Review

Why older employees engage in less counterproductive work behavior and in more organizational citizenship behavior: Examining the role of the HEXACO personality traits

Jan Luca Pletzer

Erasmus University Rotterdam, the Netherlands

ARTICLE INFO	ABSTRACT
	Meta-analytic research has established that age exhibits a small negative correlation with counterproductive work behavior (CWB) and a small positive correlation with organizational citizenship behavior (OCB). However, there is a lack of research examining *why* these relations exist, although it has been proposed that age-related changes in personality traits might explain these relations. Personality traits are generally assumed to be relatively stable, but small changes do occur across the adult lifespan: Especially those personality domains that are predictive of CWB and OCB change with increasing age. In line with these arguments, the current meta-analytic results ($k = 18$) demonstrate that HEXACO Honesty-Humility, Emotionality, and Conscientiousness mediate the relation between age and CWB, and that HEXACO Emotionality, Conscientiousness, and Openness to Experience mediate the relation between age and OCB. These results provide evidence that age-related changes in personality can explain the relation of age with these two dimensions of contextual job performance. Limitations and ideas for future research are discussed.

1. Introduction

Older employees are more likely to engage in organizational citizenship behavior (OCB) and less likely to engage in counterproductive work behavior (CWB) than younger employees (Ng & Feldman, 2008). However, it is not clear why age correlates positively with OCB and negatively with CWB, and Ng and Feldman (2013) call for more research that addresses "why older workers may or may not perform at the same level as the younger workers" (p. 508). The same authors also propose that changes in personality traits can explain the relations between age and job performance (e.g., OCB and CWB). Supporting this proposition, Pletzer, Oostrom, and Voelpel (2021) recently demonstrated that the Big Five domains Conscientiousness, Agreeableness, and Neuroticism, as well as trait negative affect (partially) mediate the relation between age and CWB, but they did not examine the six HEXACO domains as potential mediators and also did not examine OCB as an outcome. However, examining the HEXACO traits as mediators is important because recent personality research demonstrated that the HEXACO personality model might capture human personality more accurately than the Big Five model (Ashton & Lee, 2019). In the current study, I therefore extend Pletzer et al.'s (2021) findings and aim to answer Ng and Feldman's (2013) call for more research about the

why that can explain the negative relation between age and CWB and the positive relation between age and OCB by meta-analytically testing if the HEXACO personality domains mediate these relations.

1.1. CWB and OCB

Broad conceptualizations of job performance nowadays often include employee behaviors that go beyond what is required from them in their formal task description. CWB and OCB both describe such extra-role behavior (Motowidlo & Van Scotter, 1994). CWB, commonly also referred to as workplace deviance, can be defined as "voluntary behavior that violates significant organizational norms and in so doing threatens the well-being of an organization, its members, or both" (Robinson & Bennett, 1995, p. 556). Typical CWBs include coming too late to work, stealing from the employer, or insulting coworkers. As the definition and the examples imply, CWB can be targeted at the organization (CWB-O) or at other individuals in the organization (CWB-I). OCB can be defined as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization" (Organ, 1988, p. 4). Typical OCBs include helping a coworker with a heavy workload or attending non-mandatory

work meetings. Just like CWB, OCB can also be targeted at the organization (OCB-O) or at other individuals in the organization (OCB-I). Dalal (2005) demonstrated meta-analytically that CWB and OCB are correlated but distinct constructs ($\rho = -0.32$).

1.2. The relations of age with CWB and OCB

To date, Ng and Feldman (2008) provided the most comprehensive review of the relations of age with different dimensions of job performance. They found a non-significant relation between age and task performance, but a small, statistically significant relation of age with both CWB ($\rho = -0.12$) and OCB ($\rho = 0.08$), indicating that older employees are slightly less likely to engage in CWB and slightly more likely to engage in OCB. Yet, it remains unclear *why* age relates negatively to CWB and OCB, and it has been proposed that personality traits can explain these relations (Ng & Feldman, 2013). In the following sections, I will review evidence regarding the relations of age with personality, of personality with CWB and OCB, and for the proposed indirect effect of age on CWB and OCB via personality.

1.3. Age and personality

The neosocioanalytic model of personality change (Roberts & Wood, 2006) posits that, although personality is generally assumed to be relatively stable and does not change a lot after adolescence (McCrae & Costa, 1994), small changes in personality traits do occur across the adult lifespan. In line with this theoretical account, more recent advances in personality research suggest that personality traits indeed change across the adult lifespan (Roberts et al., 2006; Roberts & Mroczek, 2008; Soto et al., 2011), also in response to significant life and work events (Tasselli et al., 2018; Wille et al., 2019). As such, personality seems to be both stable and changeable (Roberts et al., 2006). Personality is most commonly assessed with Big Five or Five-Factor Model (FFM) domains: Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (versus Emotional Stability) (Goldberg, 1990; McCrae & Costa, 1992). However, more recent evidence suggests that human personality might be described more accurately using the six broad HEXACO domains Honesty-Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, and Openness to Experience (Ashton & Lee, 2007). The most noteworthy difference between the Big Five and the HEXACO model is that the HEXACO adds a sixth domain called Honesty-Humility, which describes the tendency of individuals to be fair and genuine in social interactions. Several other differences exist as well but go beyond the scope of the current manuscript (see Ashton & Lee, 2007, for a detailed discussion). Importantly, the HEXACO model seems to capture more personality variance than the Big Five model (Ashton & Lee, 2019).

For the HEXACO domains, Ashton and Lee (2016) examined age trends in an online sample of approximately 100,000 participants, and found that Honesty-Humility showed the most consistent increase across the adult lifespan: Scores increased by almost one standard deviation from age 18 to age 60. Extraversion increased across the entire adult lifespan as well, whereas Conscientiousness and Openness to Experience mostly increased until young adulthood (mid-20s) after which these domains continued to increase only marginally up until the retirement age. Emotionality decreased across the entire adult lifespan. Agreeableness showed a small increase from approximately age 30 to 65 (i.e., the working age).[1] Taken together, all HEXACO domains change across

the adult lifespan, and these changes occur in directions which coincide with the criterion-related validity of these personality domains for CWB and OCB.

