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# **CHAPTER 5**

## **AGE AND WORKPLACE DEVIANCE: A META- ANALYSIS**

This chapter is based on Pletzer, J. L., Ostrom, J. K., & Voelpel, S. C. (2018). Age and workplace deviance: A meta-analysis. Paper drafts have been presented at the WAOP Conference 2016 and at the Academy of Management Conference 2017.

**Abstract**

In this meta-analysis, we examine the relationship between age and workplace deviance. We find a small but significant negative correlation ( $r = -.088$ ,  $k = 135$ ). As hypothesized based on the socio-emotional selectivity theory and the neo-socioanalytical model of personality change, this relationship is (partially) mediated by personality (i.e., conscientiousness, agreeableness, and extraversion) and by negative affect. Age shows a similar correlation with the two subfacets of workplace deviance: interpersonal and organizational deviance. Several methodologically and practically relevant moderators are examined. For example, the negative correlation between age and workplace deviance is stronger when workplace deviance is measured through self-reports as compared to other-reports. Results of this meta-analysis suggest that hiring older individuals could benefit organizations because it might reduce levels of workplace deviance and thereby lead to a competitive advantage for these organizations. Methodological, theoretical, and practical implications, as well as limitations and future research ideas, are discussed.

*Keywords:* counterproductive work behavior, workplace deviance, personality, negative affect, socio-emotional selectivity theory, neo-socioanalytical model of personality change, job selection, hiring, age

## Introduction

An important behavioral determinant of job performance is workplace deviance, which describes voluntary behaviors that harm the wellbeing of the organization and its employees (Robinson & Bennett, 1995). As such, levels of employee deviant behavior are often used in performance evaluations (Lievens, Conway, & De Corte, 2008; Welbourne, Johnson, & Erez, 1998). Workplace deviance can have far-reaching and detrimental consequences for a number of important outcomes at work. For example, it decreases task performance (for a review, see Sackett, 2002) and just a few deviant employees may impair team performance (Dunlop & Lee, 2004). Furthermore, deviant behavior inflicts psychological harm on coworkers (Pearson, Andersson, & Porath, 2000) and thereby increases coworkers' stress levels and may even lead to increased levels of depression and anxiety among victims (Cortina et al., 2001). Consequently, estimates of the annual costs of workplace deviance are tremendous, varying between \$50 billion (Henle et al., 2005) and \$6 to \$200 billion in the USA alone (Robinson & Bennett, 1995), but the real costs might be even higher due to the hidden nature of these behaviors.

The most commonly used definition of workplace deviance describes it as “voluntary behavior that violates significant organizational norms and in so doing threatens the wellbeing of an organization, its members, or both” (Robinson & Bennett, 1995, p. 556). This definition distinguishes between two subfacets of workplace deviance: interpersonal and organizational deviance. The former describes deviant behavior directed toward other members of the organization, such as insulting a colleague or disobeying the supervisor's instructions. The latter characterizes deviant behavior targeting the organization, such as coming late to work or stealing from the employer. Both forms can vary in severity, but are always detrimental and costly for organizations (Henle et al., 2005; Sackett, 2002). The term *counterproductive work behavior* is often used as a synonym for workplace deviance.

Previous research has shown that workplace deviance can be caused by characteristics of the organizational environment (e.g., abusive supervision; Mitchell & Ambrose, 2007) or by stable individual differences (e.g., personality; Hastings & O'Neill, 2009). One important category of such stable individual differences are demographic characteristics. For example, Ng, Lam, and Feldman (2016) recently provided meta-analytic evidence that, on average, women behave in a slightly less deviant manner in the workplace than men. Another important demographic characteristic is age. Previous meta-analyses have only indirectly addressed the relationship between age and workplace deviance. Berry, Carpenter, and Barratt (2012), who meta-analytically examined the incremental validity of other-reports over and above self-

reports of workplace deviance, reported a small negative correlation between age and workplace deviance ( $r = -.05$ ,  $k = 13$ ). Ng and Feldman (2008) focused on the relationship between age and various conceptualizations of job performance, including workplace deviance. They found a negative correlation between age and self-rated ( $r = -.12$ ,  $k = 28$ ) and other-rated workplace deviance ( $r = -.09$ ,  $k = 6$ ). Lastly, Berry, Ones, and Sackett (2007), who examined various predictors of workplace deviance, showed that age correlates negatively with interpersonal ( $r = -.05$ ,  $k = 14$ ) and organizational workplace deviance ( $r = -.09$ ,  $k = 12$ ). Even though these previous meta-analyses investigated age as one possible predictor of workplace deviance, they were based on a small number of studies, did not provide theoretical arguments for the effect, rarely distinguished between interpersonal and organizational workplace deviance, nor examined other important moderators. The current meta-analysis therefore extends existing literature by offering a comprehensive quantitative overview of the age-workplace deviance relationship, by testing theory-driven hypotheses for this relationship, by distinguishing between different subtypes and rater sources, and by examining several theoretically and practically relevant moderators (e.g., type of questionnaire, country characteristics).

