24]	[0.01, 0.17]	[-0.07, 0.09]	[-0.08, 0.08]
Risk Taking	0.31**	0.15**	-0.05	0.02
	[0.23, 0.39]	[0.07, 0.23]	[-0.13, 0.03]	[-0.06, 0.10]
MPQ Traits Associated with Conscientiousness				
Achievement	-0.08*	-0.04	0.34**	0.26**
	[-0.16, 0.00]	[-0.12, 0.04]	[0.26, 0.42]	[0.18, 0.34]
(Self) Control	-0.23**	-0.08*	0.19**	0.15**
	[-0.31, -0.15]	[-0.16, 0.00]	[0.11, 0.27]	[0.07, 0.23]
PID-5 Psychoticism				
Eccentricity	0.30**	0.21**	-0.09*	-0.04
	[0.22, 0.38]	[0.13, 0.29]	[-0.17, -0.01]	[-0.12, 0.04]
Cognitive and Perceptual Dysregulation	0.17**	0.10*	-0.03	0.00
	[0.09, 0.25]	[0.02, 0.18]	[-0.11, 0.05]	[-0.08, 0.08]
Unusual Beliefs and Experiences	0.18**	0.08	0.01	0.05
	[0.10, 0.26]	[0, 0.16]	[-0.07, 0.09]	[-0.03, 0.13]
MPQ Traits Associated with Openness				
Absorption	0.05	-0.03	0.09*	0.07

	[-0.03, 0.13]	[-0.11, 0.05]	[0.01, 0.17]	[-0.01, 0.15]
Traditionalism†	-0.13**	-0.05	0.10*	0.06
	[-0.21, -0.05]	[-0.13, 0.03]	[0.02, 0.18]	[-0.02, 0.14]

Note. †Indicates the facet/lower order trait falls on the opposite pole of its respective trait domains. *p<.05, **p<.01. N for correlations ranges from 649-650. ◊ Raw indicates personality trait scales not adjusted for the other assessment's personality traits, Adjusted indicates the residuals of a trait after that trait was regressed onto all other traits of the other personality assessment.

Follow-up analyses including a subset of MPQ traits measured concurrently with work-behavior and PID-5 assessments.

The seven MPQ scales given at the later follow-up included Aggression, Alienation, Control, Harm Avoidance, Stress Reaction, Traditionalism, and Well-Being. We examined the correlations between the age 29 MPQ scales assessment and the midlife MPQ scales assessment (correlations ranged from r= .67 to .81, see Appendix B Table B.34). Correlations between the nontask performance and the MPQ traits at the two assessments are presented in Table B.35. We ran a series of linear mixed models. First, we compared the amount of variance accounted for in CWB and OCB by the full 11 scales of the MPQ at age-29 and the seven-scale subset of the MPQ at age-29. This revealed that the seven-scale subset performed similarly to the full 11 scales for CWB, but less well for OCB (see Appendix B Figure B.7A). We then examined the time component by comparing the amount of variance accounted for in CWB and OCB by the seven scales at age 29 compared to the seven scales at midlife. More variance in both OCB and CWB was accounted for by the concurrently measured compared to the prospectively measured MPQ traits (Appendix B Figure B.7B). Given these two findings, we examined the amount of variance accounted for in OCB and CWB by the PID-5, by a combination of age 29 and midlife MPQ scales (i.e., using the seven scales from midlife and the other four scales from age 29), and by a combination of the PID-5 and midlife and 29 MPQ traits (Appendix B Figure B.7C). This allowed us to 1) better understand the relationship between the MPQ traits and nontask performance, and, 2) tentatively examine the degree to which the two scales may accounted for additional variance over each other when time of assessment plays less of a confounding role. *However,* we caution against strong comparisons of the relative value of maladaptive and normative personality traits both in light of the study design.