1.4. Personality and CWB

Personality generally predicts extra-role behaviors, such as CWB and OCB, better than it predicts task performance (e.g., Chiaburu et al., 2011), possibly because engaging in CWB and OCB is similar across different jobs, tasks, and work environments, whereas task performance differs between jobs (N. P. Podsakoff et al., 2009). The Big Five domains are already strong predictors of CWB (Berry et al., 2007; Berry et al., 2012; Salgado, 2002), but the HEXACO domains outperform the Big Five domains in the prediction of CWB (Pletzer, Bentvelzen, et al., 2019). Among the HEXACO domains, especially Honesty-Humility ($\rho = -0.42$), but also Conscientiousness ($\rho = -0.39$), Agreeableness ($\rho = -0.21$), Emotionality ($\rho = -0.09$), and Extraversion ($\rho = -0.09$) predict CWB significantly (Pletzer, Oostrom, Bentvelzen, & de Vries, 2020).

These meta-analytic findings for the relations between the HEXACO domains and CWB in combination with the findings of age-related changes in these HEXACO domains suggest that some of the HEXACO domains might mediate the negative relation between age and CWB. Previous research indicates that Honesty-Humility shows the strongest relation with both age and CWB compared to all other HEXACO domains, suggesting that it also shows the strongest indirect effect for the relation between age and CWB. Emotionality, Agreeableness, and Conscientiousness also relate to both age and CWB (at least in individuals who are in the working age), suggesting that these variables also mediate the relation between age and CWB. Extraversion also relates to both age and CWB, but both effect sizes are relatively small in magnitude and I therefore do not expect that Extraversion mediates the relation between age and CWB. Openness to Experience does not significantly relate to CWB, thereby suggesting that it will also not mediate the relation between age and CWB. Based on the aforementioned evidence, I hypothesize the following:

Hypothesis 1. The HEXACO domains Honesty-Humility (*H1a*), Emotionality (*H1b*), Agreeableness (*H1c*), and Conscientiousness (*H1d*) mediate the relation between age and CWB. The indirect effects for Honesty-Humility and Conscientiousness are stronger than the indirect effects for Emotionality and Agreeableness (*H1e*).

1.5. Personality and OCB

Personality is also a relatively strong predictor of OCB, and several meta-analyses have already examined the relations between the Big Five domains and OCB (Chiaburu et al., 2011; Hoffman et al., 2007; LePine et al., 2002). For the HEXACO, Zettler et al. (2020) recently found that Extraversion ($\rho = 0.20$), Conscientiousness ($\rho = 0.18$), Honesty-Humility ($\rho = 0.15$), Openness to Experience ($\rho = 0.15$), and Agreeableness ($\rho = 0.11$) correlate positively with OCB. Emotionality did not significantly correlate with OCB. In another meta-analysis about the relations between the HEXACO domains and OCB, Pletzer, Oostrom, and De Vries (2020) found slightly stronger correlations based on a larger number of included studies as they demonstrated that Extraversion ($\rho = 0.35$), Conscientiousness ($\rho = 0.32$), Agreeableness ($\rho = 0.22$), Honesty-Humility ($\rho = 0.21$), and Openness to Experience ($\rho = 0.20$) correlate significantly with OCB. Emotionality also did not correlate with OCB.

These meta-analytic findings in combination with the observed age-related changes in the HEXACO domains (Ashton & Lee, 2016) suggest that the domains Honesty-Humility, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience mediate the relation between age and OCB. Based on the finding that the relations of Extraversion and Conscientiousness with OCB are stronger than for the other domains, I expect particularly strong indirect effects via these two domains. I therefore hypothesize the following:

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[1] Two additional studies with much smaller samples examined the relations of (some of) the HEXACO domains with age. Sibley and Pirie (2013) only examined the relation of age with Honesty-Humility, and found that it shows a stronger age-related increase than any of the Big Five domains. Similarly, Kawamoto (2016) also found the strongest age-related increase for Honesty-Humility in a Japanese sample. Emotionality decreased with age, whereas Extraversion, Agreeableness, Conscientiousness, and Openness to Experience did not change with age.

Hypothesis 2. The HEXACO domains Honesty-Humility (*H2a*), Extraversion (*H2b*), Agreeableness (*H2c*), Conscientiousness (*H2d*), and Openness to Experience (*H2e*) mediate the relation between age and OCB. The indirect effects for Extraversion and for Conscientiousness are stronger than the indirect effects for Honesty-Humility, Agreeableness, and Openness to Experience (*H2f*).

2. Method

2.1. Systematic literature search

I tried to locate studies in several ways. First, I conducted a systematic literature search on Web of Science on November 28, 2019, with the following search terms:

TS = ((HEXACO or Honesty-Humility) AND ("Organi*ational citizenship behavi*" OR OCB OR "counterproductive work behavi*" OR CWB OR "workplace deviance" OR "deviant workplace behavi*" OR "deviant work behavi*")).

This search yielded 41 results, which I examined in full. Second, I screened the reference lists of relevant meta-analyses about the HEXACO (Lee, Berry, & Gonzalez-Mulé, 2019; Pletzer, Bentvelzen, et al., 2019; Pletzer, Oostrom, Bentvelzen, & de Vries, 2020; Pletzer et al., 2020). Third, I contacted authors of relevant studies to request unpublished studies. I only included articles that reported all correlations (and the respective sample size *N*) between participants' age, all six HEXACO domains, and CWB *or* OCB. For example, I did not include studies that only reported the correlation of one HEXACO domain with the predictor and the criterion because this would have led to too many missing values, which prevent the successful execution of the meta-analytic structural equation model (MASEM). If a study did not report the necessary statistics, I requested this information from the authors. Ten articles with thirteen independent samples were included from the literature search, three independent samples by contacting authors of relevant studies, and two independent samples by scanning the reference lists of relevant meta-analyses. In total, I was able to include data from eighteen independent samples. All effect sizes and reliabilities were independently coded by a trained research assistant and by me, resulting in agreement that exceeded 98%. Inconsistencies were resolved by discussing the coding after revisiting the respective article or dataset.

Eighteen correlations were included for the relations between age and the six HEXACO domains (*N* = 5601), fifteen for the relations between the HEXACO domains and CWB and for the relation between age and CWB (*N* = 4980), eleven for the relations between the six HEXACO domains and OCB (*N* = 3832), and ten for the relation between age and OCB (*N* = 3570). The studies were published (or conducted, for unpublished studies) between 2007 and 2021, with a median publication year of 2015. Table 1 provides an overview of all included studies. All codings, datasets, and R scripts used for the analyses are available here: OSF Project Page.