### **Socio-Emotional Selectivity Theory and Neo-Socioanalytical Model of Personality Change**

The age-workplace deviance relationship can be explained with the socio-emotional selectivity theory (Carstensen, 1992) and with the neo-socioanalytical model of personality change (Roberts & Wood, 2006). An important determinant of workplace deviance is negative affect (Bing et al., 2007; Dalal, 2005; Lee & Allen, 2002; Spector & Fox, 2002). Almost all deviant behaviors originate out of some form of frustration, anger, or aggravation (Fox & Spector, 1999). Research has consistently found that individuals develop a more pronounced preference for positive over negative emotions with increasing age (i.e., positivity effect; e.g., Mather & Carstensen, 2005). This finding can be explained by the *socio-emotional selectivity theory*, which states that as individuals grow older and their time horizons shrink, they become increasingly selective and spend more time on emotionally meaningful goals and activities (Carstensen, 1992). Hence, older individuals are motivated to retain positive memories and to self-select into positive and meaningful situations. They also experience fewer interpersonal conflicts and less stress in response to conflicts if they occur (Birditt, Fingerman, & Almeida, 2005). In addition to this increased motivation to avoid negative emotions and conflicts, older (rather than younger) individuals have also been found to use more appropriate emotion regulation strategies due to their increased experience with emotional situations (Charles, 2010; Scheibe & Carstensen, 2010; Scheibe, Sheppes, & Staudinger, 2015). These emotion regulation

skills decrease the likelihood of experiencing negative emotions even further (Mather & Carstensen, 2005). Thus, according to *socio-emotional selectivity theory* and research findings that build on it, we expect that negative affect decreases with increasing age, which is subsequently associated with a decrease in levels of workplace deviance.

Another reliable predictor of workplace deviance are personality characteristics (Berry et al., 2007). The *neo-socioanalytical model of personality change* posits that personality characteristics, such as those in the five-factor model (Digman, 1990), change across the adult lifespan (Roberts & Wood, 2006). Longitudinal and cross-sectional studies have shown that Agreeableness, Conscientiousness, and Emotional Stability (versus Neuroticism) increase with age (Roberts & Mroczek, 2008; Roberts, Walton, & Viechtbauer, 2006), and meta-analytic evidence indicates that these exact same personality characteristics are negatively correlated with workplace deviance ( $r = -.23$  to  $-.35$ ; Berry et al., 2007). The other two personality domain scales, Openness to Experience and Extraversion, have not been shown to significantly correlate with age or workplace deviance. Thus, according to the *neo-socioanalytical model of personality change* and research linking personality to levels of workplace deviance, we also expect that personality changes with increasing age, which is subsequently associated with a change in levels of workplace deviance.

Based on these two theories, we hypothesize the following:

*Hypothesis 1:* Age correlates negatively with workplace deviance.

*Hypothesis 2:* Negative affect mediates the negative relationship between age and workplace deviance.

*Hypothesis 3:* The personality domain scales of Conscientiousness, Agreeableness, and Neuroticism mediate the negative relationship between age and workplace deviance.

### **Moderators of the Age – Workplace Deviance Relationship**

The relationship between age and workplace deviance is likely to be influenced by certain methodological or demographic characteristics of the included studies. In the following, we will outline our expectations for a variety of theoretically and practically relevant moderators of this relationship.

**Country characteristics: Pension coverage & social connections in old age.** As described above, negative affect is an important predictor of workplace deviance (Bing et al., 2007; Dalal, 2005; Lee & Allen, 2002; Spector & Fox, 2002). According to the socio-emotional selectivity theory, affective and emotional experiences become less negative with increasing age (Carstensen, 1992; Mather & Carstensen, 2005). Two important predictors of emotional experiences and wellbeing are financial security and social relationships (Bridges & Disney,

2010; Grant, Christianson, & Price, 2007; Green & Leeves, 2013; Kok et al., 2013; Miron-Shatz, 2009). Hence, we chose to investigate the moderating role of age-relevant conceptualizations of these two important determinants of emotional experiences and wellbeing on a country-level: a country's *pension coverage* and the average number of *social connections* in old age.

An important protective factor against workplace deviance is job or income security (e.g., Reisel, Probst, Chia, Maloles, & König, 2010; Tian, Zhang, & Zou, 2014). If employees feel that they have a future in their organization and do not fear being terminated, they are less likely to behave deviantly at work. While job security remains important for employees of all ages, older employees additionally place more value on a related construct, namely their financial security after retirement (Taylor & Shore, 1995). One indicator for financial security after retirement is a country's pension coverage (i.e., the percentage of individuals receiving a pension after retirement). Hence, the relationship between age and workplace deviance should be affected by a country's pension coverage. If older employees worry less about their financial security after retirement, they should be less likely to show workplace deviance. We therefore expect that the correlation between age and workplace deviance becomes more negative for countries with high pension coverage.

Similarly, social support functions as a buffer against negative experiences at work (Viswesvaran, Sanchez, & Fisher, 1999). For example, employees who do not experience work-family conflict are less likely to engage in deviant workplace behavior (e.g., Darrat, Amyx, & Bennett, 2010; Ferguson, Carlson, Hunter, & Whitten, 2012). Significant social connections should therefore also function as a protective factor against the occurrence of workplace deviance, because employees with a strong social support network comprising families, friends, and coworkers are less likely to react to the negative effects of stress at work (Viswesvaran et al., 1999; Wills, 1985). Especially in old age, the number of significant social connections usually decreases (Bhattacharya, Ghosh, Monsivais, Dunbar, & Kaski, 2016). Hence, we expect the average number of significant social connections of older individuals in a given country to moderate the relationship between workplace deviance and age, in a way that the effect size will be more negative in countries with high levels of significant social connections in old age.

**Gender.** A recent meta-analysis showed that female employees behave less deviantly in the workplace than male employees (Ng et al., 2016). These authors also found that the relationship between gender and self-rated interpersonal workplace deviance became less negative in samples with a higher average age. While no explanation for their findings was provided, building on their results we would expect that the relationship between age and

(interpersonal) workplace deviance becomes more negative when the average percentage of women included is higher in a respective study.