Table B.34. Correlations between MPQ subset scales at the target age 29 and target midlife age assessments

Trait	Correlation b/t Age 29 and Midlife Assessments *r* [95% CI]
Aggression	.69** [.65, .73]
Alienation	.69** [.65, .73]
Stress Reaction	.71** [.67, .75]
Harm Avoidance	.81** [.79, .84]
Control	.67** [.63, .71]
Well-Being	.67** [.62, .71]
Traditionalism	.75** [.72, .78]

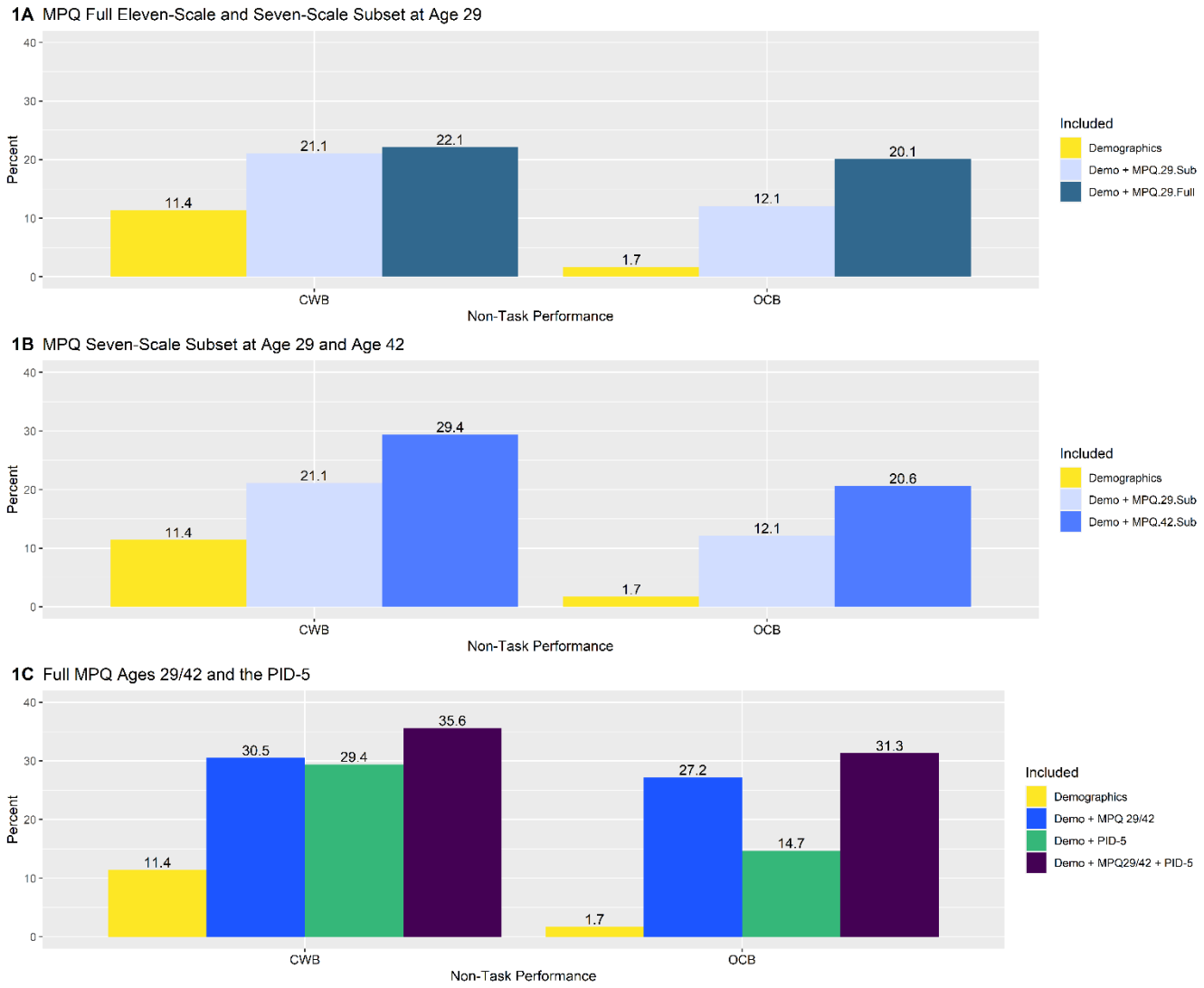
N = 646 – 648, ** p <.01

Table B.35. Correlations between the Age 29 and midlife MPQ assessments and nontask performance