2.2. Definition of variables

2.2.1. Age

The average age of the participants in the included independent samples was 36.71 years, ranging from 20.61 to 50.71 years.

2.2.2. Personality

Personality was assessed with the HEXACO personality inventory in all included studies (K. Lee & Ashton, 2004). Four studies used the 60-item, eight studies the 100-item, and six studies the 200-item HEXACO measure.

2.2.3. CWB

Across all included studies, CWB was assessed most often with the Bennett and Robinson (2000) measures (*k* = 9). The remaining studies

Table 1
Studies and their characteristics included in the meta-analysis.

	Study	Average N	CWB	OCB	Average age
1	Anglim et al. (2018) applicants	260	Yes	Yes	41.88
2	Anglim et al. (2018) non-applicants	347	Yes	Yes	50.71
3	Barends et al. (2021)	239	Yes	No	40.10
4	Bourdage et al. (2012)	262	No	Yes	29.28
5	Bourdage et al. (2018) employees	205	Yes	Yes	45.60
6	Bourdage et al. (2018) students	152	Yes	Yes	20.61
7	Chirumbolo (2015)	203	Yes	No	41.41
8	Cohen et al. (2014)	1317	Yes	Yes	39.48
9	De Vries and Van Gelder (2015)	455	Yes	No	45.56
10	De Vries et al. (2014)	238	Yes	Yes	32.87
12	Marcus et al. (2007) Canadian sample	169	Yes	No	21.56
13	Marcus et al. (2007) German sample	292	Yes	No	31.85
14	Oostrom et al. (2019)	103	No	Yes	37.80
15	Pletzer et al. (2015)	519	Yes	Yes	36.43
16	Pletzer (2019)	173	Yes	Yes	32.82
17	Szabo et al. (2018)	256	No	Yes	37.12
18	Wiltshire et al. (2014)	268	Yes	No	40.26
19	Zettler and Hilbig (2010)	143	Yes	No	35.40

Note. Average *N* = average sample size coded across included correlations; CWB and OCB columns = if a study included CWB or OCB as an outcome.

used different measures (Ashton, 1998; Kelloway & Loughlin, 2002; Spector et al., 2006). One study did not disclose the measure it used (A. De Vries et al., 2014). All studies relied on self-reports to assess CWB.

2.2.4. OCB

Most studies used Lee and Allen's (2002) measure to assess OCB (*k* = 6). The remaining studies used different measures (Borman & Motowidlo, 1997; Fox et al., 2012; Podsakoff et al., 1990; Van Scotter & Motowidlo, 1996; Williams & Anderson, 1991). Nine studies relied on self-reports to assess OCB, whereas two studies used other-reports to assess OCB.

2.3. Data analysis

A two-stage MASEM, which combines meta-analysis with structural equation modeling, was employed to test the hypotheses using a random-effects model (Cheung, 2014, 2015). For each study, I coded all available correlations between age, the six HEXACO domains, and CWB or OCB, and corrected the respective correlations for unreliability in both the mediator and the criterion using local reliabilities (i.e., Cronbach's alpha values; see supplementary materials for average reliabilities). Whenever sample sizes differed per cell in the correlation matrix of a given study, I coded the average sample size across all cells. I created separate correlation matrices for CWB and OCB because otherwise I would have had too many missing values, resulting in nonpositive definite correlation matrices which prevent the successful execution of the MASEM. If a study only included CWB but not OCB as an outcome, the correlations between age and the HEXACO domains were nevertheless included in the subset of CWB studies (and vice versa) to increase precision when estimating these relations.

In the first stage of the MASEM, the corrected correlation matrices from the primary studies are combined to create one pooled correlation matrix weighted by sample size. The pooled correlation matrices can be found in Table 3 for CWB and in Table 5 for OCB. In the second stage of the MASEM, this pooled correlation matrix is subjected to a structural equation model to test the mediation hypotheses. I included direct effects from age to the criterion as well as indirect effects via all six HEXACO domains. The mediators were allowed to covary. The fit indices common to structural equation models are all zero because the models are saturated (just identified) path models. The mediation

hypotheses are supported if the 95% confidence interval for the indirect effect does not include zero. I used the *metaSEM* package in *R* for these analyses (Cheung, 2014), and base all analyses on correlations corrected for unreliability in the mediator and in the criterion (see Footnotes 2 and 3 as well as supplementary materials for results based on sample size-weighted correlations).

3. Results

3.1. Counterproductive work behavior

The detailed results for the MASEM for CWB can be found in Table 2 (meta-analytic results for the focal relations between age, the six HEX-ACO domains, and CWB), Table 3 (meta-analytic pooled correlation matrix), and Table 6 (direct and indirect effects). Fig. 1 shows the structural equation model for CWB. Age correlated negatively with CWB ($\rho = -0.181$) and with Emotionality ($\rho = -0.060$), and positively with Honesty-Humility ($\rho = 0.256$), Conscientiousness ($\rho = 0.101$), Agreeableness ($\rho = 0.099$), and Openness to Experience ($\rho = 0.095$). The correlation with Extraversion was non-significant. All six HEXACO domains correlated negatively with CWB: Honesty-Humility exhibited the strongest correlation ($\rho = -0.427$), followed by Conscientiousness ($\rho = -0.411$), Agreeableness ($\rho = -0.218$), Extraversion ($\rho = -0.127$), Openness to Experience ($\rho = -0.082$), and Emotionality ($\rho = -0.046$).

The direct effect of age on CWB was no longer statistically significant in the structural equation model ($c' = -0.077$). The indirect effects via Honesty-Humility ($a_1*b_1 = -0.074$), Emotionality ($a_1*b_1 = 0.004$), and Conscientiousness ($a_5*b_5 = -0.029$) were statistically significant, whereas the indirect effects via Extraversion, Agreeableness, and Openness to Experience were non-significant. Honesty-Humility, Emotionality, and Conscientiousness therefore mediate the negative relation between age and CWB. These results provide support for *H1a*, *H1b*, and *H1d*. *H1e*, which postulated that the indirect effects via Honesty-Humility and Conscientiousness would be stronger than the indirect effects via Agreeableness and Emotionality, is also supported, whereas *H1c*, which postulated that Agreeableness would mediate the age-CWB relation, is not supported.[2] Taken together, this model explained 27.27% of the variance in CWB. I also tested all mediation hypotheses separately for CWB-I and CWB-O (see supplementary materials for detailed results). Honesty-Humility ($a_1*b_1 = -0.048$), Emotionality ($a_2*b_2 = 0.011$), Agreeableness ($a_4*b_4 = -0.017$), and Conscientiousness ($a_5*b_5 = -0.024$) mediated the relation between age and CWB-I. For CWB-O, Honesty-Humility ($a_1*b_1 = -0.056$), Agreeableness ($a_4*b_4 = -0.008$), and Conscientiousness ($a_5*b_5 = -0.030$) emerged as significant mediators.