**Self- versus other-reports.** Previous research suggests that other-reports of workplace deviance are significantly correlated with self-reports (Berry et al., 2012). In their meta-analysis, Ng and Feldman (2008) found overlapping confidence intervals for the correlation between age and self-reported and other-reported workplace deviance (self-reports:  $r = -.12$ , 95% CI [-0.15, -0.10]; other-reports:  $r = -.09$ , 95% CI [-0.17, -0.02]). As the number of studies included for other-reports was really low in their meta-analysis ( $k = 6$ ), it is important to examine whether the source of the workplace deviance rating (self- versus other-report) moderates the relationship between workplace deviance and age. Results of this moderation analysis will demonstrate whether self- and other-reports of workplace deviance are differently susceptible to age differences in employees, which carries important implications for future studies of workplace deviance in age-diverse samples.

**Workplace deviance form.** In a similar vein, we will examine the extent to which age correlates differently with interpersonal and organizational workplace deviance. Meta-analytic evidence indicates that these two sub-dimensions correlate highly ( $r = .70$ ; Dalal, 2005). In addition, a previous meta-analysis by Berry, Ones, and Sackett (2007) found no significant difference in the relationship of age with interpersonal ( $r = -.05$ ) and organizational workplace deviance ( $r = -.09$ ). However, they did not statistically test the difference between these correlation coefficients nor reported 95% confidence intervals. Interpersonal and organizational workplace deviance show different relationships with personality dimensions (Berry et al., 2007) and might be more or less prevalent and destructive in different industries; for example, service industries with a lot of customer contact would probably suffer more from interpersonal workplace deviance than producing industries with no or low customer contact. For future studies of workplace deviance and for practitioners it is therefore important to examine if age is differently related to interpersonal or organizational workplace deviance.

**Workplace deviance questionnaire.** Workplace deviance can be assessed with a variety of questionnaires. To the best of our knowledge, no research has yet examined the questionnaire as a moderator of the age-workplace relationship. We will therefore exploratorily examine if the three most commonly used workplace deviance questionnaires (Aquino, Lewis, & Bradfield, 1999; Bennett & Robinson, 2000; Spector et al., 2006) differ in their relationship with age. If these questionnaires are differently susceptible to age differences in respondents, researchers should be even more careful in selecting a workplace deviance questionnaire, especially when studying workplace deviance in age-diverse samples.



**Curve of the age – workplace deviance relationship.** Ng and Feldman (2008) showed in their meta-analysis that the relationship between age and workplace deviance follows a negative, concave curve when categorizing studies according to the average age in their sample (younger than 25:  $r = -.01$ ; 25-39 years old:  $r = -.12$ , older than 40:  $r = -.17$ ). Because the number of included studies in each respective age category was low ( $k$  per category was not reported, but overall  $k = 28$ , suggesting that the average  $k$  was only around 9) we will try to replicate these results in a much larger sample.

### **Contribution of the Current Meta-Analysis**

This meta-analysis makes several contributions to the literature. First, we provide a comprehensive meta-analytic overview of the age-workplace deviance relationship. Second, we will test two possible explanatory mechanisms based on the *socio-emotional selectivity theory* (Carstensen, 1992) and the *neo-socioanalytical model of personality change* (Roberts & Wood, 2006). Third, we do not only provide meta-analytic results for the relationship between age and workplace deviance, but also for the relationships between age and negative affect, negative affect and workplace deviance, age and personality, and between personality and workplace deviance. Fourth, we test several theoretically, methodologically, and practically relevant moderators of the relationship between age and workplace deviance.

## **Method**

### **Systematic Literature Search**

We conducted a systematic literature search in several scientific databases, including *PsycInfo*, *PsycArticles*, and *Business Source Premier*. We searched for articles containing the keywords *workplace deviance* or *counterproductive work behavior* in the abstract or title and the keyword *age* in the entire text. After duplicates were removed, we were able to identify 3535 scientific articles. We screened the title and the abstract of each of these articles to assess if the article included a measure of workplace deviance. This strategy generated 674 articles, which were examined in full. In addition, we searched *GoogleScholar* for more articles containing the abovementioned keywords. Finally, we examined prior meta-analyses published on the topic of workplace deviance (Berry et al., 2012, 2007; Ng & Feldman, 2008; Ng et al., 2016) to see whether these contained any additional studies we might have missed in our literature search.

Several criteria had to be met for a study to be included in our meta-analysis. First, the article had to report the correlation coefficient ( $r$ ) between workplace deviance and age, and the respective sample size. Second, the article had to report data from field studies and not from experimental studies. Third, workplace deviance had to be measured on an individual level.

Studies that reported levels of workplace deviance on a team or organizational level were excluded. Fourth, age had to be measured on a continuous scale. Studies that used a categorical measure of age were excluded. Note that some studies measured workplace deviance at two points in time. Because time 2 data could potentially be confounded by the time lag between measurement points, we only coded time 1 data. Based on these inclusion criteria, 109 scientific articles containing 135 individual studies and 205 effect sizes were included in the meta-analysis. The articles we were able to find were published between 1990 and 2016, with a median publication year of 2011. On average, each individually coded effect size was based on a sample of 303 participants. The first author and a trained student assistant coded all effect sizes and study characteristics independently from each other, which resulted in more than 90% agreement. Any inconsistencies in the codings were resolved after revisiting the article and discussing the respective coding. The codings for each included effect size are in Table 1.