	CWB (~30-40)		**OCB (~30-40)**	
	Prospective (Age ~29) MPQ Trait	Concurrent (~30-40) MPQ Trait	Prospective (Age ~29) MPQ Trait	Concurrent (~30-40) MPQ Trait
Aggression	0.41** [0.33, 0.49]	0.50** [0.44, 0.56]	-0.19** [-0.27, -0.11]	-0.28** [-0.36, -0.20]
Alienation	0.19** [0.11, 0.27]	0.23 [0.15, 0.31]	-0.12** [-0.20, -0.04]	-0.16** [-0.24, -0.08]
Stress Reaction	0.10* [0.02, 0.18]	0.17 [0.09, 0.25]	-0.10* [-0.18, -0.02]	-0.19** [-0.27, -0.11]
Harm Avoidance	-0.21** [-0.29, -0.13]	-0.28 [-0.36, -0.20]	0.09* [0.01, 0.17]	0.07 [-0.01, 0.15]
Control	-0.23** [-0.31, -0.15]	-0.27 [-0.35, -0.19]	0.19** [0.11, 0.27]	0.19** [0.11, 0.27]
Well-Being	-0.16** [-0.24, -0.08]	-0.17 [-0.25, -0.09]	0.28** [0.20, 0.36]	0.39** [0.31, 0.47]
Traditionalism	-0.13** [-0.21, -0.05]	-0.07 [-0.15, 0.01]	0.10* [0.02, 0.18]	0.07 [-0.01, 0.15]

Note. N = 650 for the prospective MPQ traits. N = 646-648 for the concurrent MPQ traits. * $p<.05$, ** $p<.01$

Figure B.7 A-C: Variance accounted for in CWB and OCB by the full MPQ and subset MPQ



Note. N = 645. Sub is the subset of seven MPQ scales (i.e., Well-being, Stress reaction, Alienation, Aggression, Control, Harm avoidance, Traditionalism). Full is all 11 MPQ scales. PID-5 is the 25 personality traits. Includes sex and age (age at prospective MPQ assessment and age at midlife assessment).

Appendix C Supplementary material for *Associations among adolescent disinhibition, adolescent prosociality, counterproductive and citizenship workplace behavior: A prospective study*

Table C.36. Opinions and Attitudes Scales

Antisocial Attitude
If I were really stuck, I might try to copy an answer from someone else's test at school
I see nothing wrong in trying a little beer with my friends
I could see cutting class to spend time with my friends
It's ok for someone my age to try a cigarette now and then
If I knew I could get away with it, I might take something from a store without paying for it
I'd rather tell my parents a lie than admit I had done something that would make them angry
I might try marijuana (pot) sometime
If really needed some money, I might sneak some out of my parents' wallet or purse
Aggressive Orientation
If a person challenges you, you have to be ready to fight back
If another kid cut in front me in line, I'd probably push him or her out of the way
If a friend got into a fight, I'd be ready to jump in so that she or he could win
I want to be known as a good fighter, someone the other kids are afraid of
If I didn't like someone, I might try to hurt him or her just for the heck of it
Sometimes people my age need to carry a weapon for their own protection
If someone bigger than be was bothering me, I might try and get some friends together to beat him or her up
If someone calls me a name, that is reason enough to fight
Prosocial Attitudes
I enjoy working really hard at school
I very much want to complete my homework on time
I usually will go out of my way to help other kids at school, even if they aren't my friends
In doing school projects, I always want mine to be the best
I go out of my way to try and help my teachers
I know I can get what I want by working hard
I'd like to help out (volunteer) at a community center or at my church or synagogue
I usually do my chores around the house without being asked
I'd rather watch television than do my homework at night

At school, I would rather take it easy than work hard

Developed by staff at the Minnesota Twin Family Study. See Burt (2014).