3.2. Organizational citizenship behavior

The detailed results for the MASEM with OCB as criterion can be found in Table 4 (meta-analytic results for focal the relations between age, the six HEXACO domains, and OCB), Table 5 (meta-analytic pooled correlation matrix), and Table 6 (direct and indirect effects). Fig. 2 shows the structural equation model for OCB. Age correlated positively with OCB ($\rho = 0.116$). The correlations for age with the six HEXACO

domains are based on the same studies as mentioned above for CWB and are therefore almost identical. Small discrepancies in the third decimal occur because I used a random-effects model, but none of the conclusions regarding statistical significance change. Extraversion showed the strongest positive correlation with OCB ($\rho = 0.333$), followed by Conscientiousness ($\rho = 0.282$), Openness to Experience ($\rho = 0.227$), Agreeableness ($\rho = 0.201$), and Honesty-Humility ($\rho = 0.180$). Emotionality did not correlate significantly with OCB.

The direct effect of age on OCB ($c' = 0.062$) in the structural equation model is no longer statistically significant. Three indirect effects were statistically significant: The indirect effects via Conscientiousness ($a_5*b_5 = 0.016$) and Openness to Experience ($a_6*b_6 = 0.011$) were positive, whereas the indirect effect via Emotionality was negative ($a_2*b_2 = -0.005$). The indirect effects for Honesty-Humility, Extraversion, and Agreeableness were non-significant. These results therefore only support *H2d* and *H2e*, but none of the other hypotheses concerning OCB. The indirect effect via Emotionality was not hypothesized.[3] Taken together, this model explained 18.70% of the variance in OCB.

As for CWB, I also tested the mediation hypotheses separately for OCB-I and OCB-O (see supplementary materials for detailed results). Age correlated positively with both OCB-I ($\rho = 0.095$) and OCB-O ($\rho = 0.208$). For OCB-I, Emotionality ($a_2*b_2 = -0.008$) and Openness to Experience ($a_6*b_6 = 0.012$) emerged as significant mediators. Conscientiousness did not mediate the relation between age and OCB-I. For OCB-O, the direct effect remained statistically significant when adding the mediators to the structural equation model ($c' = 0.155$), and only Conscientiousness ($a_5*b_5 = 0.021$) mediated the relation between age and OCB-O.

4. Discussion

The goal of the current meta-analysis was to examine why older employees engage in less CWB and in more OCB than younger employees. Based on recent research suggesting that personality traits do change across the adult lifespan (e.g., Ashton & Lee, 2016), and on research showing a strong link of personality with both CWB and OCB (Chiaburu et al., 2011; Pletzer, Oostrom, Bentvelzen, & de Vries, 2020; Pletzer et al., 2020), it was examined if personality traits mediate the relations of age with CWB and OCB. In fact, the current findings demonstrate that age-related changes in personality are one of the explanatory mechanisms for these relations: Honesty-Humility, Emotionality, and Conscientiousness mediate the relation between age and CWB, and Emotionality, Conscientiousness, and Openness to Experience mediate the relation between age and OCB. These findings contribute several interesting insights about why employees' behavior changes with increasing age.

First, the current findings highlight that age-related personality development is one mechanism that can explain *why* employees engage in lower levels of CWB and in higher levels of OCB with increasing age. Personality development across the adult lifespan mostly occurs in those domains regarded as desirable (Roberts et al., 2006), and these age-related changes in personality are generally beneficial for organizations and employees when considering CWB and OCB as expressions of personality traits in a work context: With increasing age, employees score higher on Honesty-Humility, Conscientiousness, and Openness to Experience, and lower on Emotionality, which subsequently manifests

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[2] Please note that the results differ slightly when using sample size-weighted correlations. The direct effect then decreases in magnitude but remains statistically significant, and the indirect effect for Agreeableness is statistically significant as well. The indirect effects for Honesty-Humility and Conscientiousness are significantly stronger than those for Emotionality and Agreeableness. The detailed results for CWB using sample size-weighted correlations can be found in the supplementary materials. Also note that the conclusions for the investigated mediations (i.e., significant mediations via Honesty-Humility, Emotionality, and Conscientiousness) remain the same when removing the direct path from age to CWB from the model.

[3] The results for OCB remain the same using sample size-weighted correlations: Conscientiousness and Openness to Experience positively and Emotionality negatively mediate the relation between age and OCB. The detailed results for OCB using sample size-weighted correlations can be found in the supplementary materials. Also note that the conclusions for the investigated mediations (i.e., significant mediations via Emotionality, Conscientiousness, and Openness to Experience) remain the same when removing the direct path from age to OCB from the model.

Table 2
Meta-analytic results used to test the mediation hypotheses for CWB.

	k	N	r	SDr	ρ	SDρ	95% CI	80% CrI	I²
Age - CWB	15	4980	−0.170**	0.131	−0.181**	0.148	−0.259, −0.103	−0.370, 0.008	86.44
Honesty-humility									
Age – HH	18	5601	0.233**	0.068	0.256**	0.088	0.208, 0.304	0.143, 0.369	71.20
HH – CWB	15	4980	−0.358**	0.070	−0.427**	0.094	−0.480, −0.373	−0.548, −0.306	76.23
Emotionality									
Age – E	18	5601	−0.054*	0.087	−0.060*	0.104	−0.115, −0.005	−0.193, 0.073	74.93
E – CWB	15	4980	−0.034	0.069	−0.046*	0.066	−0.090, −0.001	−0.130, 0.040	53.70
Extraversion									
Age – X	18	5601	0.044	0.100	0.047	0.114	−0.011, 0.106	−0.098, 0.193	78.28
X – CWB	15	4980	−0.112**	0.058	−0.127**	0.078	−0.175, −0.078	−0.227, −0.026	62.67
Agreeableness									
Age – A	18	5601	0.089**	0.013	0.099**	0.040	0.067, 0.131	0.048, 0.150	28.46
A – CWB	15	4980	−0.184**	0.051	−0.218**	0.065	−0.261, −0.175	−0.301, −0.135	54.28
Conscientiousness									
Age – C	18	5601	0.092*	0.118	0.101*	0.132	0.036, 0.167	−0.067, 0.270	83.27
C – CWB	15	4980	−0.349**	0.107	−0.411**	0.134	−0.482, −0.340	−0.582, −0.240	86.71
Openness to experience									
Age – O	18	5601	0.085**	0.014	0.095**	0.019	0.065, 0.125	0.070, 0.120	4.24
O – CWB	15	4980	−0.072*	0.107	−0.082*	0.129	−0.152, −0.012	−0.246, 0.083	82.20