Table 1  
*Studies, Effect Sizes, and Codings included in the Meta-Analysis*

| Study                        | Form | <i>r</i> | <i>N</i> | Questionnaire | Rater | Country | PC    | SC   | %F   |
|------------------------------|------|----------|----------|---------------|-------|---------|-------|------|------|
| Alias et al. (2013)          | ID   | -.03     | 429      | B&R           | SR    | MY      | ---   | ---  | 64.6 |
|                              | OD   | .00      | 429      | B&R           | SR    | MY      | ---   | ---  | 64.6 |
| Andreoli & Lefkowitz (2009)  | WD   | -.02     | 145      | ---           | SR    | USA     | 92.5  | 94.0 | 48.3 |
| Aquino & Douglas (2003)      | ID   | -.08     | 308      | D&M           | SR    | USA     | 92.5  | 94.0 | 44.2 |
| Aquino et al. (2004)         | ID   | -.04     | 192      | B&R           | SR    | USA     | 92.5  | 94.0 | 34.0 |
|                              | OD   | -.04     | 192      | B&R           | SR    | USA     | 92.5  | 94.0 | 34.0 |
| Banks et al. (2012)          | ID   | .02      | 108      | B&R           | SR    | KR      | 77.6  | 60.0 | 40.0 |
|                              | OD   | .06      | 108      | B&R           | SR    | KR      | 77.6  | 60.0 | 40.0 |
| Bolton et al. (2012)         | WD   | -.16     | 175      | Spector       | SR    | USA     | 92.5  | 94.0 | 51.0 |
| Bordia et al. (2008) S1      | WD   | -.01     | 153      | CR            | OB    | PH      | 28.3  | 76.0 | 68.0 |
| Bordia et al. (2008) S2      | OD   | -.02     | 168      | Aquino        | OR    | PH      | 28.3  | 76.0 | 48.2 |
| Bordia et al. (2008) S3      | ID   | -.10     | 187      | Aquino        | OR    | PH      | 28.3  | 76.0 | 58.0 |
|                              | OD   | .00      | 187      | Aquino        | OR    | PH      | 28.3  | 76.0 | 58.0 |
| Bowling (2010)               | OD   | -.25     | 209      | B&R           | SR    | USA     | 92.5  | 94.0 | 56.0 |
| Bowling et al. (2010)        | OD   | -.24     | 227      | B&R           | SR    | USA     | 92.5  | 94.0 | 59.0 |
| Bowling et al. (2011) S1     | ID   | -.02     | 193      | B&R           | SR    | USA     | 92.5  | 94.0 | 64.0 |
|                              | OD   | -.04     | 193      | B&R           | SR    | USA     | 92.5  | 94.0 | 64.0 |
| Bowling et al. (2011) S2     | ID   | -.21     | 220      | B&R           | SR    | USA     | 92.5  | 94.0 | 57.0 |
|                              | OD   | -.24     | 220      | B&R           | SR    | USA     | 92.5  | 94.0 | 57.0 |
| Bowling et al. (2011) S3     | ID   | -.14     | 122      | B&R           | SR    | USA     | 92.5  | 94.0 | 77.0 |
|                              | OD   | -.13     | 122      | B&R           | SR    | USA     | 92.5  | 94.0 | 77.0 |
| Bruk-Lee & Spector (2006)    | ID   | -.22     | 121      | Fox           | SR    | USA     | 92.5  | 94.0 | 78.0 |
|                              | OD   | -.27     | 121      | Fox           | SR    | USA     | 92.5  | 94.0 | 78.0 |
|                              | ID   | -.20     | 121      | Fox           | OR    | USA     | 92.5  | 94.0 | 78.0 |
|                              | OD   | -.15     | 121      | Fox           | OR    | USA     | 92.5  | 94.0 | 78.0 |
| Chao et al. (2011)           | WD   | -.19     | 131      | G&S           | SR    | CN      | 74.4  | 63.0 | 58.0 |
| Chen et al. (2013)           | WD   | -.17     | 310      | B&R           | SR    | TW      | ---   | ---  | 59.4 |
| Chirumbolo (2015)            | WD   | .09      | 203      | K&L           | SR    | IT      | 81.0  | 91.0 | 53.7 |
| Chiu & Peng (2008)           | ID   | -.07     | 233      | B&R           | SR    | TW      | ---   | ---  | 70.0 |
|                              | OD   | -.11     | 233      | B&R           | SR    | TW      | ---   | ---  | 70.0 |
| Chullen et al. (2010)        | ID   | -.07     | 1924     | CR            | OB    | USA     | 92.5  | 94.0 | 86.0 |
|                              | OD   | -.09     | 1924     | CR            | OB    | USA     | 92.5  | 94.0 | 86.0 |
| Cohen et al. (2013)          | WD   | -.27     | 411      | Spector       | SR    | USA     | 92.5  | 94.0 | 55.6 |
| Connelly et al. (2011)       | ID   | -.19     | 157      | ---           | SR    | CA      | 97.7  | 94.0 | 54.0 |
|                              | OD   | -.16     | 157      | ---           | SR    | CA      | 97.7  | 94.0 | 54.0 |
| Côté et al. (2011)           | ID   | -.18     | 246      | B&R           | SR    | CA      | 97.7  | 94.0 | 73.0 |
| Cronin & Smith (2011)        | WD   | -.05     | 161      | ---           | SR    | USA     | 92.5  | 94.0 | 56.0 |
| Dahling et al. (2008)        | WD   | -.07     | 323      | F&S           | OR    | USA     | 92.5  | 94.0 | 68.5 |
| Dahling et al. (2012)        | ID   | .00      | 211      | F&S           | SR    | USA     | 92.5  | 94.0 | 71.6 |
|                              | OD   | -.03     | 211      | F&S           | SR    | USA     | 92.5  | 94.0 | 71.6 |
|                              | WD   | -.03     | 211      | F&S           | SR    | USA     | 92.5  | 94.0 | 71.6 |
| De Clercq et al. (2014)      | OD   | -.21     | 272      | B&R           | SR    | UA      | 95.0  | 81.0 | 46.0 |
| de Vries & van Gelder (2015) | WD   | -.08     | 455      | Self          | SR    | NL      | 100.0 | 81.0 | 45.3 |
| Deckop et al. (2014)         | ID   | -.04     | 270      | B&R           | OR    | USA     | 92.5  | 94.0 | 50.0 |