Table C.37. Delinquent Behavior Inventory

Riding a bicycle recklessly (for example, not stopping for stop sign, riding fast on sidewalks)
Driving a car or motorcycle without a license or learner's permit
Belonging to a group (of tem or more people) who go around together and sometimes get into fights or cause a disturbance
Cutting classes at school
Deliberately travailing without a ticket or paying the wrong fare (on a bus, for example)
Setting off fireworks in the street
Taking money from home, with no intention of returning it
Taking an unknown person's car or motorcycle for a joy riding (with no intention of keeping it for good)
Smashing, slashing or damaging things (this includes writing and spray painting things) in public places, like streets, theaters, school halls, busses, and subways
Annoying insulting or fighting other people (strangers) in public
Breaking into a big store, mall, warehouse, etc.
Breaking into a small shop or store, whether or not anything was stolen
Stealing things out of cars
Carrying some kind of weapon (for example a knife or gun) in case it is needed in a fight
Attacking an enemy or someone in a rival gang (without using any sort of weapon) in a public place
Breaking the windows of an empty house
Using any kind of weapon (for example a knife, gun, razor, or broken bottle) in a fight
Drinking alcoholic drinks in bars while under age
Using a fake ID in a bar or restaurant
Stealing things from big stores, supermarkets, or shops in a mall (while the store is open)
Stealing thing from small shops or stores (while the shop is open)
Deliberately littering the streets or sidewalks by smashing bottles, tipping trash cans, etc.
Buying cheap, or accepting as a present, anything known or suspected of being stolen
Planning well in advance to get into a house or apartment to steal valuables and following through on the plan
Getting into a house or apartment and stealing things (Don't count this if stealing results from planning well in advance)
Taking a bicycle belonging to an unknown person and keeping it

Struggling or fighting to get away from a police officer

Attacking or fighting a police officer who is trying to arrest someone else

Stealing school property worth more than about $5

Stealing tools, materials, or anything else worth more than $5 from an employer (during work hours – don't count breaking in)

Trespassing (for example, railroad cars, private property, public places after closing time, empty houses)

Going to see an X-rated film under age

Illegally gambling, including under aged gambling

Stealing goods or money from video games, juke boxes, telephones, etc.

Stealing from people's clothes hanging up or laying around anywhere

Obtaining money by false pretenses, or conning someone

Slight adapted version of Gibson (1967) See Taylor et al., (2000)

Table C.38. Interpersonal Peer Behaviors: Relational Aggression, Overt Aggression, Prosocial Behavior

Please think about your relationship with other students at your school (or other people about your age). During the last three years, how often did these things happen while you were with them? (If you have graduated from or left high school, answer for your relationships during your las three years of high school).

1= Never, 2 = Almost Never, 3= Sometimes, 4= Almost all the time, 5 = All the time

Relational Aggression
How often did you spread rumors or gossip about another student to make others not like him/her anymore?
How often did you leave out or exclude other students from activities?
How often did you try to get even with another student by excluding him/her from your group of friends?
How often did you threaten not to hang out with another student unless he/she did what you wanted to do?
How often did you try to keep others from hanging out with another student by saying mean things about him/her?
Overt Aggression
How often did you hit another student?
How often did you yell at another student and call him/her mean names?
How often did you push and shove other students?
How often did you start a physical fight with another student?
How often did you threaten to beat up another student if he/she didn't do what you wanted him/her to do?
Prosocial Behavior
How often did you try to cheer up other students who felt upset or sad?
How often did you let other students know that you cared about them?
How often did you help out other students when they needed it?
How often did you do something that made another student feel happy?
How often did you say something nice to another student?