Note. k = cumulative number of studies; *N* = cumulative sample size; *r* = sample-size weighted mean correlation; SD*r* = standard deviation for *r*; ρ = weighted correlation coefficient corrected for unreliability; SDρ = standard deviation for ρ; 95% CI = 95% confidence interval for ρ; 80% CrI = 80% credibility interval for ρ; CWB = counterproductive work behavior.

* $p < .05$.
** $p < .001$.

Table 3
Meta-analytic corrected correlation matrix for the HEXACO domains and CWB.

	Age	HH	E	X	A	C	O	CWB
Age	–							
HH	0.256**	–						
E	−0.060*	0.003	–					
X	0.047	0.050	−0.196**	–				
A	0.099**	0.396**	−0.201**	0.246**	–			
C	0.101*	0.346**	−0.028	0.264**	0.195**	–		
O	0.095**	0.118**	−0.114**	0.298**	0.171**	0.150**	–	
CWB	−0.181**	−0.427**	−0.046*	−0.127**	−0.218**	−0.411**	−0.082*	–

Note. Age – CWB and Mediators – CWB *k* (*N*) = 15 (4980); Age – Mediators *k* (*N*) = 18 (5601).

** $p < .001$.
* $p < .05$.

itself in lower levels of CWB and in higher levels of OCB. As such, even small age-related changes in these personality domains can result in profound benefits for organizations, coworkers, and for employees themselves. Organizations should therefore try to retain older employees in their workforce and should avoid discriminating against older individuals in hiring and promotion decisions, as this will have desirable consequences for organizations.

Interestingly, it is not entirely clear why such age-related personality change occurs, but two mechanisms have been proposed: the social investment principle and intrinsic maturation (Costa et al., 2019). The former and more prominent mechanism posits that individuals assume responsibilities and overcome certain challenges as they age (e.g., raising children or being productive workers), which is rewarded by other members of society if these behaviors are in line with societal expectations. Traits associated with these behaviors are then manifested and strengthened. For example, being organized and diligent is generally rewarded at work, and Conscientiousness scores might therefore increase across the adult lifespan. Findings that personality changes in response to significant life and work events support this principle (Tasselli et al., 2018; Wille et al., 2019). The intrinsic maturation principle holds that personality change is built into individuals, similar to the onset of puberty or to declines in fluid intelligence after young

adulthood. The universality of personality development and evolutionary arguments, which hold that, among other things, becoming more conscientious, agreeable, and less neurotic improves the chances of survival with increasing age, support this principle (Draper & Beisky, 1990). Such intrinsic personality development could also explain the current findings.

Second, the current results confirm the general notion that Conscientiousness is the most important personality domain when predicting job performance (Wilmot & Ones, 2019): Conscientiousness mediated both relations of interest in the current meta-analysis. Traits associated with Conscientiousness, such being organized, diligent, and prudent, increase with age and manifest themselves not just in increased task performance (Barrick & Mount, 1991), but also in lower levels of CWB and in higher levels of OCB. Emotionality also mediated both relations, but to a substantially smaller degree than Conscientiousness. However, researchers and practitioners examining why employees' age affects their contextual performance at work should be aware that Emotionality can explain these relations as well. Especially the finding that Emotionality mediated the relation between age and OCB is suprising given that previous research has not found a significant relation between Emotionality and OCB (Pletzer et al., 2020; Zettler et al., 2020). These divergent findings highlight that the Emotionality-OCB relation is
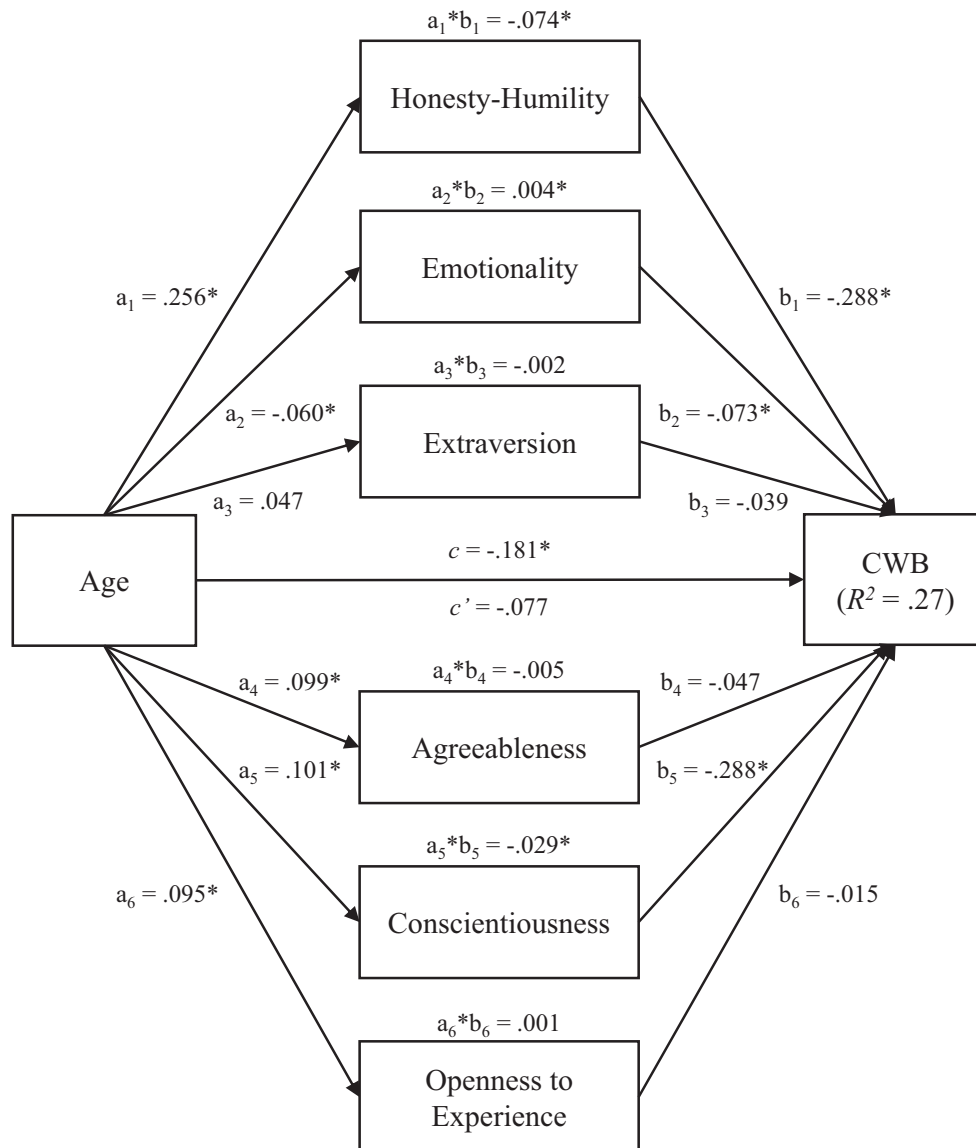
Fig. 1. The HEXACO domains as mediators for the relation between age and CWB.
Note. a = relation between age and mediator, b = relation between mediator and workplace deviance; a*b = indirect effect, c = total relation between age and workplace deviance, c' = direct effect in the structural equation model; * $p < .05$.