|                              |     |      |     |           |    |     |       |      |      |
|------------------------------|-----|------|-----|-----------|----|-----|-------|------|------|
|                              | OD  | -.16 | 270 | B&R       | OR | USA | 92.5  | 94.0 | 50.0 |
| Devonish & Greenidge (2010)  | ID  | -.02 | 211 | Spector   | SR | BB  | ---   | ---  | 54.5 |
|                              | OD  | -.01 | 211 | Spector   | SR | BB  | ---   | ---  | 54.5 |
| Dubbelt et al. (2014)        | ID  | -.10 | 285 | B&R       | SR | NL  | 100.0 | 81.0 | 40.7 |
|                              | OD  | .01  | 285 | B&R       | SR | NL  | 100.0 | 81.0 | 40.7 |
|                              | ID  | .27  | 64  | Stewart   | OR | NL  | 100.0 | 81.0 | 40.7 |
|                              | OD  | .13  | 64  | Stewart   | OR | NL  | 100.0 | 81.0 | 40.7 |
| Duffy et al. (1998)          | WD  | -.10 | 181 | Self-made | SR | USA | 92.5  | 94.0 | 11.0 |
| Duffy et al. (2006)          | WD  | -.03 | 737 | Self      | SR | SI  | 95.1  | 88.0 | 7.0  |
| El Akremi et al. (2010)      | ID  | -.06 | 602 | B&R       | SR | FR  | 100.0 | 93.0 | 57.0 |
|                              | OD  | -.14 | 602 | B&R       | SR | FR  | 100.0 | 93.0 | 57.0 |
| Enns & Rotundo (2012)        | WD  | -.09 | 110 | Fox       | SR | USA | 92.5  | 94.0 | 66.7 |
| Erkutlu & Chafra (2013)      | OD  | .07  | 848 | B&R       | OR | TR  | 88.1  | 81.0 | 32.0 |
| Eschleman et al. (2014)      | ID  | -.15 | 268 | M&A       | SR | USA | 92.5  | 94.0 | 50.0 |
|                              | OD  | -.20 | 268 | B&R       | SR | USA | 92.5  | 94.0 | 50.0 |
| Ferris et al. (2009)         | OD  | -.17 | 230 | Aquino    | SR | USA | 92.5  | 94.0 | 47.0 |
| Ferris et al. (2009b)        | WD  | -.22 | 123 | B&R       | SR | --- | ---   | ---  | 66.0 |
| Fine et al. (2010)           | WD  | .04  | 429 | Self      | SR | IL  | 73.6  | 91.0 | 62.0 |
| Galperin, (2012)             | ID  | -.23 | 240 | B&R       | SR | CA  | 97.7  | 94.0 | 34.0 |
|                              | OD  | -.13 | 240 | B&R       | SR | CA  | 97.7  | 94.0 | 34.0 |
| Gill et al. (2011)           | WD  | .08  | 120 | B&R       | OR | KR  | 77.6  | 60.0 | 47.0 |
| Gottfredson & Holland (1990) | WD  | -.36 | 71  | Self      | SR | USA | 92.5  | 94.0 | 75.0 |
| Gruys et al. (2010) S1       | WD  | -.24 | 317 | Self      | SR | USA | 92.5  | 94.0 | 56.0 |
| Gruys et al. (2010) S2       | ID  | .02  | 262 | B&R       | OR | USA | 92.5  | 94.0 | ---  |
|                              | OD  | .14  | 262 | B&R       | OR | USA | 92.5  | 94.0 | ---  |
| Gutworth & Dahling (2013)    | OD  | -.07 | 147 | B&R       | SR | USA | 92.5  | 94.0 | 73.5 |
| Harvey et al. (2014)         | OD  | .12  | 396 | Aquino    | SR | USA | 92.5  | 94.0 | 56.0 |
| Harvey, et al. (2014b)       | OD  | .05  | 152 | Aquino    | OR | USA | 92.5  | 94.0 | 66.0 |
| Hastings & Finegan (2011)    | ID  | -.07 | 200 | B&R       | SR | CA  | 97.7  | 94.0 | 67.5 |
|                              | OD  | -.08 | 200 | B&R       | SR | CA  | 97.7  | 94.0 | 67.5 |
| Henle (2005)                 | WD  | -.16 | 151 | B&R       | SR | USA | 92.5  | 94.0 | 53.6 |
| Holtz & Harold (2013) S1     | ID  | -.20 | 318 | B&R       | SR | USA | 92.5  | 94.0 | 53.0 |
|                              | OD  | -.21 | 318 | B&R       | SR | USA | 92.5  | 94.0 | 53.0 |
|                              | WD  | -.23 | 318 | B&R       | SR | USA | 92.5  | 94.0 | 53.0 |
| Holtz & Harold (2013) S2     | ID  | -.17 | 122 | B&R       | OR | USA | 92.5  | 94.0 | 65.0 |
|                              | OD  | -.26 | 122 | B&R       | OR | USA | 92.5  | 94.0 | 65.0 |
|                              | WD  | -.23 | 122 | B&R       | OR | USA | 92.5  | 94.0 | 65.0 |