Crick, N. R., & Grotpeter, J. K. (1995). Relational Aggression, Gender, and Social-Psychological Adjustment. Child Development, 66(3), 710–722. https://doi.org/10.1111/j.1467-8624.1995.tb00900.x

Table C.39. Externalizing Symptoms

Oppositional Defiant Disorder SX	**Conduct Disorder SX**	**Attention Deficit-Hyperactivity Disorder SX**
Often argues with adults	Truant before 13	Difficulty remaining seated
Often loses temper	Stolen nontrivial items	Often fidgets/squirms/restless
Defies adult's requests	Lies to con others	Difficulty playing quietly
Deliberately annoys people	Set fires to cause damage	Often talks excessively
Angry and resentful	Run away for lengthy period	Difficulty sustaining attention
Touchy/ easily annoyed	Often initiates physical fights	Difficulty following instructions
Spiteful or vindictive	Cruel to people	Often easily distracted
Blames others for mistakes	Used wean with potential for harm	Often interrupts or intrudes
	Stolen with confrontation	Often blurts out answers
	Cruel to animals	Difficulty awaiting turn
	Destroyed property	Difficulty organizing
	Broke into house/car	Often loses necessary items
	Bullies, threatens, intimidates	Often seems not to listen
	Stays out before 13	Often forgetful
		Avoids mental effort
		Inappropriate running about
		Careless mistakes
		"On the go"

(*Diagnostic and Statistical Manual of Mental Disorders : DSM-IV*, 1994)

Table C.40. Sibling Relationship Questionnaire: Prosocial Scale

How much do both you and this sibling do nice things for each other?
How much do you and this sibling cooperate with each other?
How much do both you and your sibling share with each other?

1. Hardly at all, 2 = not too much 3. Somewhat 4= very much 5 = extremely much

(Furman & Buhrmester, 1985)

Table C.41 Pre and Post Winsorized Scores

	PRE-Winsorize			POST-Winsorize			
	Min	Mean (SD)	Max	Min	Mean (SD)	Max	% of Scores changed (N)
Adolescent Measures							
Prosocial Behavior: Sibling	3.0	9.3 (2.0)	15.0	3.0	9.3 (2.0)	15.0	0% (0)
Antisocial Attitudes	8.0	13.3 (5.1)	31.0	8.0	13.3 (5.1)	29.0	0.3% (2)
Aggressive Attitudes	8	13.5 (4.6)	32.0	8.0	13.5 (4.5)	27.0	0.4% (3)
Prosocial Attitudes	14.0	29.7 (4.5)	40.0	16.0	29.8 (4.4)	40.0	0.3% (2)
Delinquency	0.0	4.7 (5.8)	34.0	0.0	4.6 (5.4)	22.0	1.5% (10)
Relational Aggression	0.0	2.1 (2.2)	13.0	0.0	2.1 (2.2)	9.0	0.6% (4)
Overt Aggression	0.0	1.4 (2.0)	12.0	0.0	1.3 (1.8)	7.0	2.0% (13)
Prosocial Behavior: Peer	0.0	13.4 (3.4)	20.0	3.0	13.4 (3.4)	20.0	0.5% (3)
Adult Measures							
CWB	0.0	8.4 (6.6)	48	0.0	8.3 (6.1)	28.0	1.2% (11)
OCB	20.0	44.3 (6.8)	60	24.0	44.3 (6.8)	60.0	0.3% (2)