relatively volatile, and could indicate that it depends on situational characteristics. For example, Emotionality might relate more strongly to CWB and OCB when employees experience high levels of work stress or when they work in jobs with high levels of customer or patient contact that could elicit emotional responses. It is also worth mentioning that Honesty-Humility exhibited the strongest correlation with age out of all six HEXACO domains, which is in line with findings by Ashton and Lee (2016). The relatively strong positive relation between age and Honesty-Humility then translates itself into reduced levels of CWB (but not higher levels of OCB).

Third, it is also interesting to note that the relation between age and CWB was stronger than the relation between age and OCB, and that the indirect effects via the HEXACO domains were stronger for CWB than for OCB. In addition, the tested model explained 27.27% of the variance in CWB but "only" 18.70% of the variance in OCB. This aligns with previous findings suggesting that CWB is determined to a larger extent by individual differences than OCB. For example, general mental ability, the Big Five, and integrity tests combined explain more variance in CWB than in OCB (Lee et al., 2019) and the HEXACO domains also explain more variance in CWB than in OCB (Pletzer, Bentvelzen, et al., 2019;

Pletzer, Oostrom, Bentvelzen, & de Vries, 2020; Pletzer et al., 2020). All of these findings together suggest that CWB has a stronger dispositional core than OCB.

Fourth, the current meta-analytic results differed for the interpersonal and organizational subforms of CWB and OCB. Conscientiousness did not mediate the relation between age and CWB-I, whereas Agreeableness did not mediate the relation between age and overall CWB but did mediate the relation between age and CWB-I. Agreeableness also mediated the relation between age and CWB-O, but Conscientiousness was the stronger mediator for this relation. These findings are generally in line with previous findings demonstrating that Conscientiousness is a stronger predictor of CWB-O than of CWB-I (Pletzer, Bentvelzen, et al., 2019) because individuals scoring high on this trait are more likely to adhere to organizational norms (Marcus & Schuler, 2004). It also coincides with previous findings showing that Agreeableness is a stronger predictor of CWB-I than of CWB-O (Pletzer, Bentvelzen, et al., 2019) because Agreeableness is an inherently social trait (Wiggins, 1979).

At last, it is necessary to compare the current results to those found in a similar study about the Big Five by Pletzer et al., 2021. These authors only examined CWB as an outcome, but found that Big Five

Table 4
Meta-analytic results used to test the mediation hypotheses for OCB.

	k	N	r	SDr	ρ	SDρ	95% CI	80% CrI	I²
Age – OCB	10	3570	0.107*	0.090	0.116*	0.101	0.046, 0.186	−0.013, 0.245	72.53
Honesty-humility									
Age – HH	18	5601	0.232**	0.075	0.255**	0.095	0.205, 0.305	0.134, 0.376	74.16
HH – OCB	11	3832	0.155**	0.115	0.180**	0.135	0.095, 0.264	0.006, 0.353	83.27
Emotionality									
Age – E	18	5601	−0.054*	0.087	−0.060*	0.104	−0.115, −0.005	−0.193, 0.073	75.03
E – OCB	11	3832	0.001	0.062	0.003	0.094	−0.060, 0.067	−0.117, 0.123	69.57
Extraversion									
Age – X	18	5601	0.044	0.102	0.046	0.116	−0.013, 0.106	−0.102, 0.195	78.92
X – OCB	11	3832	0.293**	0.096	0.333**	0.110	0.262, 0.405	0.192, 0.474	77.72
Agreeableness									
Age – A	18	5601	0.089**	0.013	0.099**	0.043	0.066, 0.132	0.044, 0.154	31.81
A – OCB	11	3832	0.174**	0.100	0.201**	0.125	0.121, 0.280	0.040, 0.361	81.26
Conscientiousness									
Age – C	18	5601	0.091*	0.120	0.100*	0.134	0.034, 0.167	−0.071, 0.271	83.64
C – OCB	11	3832	0.244**	0.076	0.282**	0.205	0.161, 0.403	0.020, 0.545	92.33
Openness to experience									
Age – O	18	5601	0.085**	0.016	0.094**	0.015	0.064, 0.124	0.075, 0.113	0.00
O – OCB	11	3832	0.195**	0.086	0.227**	0.099	0.160, 0.293	0.099, 0.354	73.01

Note. k = cumulative number of studies; N = cumulative sample size; r = sample-size weighted mean correlation; SDr = standard deviation for r; ρ = weighted correlation coefficient corrected for unreliability; SDρ = standard deviation for ρ; 95% CI = 95% confidence interval for ρ; 80% CrI = 80% credibility interval for ρ; WD = workplace deviance.
* $p < .05$.
** $p < .0$.

Table 5
Meta-analytic corrected correlation matrix for the HEXACO domains and OCB.