| Holtz & Harold (2013b) S1    | WD  | .11  | 158 | Dalal     | OR | USA | 92.5  | 94.0 | 61.0 |
| Holtz & Harold (2013b) S2    | WD  | -.08 | 105 | Dalal     | OR | USA | 92.5  | 94.0 | 31.0 |
| Hunter & Penney (2014)       | ID  | .03  | 438 | Spector   | SR | USA | 92.5  | 94.0 | 62.0 |
|                              | OD  | -.14 | 438 | Spector   | SR | USA | 92.5  | 94.0 | 62.0 |
|                              | CDD | .01  | 438 | Self      | SR | USA | 92.5  | 94.0 | 62.0 |
| Iliescu et al. (2015) S1     | WD  | .02  | 226 | Spector   | SR | RO  | 98.0  | 75.0 | 49.0 |
|                              | WD  | .06  | 226 | Spector   | OR | RO  | 98.0  | 75.0 | 49.0 |
| Iliescu et al. (2015) S2     | WD  | -.02 | 245 | B&R       | SR | --- | ---   | ---  | 47.0 |
|                              | WD  | .05  | 245 | B&R       | OR | --- | ---   | ---  | 47.0 |
| Jensen & Patel (2011)        | ID  | .02  | 517 | C&G       | SR | EU  | ---   | ---  | 47.0 |
|                              | OD  | .04  | 517 | C&G       | SR | EU  | ---   | ---  | 47.0 |
| Jones (2009)                 | ID  | -.08 | 424 | B&R & S&F | SR | CA  | 97.7  | 94.0 | 79.5 |
|                              | OD  | -.13 | 424 | B&R & S&F | SR | CA  | 97.7  | 94.0 | 79.5 |
| Khan et al. (2014)           | WD  | .03  | 140 | CC&M      | SR | PK  | 2.3   | 60.0 | 45.0 |
| Kluemper et al. (2013) S1    | ID  | -.11 | 220 | B&R       | SR | USA | 92.5  | 94.0 | 55.0 |
|                              | OD  | -.22 | 220 | W&A       | OR | USA | 92.5  | 94.0 | 55.0 |
| Kluemper et al. (2013) S2    | ID  | -.08 | 100 | W&A       | OR | USA | 92.5  | 94.0 | 49.0 |
| Kwok et al. (2005)           | WD  | .02  | 155 | Self-made | SR | HK  | ---   | ---  | 70.0 |
| Lee & Allen (2002)           | WD  | .00  | 149 | B&R       | SR | CA  | 97.7  | 94.0 | 95.4 |
| Lian et al. (2012) S1        | ID  | -.17 | 264 | B&R       | SR | --- | ---   | ---  | 54.0 |
| Lian et al. (2012) S2        | ID  | -.06 | 171 | Stewart   | OR | --- | ---   | ---  | 52.0 |
| Lian et al. (2012) S3        | ID  | -.08 | 198 | B&R       | SR | --- | ---   | ---  | 55.0 |
| Liao et al. (2004)           | ID  | -.20 | 286 | B&R       | SR | USA | 92.5  | 94.0 | 67.0 |
|                              | OD  | -.17 | 286 | B&R       | SR | USA | 92.5  | 94.0 | 67.0 |
| Little et al. (2011)         | OD  | -.19 | 331 | H&C       | OR | USA | 92.5  | 94.0 | 37.0 |
| Liu & Ding (2014)            | ID  | -.27 | 460 | B&R       | SR | TW  | ---   | ---  | 47.6 |
|                              | OD  | -.23 | 460 | B&R       | SR | TW  | ---   | ---  | 47.6 |
| Liu et al. (2010) S1         | ID  | -.18 | 283 | M&A       | OR | CN  | 74.4  | 63.0 | 32.9 |
| Liu et al. (2010) S2         | ID  | .07  | 222 | M&A       | SR | CN  | 74.4  | 63.0 | 50.0 |
|                              | ID  | .03  | 222 | M&A       | OR | CN  | 74.4  | 63.0 | 50.0 |
| Mackey et al. (2015) S1      | ID  | -.22 | 96  | Aquino    | SR | USA | 92.5  | 94.0 | 56.0 |
|                              | SDD | -.13 | 96  | Aquino    | SR | USA | 92.5  | 94.0 | 56.0 |
| Mackey et al. (2015) S2      | ID  | .03  | 130 | Aquino    | SR | USA | 92.5  | 94.0 | 65.0 |
|                              | SDD | .11  | 130 | Aquino    | SR | USA | 92.5  | 94.0 | 65.0 |
| Marasi et al. (2016)         | WD  | -.08 | 353 | B&R       | SR | USA | 92.5  | 94.0 | 92.0 |
| Mawritz et al. (2014)        | OD  | -.04 | 221 | B&R       | OR | USA | 92.5  | 94.0 | 55.0 |
| Mayer et al. (2012) S1       | OD  | -.26 | 367 | B&R       | SR | USA | 92.5  | 94.0 | 46.3 |
| Mayer et al. (2012) S4       | ID  | .20  | 218 | B&R       | SR | USA | 92.5  | 94.0 | 53.0 |
|                              | OD  | -.20 | 218 | B&R       | SR | USA | 92.5  | 94.0 | 53.0 |