Note, divided by the number of valid scores on that measure

Table C.42. % Missingness for each scale

	% Missing (N)
Adolescent Measures	
Prosocial Behavior: Sibling	1.2% (8)
Antisocial Attitudes	0.4% (3)
Aggressive Attitudes	0.4% (3)
Prosocial Attitudes	0.4% (3)
Delinquency	0.4% (3)
Relational Aggression	4.9% (34)
Overt Aggression	4.7% (32)
Prosocial Behavior: Peer	4.9% (34)
ADHD SX	1.9% (13)
ODD SX	1.9% (13)
CD SX	1.9% (13)
Adult Measures	
CWB	0% (0)
OCB	0.1% (1)

Table C.43. Results of regressing adolescent and adult scales onto age at assessment and sex

Adolescent Prosocial Behaviors/Attitudes
Sibling Prosocial Behavior Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 9.49022 0.70054 13.547 <2e-16 *** IDSEX 0.25589 0.16023 1.597 0.111 SIB_REL_AGE -0.04322 0.04406 -0.981 0.327
Prosocial Attitudes Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 32.04722 1.45902 21.965 < 2e-16 *** IDSEX 1.82201 0.33657 5.414 8.57e-08 *** AGE_IN -0.35296 0.09222 -3.827 0.000141 ***
Prosocial Peer Behavior Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 12.97408 1.23463 10.508 <2e-16 *** IDSEX 2.16432 0.25607 8.452 <2e-16 *** AGE_FU1 -0.16654 0.06525 -2.552 0.0109 *
Adolescent Disinhibited Behaviors/Attitudes
Attention-Deficit Hyperactivity Disorder Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 1.65509 0.31434 5.265 1.89e-07 *** IDSEX -0.41994 0.07185 -5.844 7.93e-09 *** AGE_IN -0.01578 0.01986 -0.795 0.427
Oppositional Defiant Disorder Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 0.077954 0.216115 0.361 0.718432 IDSEX 0.001387 0.049400 0.028 0.977614 AGE_IN 0.047564 0.013652 3.484 0.000526 ***
Conduct Disorder Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 0.18233 0.16832 1.083 0.279 IDSEX -0.25481 0.03848 -6.623 7.23e-11 *** AGE_IN 0.04172 0.01063 3.924 9.62e-05 ***
Aggressive Orientation Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) 15.76280 1.39465 11.302 < 2e-16 *** IDSEX -3.60596 0.32172 -11.208 < 2e-16 *** AGE_IN 0.23706 0.08815 2.689 0.00734 **
Antisocial Attitudes Coefficients: Estimate Std. Error t value Pr(>|t|)

(Intercept)	-5.35429	1.52455	-3.512	0.000474 ***
IDSEX	-0.29370	0.35168	-0.835	0.403947
AGE_IN	1.29976	0.09636	13.488	< 2e-16 ***
Delinquent Behavior Inventory				
Coefficients:				
	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-7.1046	1.6959	-4.189	3.17e-05 ***
IDSEX	-2.2050	0.3912	-5.636	2.54e-08 ***
AGE_IN	1.0376	0.1072	9.68	< 2e-16 ***
Overt Interpersonal Aggression				
Coefficients:				
	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	4.69721	0.64887	7.239	1.28e-12 ***
IDSEX	-1.24385	0.13447	-9.250	< 2e-16 ***
AGE_FU1	-0.07774	0.03426	-2.269	0.0236 *
Relational Aggression				
Coefficients:				
	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	1.82792	0.82843	2.206	0.0277 *
IDSEX	-0.14373	0.17182	-0.836	0.4032
AGE_FU1	0.02842	0.04378	0.649	0.5166
Adult Work Behavior				
Counterproductive Work Behavior				
Coefficients:				
	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	15.11903	2.92574	5.168	3.12e-07 ***
IDSEX	-3.72475	0.45620	-8.165	1.55e-15 ***
AGE_3	-0.02737	0.09092	-0.301	0.763
Organizational Citizenship Behavior				
Coefficients:				
	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	38.33961	3.35653	11.422	< 2e-16 ***
IDSEX	2.32263	0.52210	4.449	1.01e-05 ***
AGE_3	0.07015	0.10429	0.673	0.501