	Age	HH	E	X	A	C	O	OCB
Age	–							
HH	0.255**	–						
E	−0.060*	0.005	–					
X	0.046	0.050	−0.196**	–				
A	0.099**	0.397**	−0.201**	0.246**	–			
C	0.100*	0.347**	−0.025	0.264**	0.196**	–		
O	0.094**	0.118**	−0.114**	0.297**	0.171**	0.149**	–	
OCB	0.116*	0.180**	0.003	0.333**	0.201**	0.282**	0.227**	–

Note. Age – OCB k (N) = 10 (3570); Mediators - OCB k (N) = 11 (3832); Age – Mediators k (N) = 18 (5601).
** $p < .001$.
* $p < .05$.

Table 6
Total, indirect, and direct effects for CWB and OCB.

	CWB		OCB	
	Estimate	95% CI	Estimate	95% CI
Total effect	−0.181*	−0.259, −0.103	0.116*	0.046, 0.186
Direct effect	−0.077	−0.164, 0.010	0.062	−0.018, 0.142
Indirect effects via				
Honesty-humility	−0.074*	−0.101, −0.050	0.013	−0.022, 0.048
Emotionality	0.004*	0.000, 0.011	−0.005*	−0.014, −0.000
Extraversion	−0.002	−0.008, 0.002	0.012	−0.003, 0.029
Agreeableness	−0.005	−0.012, 0.002	0.008	−0.004, 0.021
Conscientiousness	−0.029*	−0.052, −0.010	0.016*	0.001, 0.040
Openness to experience	0.001	−0.007, 0.010	0.011*	0.003, 0.020

Note. All results are based on correlations corrected for unreliability in the mediator and in the criterion.
* $p < .05$.

Conscientiousness, Agreeableness, and Neuroticism mediate the relation between age and CWB. The findings for Big Five Conscientiousness and HEXACO Conscientiousness as well as for HEXACO Emotionality and Big Five Neuroticism therefore converge, but they differ regarding the role of Big Five and HEXACO Agreeableness. The differential findings for Agreeableness can be explained based on the fact that Big Five Agreeableness captures variance associated with Honesty-Humility, which is the strongest predictor of CWB. It therefore makes sense that HEXACO Agreeableness does not mediate the relation between age and CWB, whereas Big Five Agreeableness does, because some of the criterion-related variance from Big Five Agreeableness is captured by HEXACO Honesty-Humility, which does mediate the relation between age and CWB.

4.1. Limitations and future research

The current meta-analysis has several limitations which also highlight possibilities for future research. First, the current findings rely mostly on cross-sectional data. It can therefore not be disentangled if the observed age trends are due to developmental changes or due to cohort
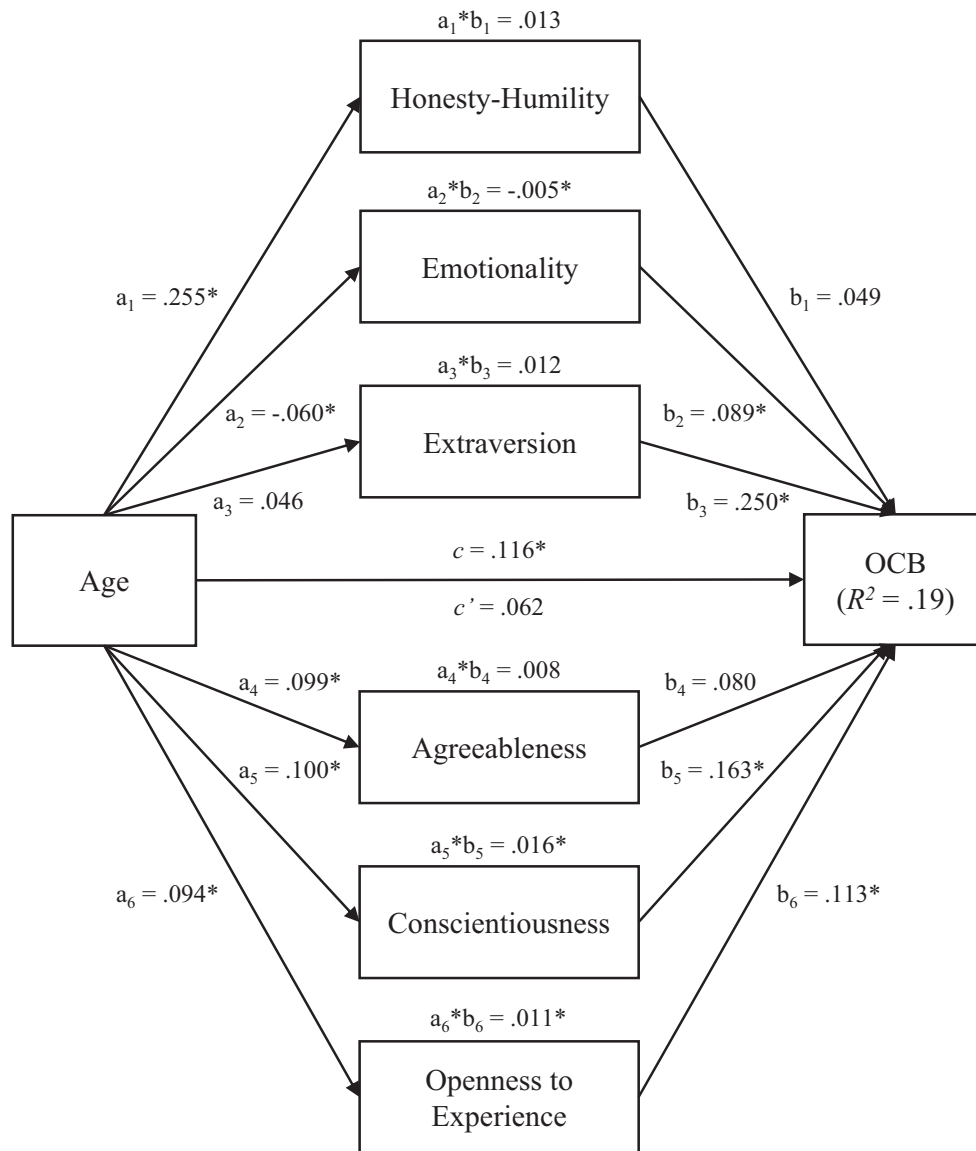
Fig. 2. The HEXACO domains as mediators for the relation between age and OCB.
Note. a = relation between age and mediator, b = relation between mediator and workplace deviance; a*b = indirect effect, c = total relation between age and workplace deviance, c' = direct effect in the structural equation model; * $p < .05$.