|                              |     |      |      |              |    |     |       |      |      |
|------------------------------|-----|------|------|--------------|----|-----|-------|------|------|
| Mitchell & Ambrose (2007)    | ID  | -.17 | 427  | B&R          | SR | USA | 92.5  | 94.0 | 56.9 |
|                              | OD  | -.28 | 427  | B&R          | SR | USA | 92.5  | 94.0 | 56.9 |
|                              | SDD | -.16 | 427  | B&R          | SR | USA | 92.5  | 94.0 | 56.9 |
| Mulki et al. (2006)          | OD  | -.11 | 208  | B&R          | SR | USA | 92.5  | 94.0 | 68.8 |
| Neves & Champion (2015)      | ID  | -.02 | 518  | B&R & Aquino | OR | --- | ---   | ---  | 51.0 |
|                              | OD  | .01  | 518  | B&R & Aquino | OR | --- | ---   | ---  | 51.0 |
| Neves & Story (2015)         | OD  | -.04 | 224  | Aquino       | OR | --- | ---   | ---  | 46.0 |
| Norman et al. (2010)         | WD  | -.22 | 199  | F&S          | SR | USA | 92.5  | 94.0 | 47.2 |
| Penhaligon et al. (2013)     | OD  | -.01 | 189  | B&R          | SR | AU  | 83.0  | 92.0 | 56.1 |
| Penney et al. (2011)         | WD  | -.15 | 239  | Spector      | SR | USA | 92.5  | 94.0 | 55.5 |
| Pitariu & Budean (2015)      | ID  | -.44 | 281  | B&R          | SR | RO  | 98.0  | 75.0 | 86.1 |
|                              | OD  | -.34 | 281  | B&R          | SR | RO  | 98.0  | 75.0 | 86.1 |
| Probst et al. (2007)         | OD  | -.20 | 144  | B&R          | SR | USA | 92.5  | 94.0 | 65.0 |
| Resick et al. (2013)         | WD  | -.15 | 190  | B&R          | OR | USA | 92.5  | 94.0 | 46.0 |
| Restubog et al. (2007)       | ID  | -.18 | 162  | Aquino       | SR | PH  | 28.3  | 76.0 | 53.7 |
|                              | OD  | -.23 | 162  | Aquino       | SR | PH  | 28.3  | 76.0 | 53.7 |
| Restubog et al. (2010)       | WD  | -.10 | 125  | CR           | OB | PH  | 28.3  | 76.0 | 59.0 |
| Restubog et al. (2013)       | OD  | -.02 | 168  | Aquino       | OR | PH  | 28.3  | 76.0 | 48.2 |
| Restubog et al. (2015) S1    | WD  | .21  | 146  | Self         | OR | AU  | 83.0  | 92.0 | 52.0 |
| Restubog et al. (2015) S2    | WD  | .00  | 168  | Self         | OR | PH  | 28.3  | 76.0 | 42.3 |
| Rosen & Levy (2013)          | WD  | -.09 | 285  | B&R          | SR | USA | 92.5  | 94.0 | 71.0 |
| Sackett et al. (2006)        | ID  | -.03 | 805  | B&R          | SR | USA | 92.5  | 94.0 | 75.9 |
|                              | OD  | -.09 | 805  | B&R          | SR | USA | 92.5  | 94.0 | 75.9 |
|                              | WD  | -.08 | 805  | B&R          | SR | USA | 92.5  | 94.0 | 75.9 |
| Sakurai (2011)               | WD  | -.27 | 202  | B&R          | SR | USA | 92.5  | 94.0 | 44.3 |
| Salami (2010)                | WD  | .20  | 422  | Spector      | SR | NG  | 5.0   | 74.0 | ---  |
| Samnani et al. (2013)        | OD  | -.16 | 221  | B&R          | SR | CA  | 97.7  | 94.0 | 72.0 |
| Semmer et al. (2010) S1      | ID  | -.12 | 199  | B&A          | SR | CH  | 100.0 | 91.0 | 57.0 |
|                              | SDD | -.07 | 199  | B&A          | SR | CH  | 100.0 | 91.0 | 57.0 |
| Semmer et al. (2010) S2      | ID  | -.14 | 205  | B&R          | SR | CH  | 100.0 | 91.0 | 55.6 |
|                              | OD  | -.36 | 205  | B&R          | SR | CH  | 100.0 | 91.0 | 55.6 |
| Shao et al. (2011)           | ID  | -.23 | 490  | B&R          | SR | USA | 92.5  | 94.0 | 71.0 |
| Sharkawi et al. (2013)       | ID  | .18  | 192  | S&F          | SR | MY  | ---   | ---  | 15.6 |
|                              | OD  | .08  | 192  | S&F          | SR | MY  | ---   | ---  | 15.6 |
| Shoss et al. (2013) S1       | WD  | .06  | 148  | Spector      | OR | PH  | 28.3  | 76.0 | 48.6 |
| Shoss et al. (2013) S2       | WD  | -.09 | 254  | Aquino       | SR | PH  | 28.3  | 76.0 | 63.0 |
| Shoss et al. (2013) S3       | OD  | -.03 | 187  | Aquino       | OR | PH  | 28.3  | 76.0 | 55.1 |
| Smoktunowicz et al. (2015)   | WD  | -.04 | 607  | Spector      | SR | PL  | 96.5  | 87.0 | 20.0 |
| Spector & Zhou (2014)        | ID  | -.03 | 915  | Spector      | SR | USA | 92.5  | 94.0 | 78.0 |