Table C.44. Correlation Matrix for age/sex adjusted behaviors/attitudes

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. ADHD SX												
2. ODD SX	0.36											
3. CD SX	0.33	0.49										
4. Aggressive Orientation	0.22	0.35	0.31									
5. Antisocial Attitudes	0.18	0.32	0.40	0.56								
6. Delinquent Behaviors	0.30	0.34	0.49	0.54	0.70							
7. Overt Aggression	0.24	0.26	0.29	0.43	0.25	0.35						
8. Relational Aggression	0.16	0.17	0.22	0.27	0.29	0.29	0.51					
9. CWB	0.19	0.16	0.15	0.16	0.26	0.22	0.25	0.17				
10. Prosocial: Sibling	-0.02	-0.15	-0.09	-0.08	-0.08	-0.04	-0.02	-0.04	-0.07			
11. Prosocial Attitudes	-0.13	-0.30	-0.27	-0.42	-0.48	-0.39	-0.20	-0.16	-0.22	0.25		

12. Prosocial: Peers	-0.07	-0.15	-0.10	-0.15	-0.14	-0.11	-0.14	-0.08	-0.13	0.15	0.31	
13. OCB	-0.05	-0.06	-0.06	-0.04	-0.08	-0.03	-0.04	-0.02	-0.30	0.13	0.18	0.22

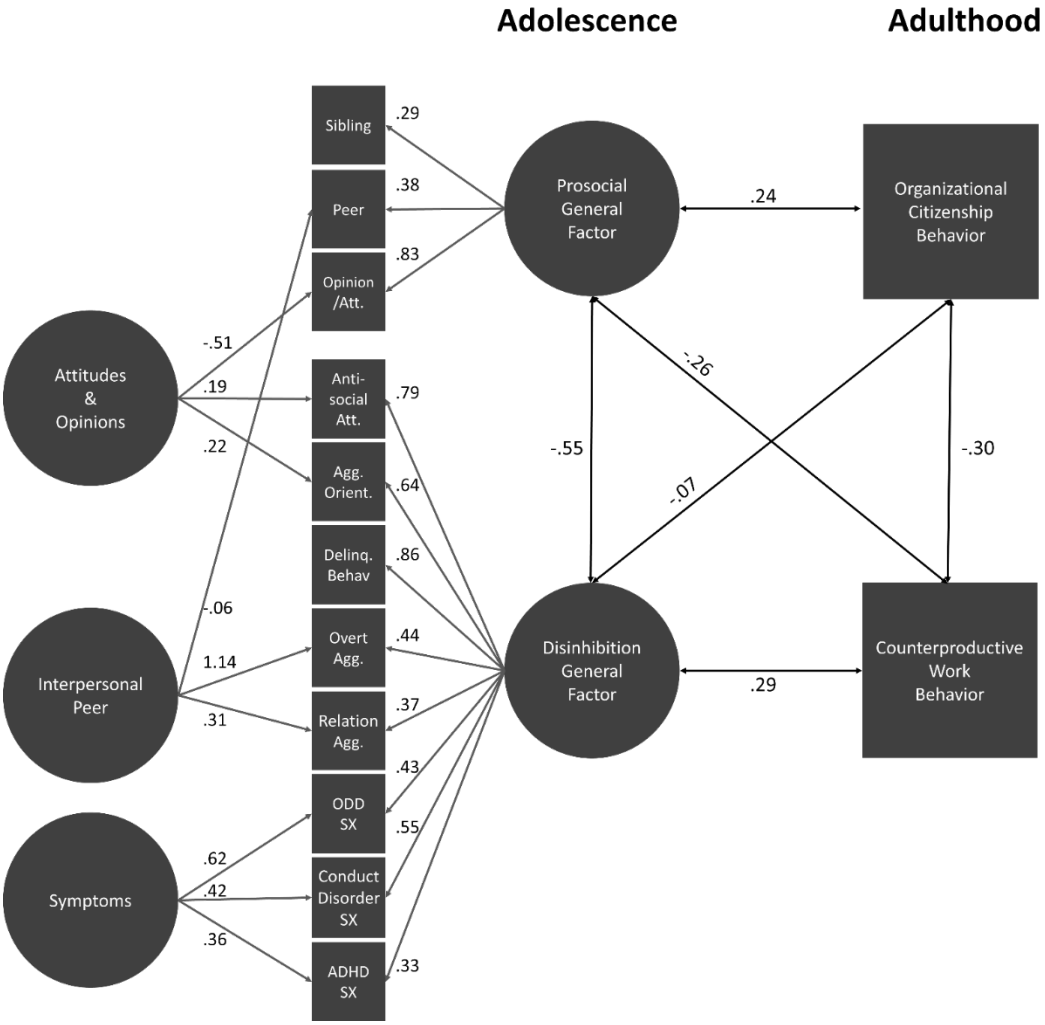
Note. Pairwise complete matrix N = 642 - 687. CWB = Counterproductive work behavior, OCB = Organizational citizenship behavior, ADHD = Attention deficit hyperactivity disorder, ODD = Oppositional defiant disorder, CD = Conduct disorder, SX = Symptoms.