effects. However, previous research examining age trends in personality development suggest that developmental changes are more likely to drive these age-related changes than cohort effects (Soto et al., 2011; Terracciano et al., 2005). Longitudinal studies could provide more conclusive answers to this question. Another limitation resulting from the fact that most included studies used cross-sectional designs to examine the relations of interest concerns the inability to establish causal relations. The current interpretation of the finding that personality mediates the relations of age with CWB and OCB is based on the trait-based approach to establishing causal relations and not on experimental control. As such, the current findings could also indicate that age determines the extent to which employees engage in CWB and OCB, which subsequently shapes their personality. In line with this alternative interpretation, increasing evidence (and the current meta-analytic results for the relations of age with the HEXACO domains) suggests that personality does change (Roberts et al., 2006) - even in response to events and behavior at work (for a review, see Tasselli et al., 2018). For example, Hudson and Roberts (2016) demonstrated that engaging in CWB results in decreases in Extraversion and Emotional Stability. This alternative explanation cannot be ruled out, but personality traits

generally seem to be more stable than engaging in CWB or OCB is, therefore suggesting that it is more plausible that personality mediates the relation of age with CWB and OCB than that CWB and OCB mediate the relation between age and personality.

Second, although the current findings indicate that the HEXACO personality traits fully mediate the relations of age with both CWB and OCB, future research should rule out other proposed mediators (e.g., cognitive intelligence; Ng & Feldman, 2013) by examining if they incrementally mediate the relations of age with CWB and OCB. It is also possible that some of the indirect effects found in the current study become non-significant when other mediators are added to the model. A more feasible alternative is, however, that other variables mediate the relations of personality with CWB/OCB, resulting in a sequential mediation for the relations of age with CWB and OCB (Holland et al., 2017). For example, Bourdage et al. (2018a) demonstrate that equity sensitivity partially mediates the relations of Honesty-Humility and Conscientiousness with CWB and OCB, and many other possible mediators exist for the relations of different personality traits with CWB and OCB. For example, the lower Emotionality scores of older individuals might predispose them to maximize positive and minimize negative

emotional experiences (Carstensen, 1992), which could, in turn, result in decreased CWB and increased OCB (Spector & Fox, 2002). Ng and Feldman (2013) have also proposed that changes in goal orientation, social-emotional experiences, and health underlie the relation of age with job performance, and previous research indicates that all of these variables are determined by one's personality (Connor-Smith & Flachsbart, 2007; Payne et al., 2007; Strickhouser et al., 2017), suggesting that these variables may in fact be mediators for the relations of personality traits with CWB and OCB. It could also be that these variables mediate the relations of age with other performance outcomes. Another possibility is that older employees, who are, on average, at higher levels in the organizational hierarchy, act as role models for employees lower in the organizational hierarchy, and therefore engage in less CWB and more OCB. Future research should therefore corroborate the current findings, and test alternative and sequential mediators for other performance outcomes (e.g., safety performance or tardiness).

Third, publication bias and selective reporting bias generally threaten the validity of meta-analyses (Rosenthal, 1979), and might have also biased the results of the current meta-analysis. To limit the influence of publication bias, I also included unpublished studies, but the possibility that publication bias influenced the current results cannot be ruled out. Regarding selective reporting bias, it should be noted that most included studies were not conducted to examine the mediations tested in the current manuscript, making it less likely that the current results are influenced by selective reporting of statistically significant results in primary studies. However, it is possible that studies which were conducted to test these mediations were not published because they did not find statistically significant results. The current results should therefore be interpreted in light of this limitation.

Fourth, the current results rely on linear relations between the study variables. However, personality seems to be more stable later in adulthood (Costa et al., 2019) and changes in some HEXACO domains actually follow a non-linear trajectory. For example, Conscientiousness and Openness to Experience increase until young adulthood (mid-20s) but remain relatively stable afterwards (Ashton & Lee, 2016). Other nonlinear patterns exist as well: Agreeableness actually decreases slightly from age 20 to age 40, after which it starts to increase again (Ashton & Lee, 2016). This curvilinear relation could be one of the reasons for the relatively small relation between age and Agreeableness in the current meta-analysis and could explain the lack of support for the hypotheses that Agreeableness mediates the relations of age with CWB and OCB. Unfortunately, I could not take curvilinear relations into account because I only had access to bivariate correlations, but future research should examine if the occurrence of CWB and OCB also follows a curvilinear age trend that coincides with the curvilinear age trend observed for some personality domains.

Fifth, the current results are only based on the HEXACO domains and therefore do not take differential relations of age with the facets of a given HEXACO domain into account. For example, the Extraversion facets Social Self-Esteem, Social Boldness, and Liveliness actually show an upward trend across the adult lifespan, whereas the Sociability facet shows a downward trend up until age 40 followed by relative stability (Ashton & Lee, 2016). These differential relations of age with the facets of Extraversion can explain the non-significant relation of age with the domain Extraversion, which explains the lack of support for the hypothesis that Extraversion would mediate the relation between age and OCB. Importantly, facets of one domain can also cancel or mask each other in their relation with CWB or OCB (Judge et al., 2013). For example, Emotionality does not correlate with OCB, but previous research indicates that the Sentimentality facet correlated positively with OCB whereas the Fearfulness and Anxiety facets correlated negatively with OCB (Pletzer et al., 2020). As such, these facets cancel each other out, which can explain the non-significant relation between Emotionality and OCB and the non-significant indirect effect via Emotionality for the relation between age and OCB. In addition, it would be interesting to examine the

indirect effect via the interstitial Altruism facet. This facet shows an upward trend from the teen years to approximately age 50 after which it remains stable (Ashton & Lee, 2016), and it is highly predictive of both CWB and OCB (Pletzer, Oostrom, Bentvelzen, & de Vries, 2020; Pletzer et al., 2020). These findings qualify the Altruism facet as a likely mediator of the relation of age with CWB and OCB. Taken together, these findings highlight the need for future research to examine if specific facets mediate the relations of age with CWB and OCB.

5. Conclusion

The current meta-analytic findings demonstrate that some of the HEXACO personality traits mediate the relations of age with CWB and OCB. More specifically, Honesty-Humility, Emotionality, and Conscientiousness mediate the negative relation between age and CWB, whereas Emotionality, Conscientiousness, and Openness to Experience mediate the positive relation between age and OCB. These findings contribute important insights why older employees are less likely to engage in CWB and more likely to engage in OCB.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2020.110550.

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