Table C.45. Attrition analysis

Adolescent Measures	**Participated in FU3** Mean (SD) N	**Did Not Participate in FU3** Mean (SD) N	Cohen's *d* 95% CI	*t*(*df*), *p*
ADHD	.75 (.94) 695	.98 (1.02) 514	.24 [.12, .35]	*t*(1050.2)= 3.99, *p*<.01
Oppositional Defiant Disorder	.79 (.64) 695	.93 (.66) 514	.21 [.10, .32]	*t*(1087.4)=3.67, *p*<.01
Conduct Disorder	.39 (.51) 695	.50 (.57) 514	.20 [.09, .31]	*t*(1042.3)=3.42, *p*<.01
Aggressive Orientation	13.5 (4.6) 684	15.4 (5.4) 509	.37 [.25, .49]	*t*(982.41)=6.2, *p*<.01
Antisocial Attitude	13.3 (5.1) 684	14.4 (5.46) 509	.21 [.09, .33]	*t*(1049.8)3.5, *p*<.01
Delinquent Behavior	5.0 (6.1) 764	7.0 (8.9) 459	.27 [.15, .39]	*t*(720.5) = 4.2, *p*<.01
Relational Aggression	2.2 (2.3) 729	2.5 (2.7) 379	.14 [.02, .26]	*t*(671.3)=2.2, *p*=.03
Overt Aggression	1.4 (2.0) 731	2.2 (2.9) 381	.38 [.25, .51]	*t*(576.7)=5.4, *p*<.01
Prosocial Attitudes / Opinions	29.8 (4.5) 684	28.4 (4.7) 509	.29 [.17, .41]	*t*(1069.9)=-4.9, *p*<.01
Prosocial Sibling Relationship	9.3 (2.1) 679	9.1 (2.2) 493	.09 [-.03, .21]	*t*(1030.9) = -1.5, *p*=.14
Peer Prosocial Behavior	13.3 (3.5) 729	12.7 (3.8) 379	.17 [.05, .29]	*t*(701.4)=-2.6, *p*=.01

*Note, self-report scales on pre-winsorized data as winsorization occurred in the final sample

Figure C.8. Five-factor model of disinhibition, prosociality, and non-task performance with measurement factors



Note. Org. = Organizational, OCB = Organizational citizenship behavior, CWB = Counterproductive work behavior, Att. = Attitudes, Agg. = Aggressive/Aggression, Orient = Orientation, Delinq. = Delinquent, Behav. = Behavior, Relation = Relational, ODD = Oppositional Defiant Disorder, SX = symptoms, ADHD = Attention Deficit-Hyperactivity Disorder.