|                              | OD  | -.02 | 915  | Spector      | SR | USA | 92.5  | 94.0 | 78.0 |
| Sprung (2011)                | ID  | -.25 | 208  | Spector      | SR | USA | 92.5  | 94.0 | 46.4 |
|                              | OD  | -.28 | 208  | Spector      | SR | USA | 92.5  | 94.0 | 46.4 |
|                              | WD  | -.27 | 208  | Spector      | SR | USA | 92.5  | 94.0 | 46.4 |
| Stamper & Masterson (2002)   | OD  | -.06 | 257  | B&R          | OR | USA | 92.5  | 94.0 | 75.0 |
| Stouten et al. (2013) S2     | OD  | -.14 | 410  | B&R          | SR | NL  | 100.0 | 91.0 | 36.2 |
| Stouten et al. (2013) S3     | ID  | -.07 | 168  | M&A          | OR | USA | 92.5  | 94.0 | 52.0 |
|                              | OD  | -.10 | 168  | B&R          | OR | USA | 92.5  | 94.0 | 52.0 |
| Sulea et al. (2012)          | WD  | -.02 | 258  | Spector      | SR | RO  | 98.0  | 75.0 | 52.0 |
| Tepper et al. (2009) S1      | ID  | -.19 | 797  | S&F          | SR | USA | 92.5  | 94.0 | 53.7 |
|                              | OD  | -.31 | 797  | S&F          | SR | USA | 92.5  | 94.0 | 53.7 |
| Tepper et al. (2009) S2      | ID  | -.14 | 356  | B&R & S&F    | SR | USA | 92.5  | 94.0 | 65.0 |
|                              | OD  | -.31 | 356  | B&R & S&F    | SR | USA | 92.5  | 94.0 | 65.0 |
| Thau & Mitchell (2010) S1    | ID  | .37  | 216  | M&A          | SR | USA | 92.5  | 94.0 | 57.4 |
|                              | OD  | -.13 | 216  | B&R          | SR | USA | 92.5  | 94.0 | 57.4 |
| Thau & Mitchell (2010) S2    | ID  | -.15 | 365  | M&A          | SR | USA | 92.5  | 94.0 | 68.0 |
|                              | OD  | -.25 | 365  | B&R          | SR | USA | 92.5  | 94.0 | 68.0 |
| Thau et al. (2007)           | ID  | .01  | 129  | B&R          | OR | NL  | 100.0 | 91.0 | 88.0 |
| Thau et al. (2007b) S1       | WD  | -.06 | 306  | B&R          | SR | USA | 92.5  | 94.0 | 42.0 |
| Thau et al. (2007b) S2       | WD  | .00  | 87   | Kickul       | OR | DE  | 100.0 | 90.0 | 40.0 |
| Thau et al. (2007b) S3       | WD  | -.03 | 106  | B&R          | OR | NL  | 100.0 | 91.0 | 40.2 |
| Thau et al. (2009) S1        | ID  | -.13 | 373  | B&R          | SR | USA | 92.5  | 94.0 | 42.0 |
|                              | OD  | -.11 | 373  | B&R          | SR | USA | 92.5  | 94.0 | 42.0 |
| Thau et al. (2009) S2        | ID  | -.21 | 1477 | M&A          | SR | USA | 92.5  | 94.0 | 50.0 |
|                              | OD  | -.21 | 1477 | B&R          | SR | USA | 92.5  | 94.0 | 50.0 |
| Tian et al. (2014)           | WD  | -.13 | 366  | B&R          | SR | CN  | 74.4  | 63.0 | 52.5 |
| Van den Broeck et al. (2014) | ID  | -.18 | 451  | B&R          | SR | RO  | 98.0  | 75.0 | 58.0 |
|                              | OD  | -.16 | 451  | B&R          | SR | RO  | 98.0  | 75.0 | 58.0 |
| Wang et al. (2012)           | ID  | -.11 | 283  | B&R          | SR | CN  | 74.4  | 63.0 | 32.9 |
|                              | OD  | -.12 | 283  | B&R          | SR | CN  | 74.4  | 63.0 | 32.9 |
|                              | SDD | -.18 | 283  | B&R          | OR | CN  | 74.4  | 63.0 | 32.9 |
| Winkel et al. (2011)         | ID  | .00  | 234  | B&R          | SR | USA | 92.5  | 94.0 | 56.0 |
|                              | OD  | -.09 | 234  | B&R          | SR | USA | 92.5  | 94.0 | 56.0 |
| Wu et al. (2014)             | ID  | -.05 | 233  | B&R          | SR | CN  | 74.4  | 63.0 | 25.8 |
| Yang & Diefendorff (2009)    | ID  | -.04 | 231  | Self         | SR | HK  | ---   | ---  | 70.0 |
|                              | OD  | -.17 | 231  | Self         | SR | HK  | ---   | ---  | 70.0 |
| Yang (2008)                  | ID  | -.06 | 256  | B&R          | SR | USA | 92.5  | 94.0 | 62.0 |

|                                |    |      |     |        |    |     |      |      |      |
|--------------------------------|----|------|-----|--------|----|-----|------|------|------|
|                                | OD | -.10 | 256 | B&R    | SR | USA | 92.5 | 94.0 | 62.0 |
| Yang et al. (2013)             | ID | .03  | 361 | B&R    | SR | CN  | 74.4 | 63.0 | 85.0 |
|                                | OD | .04  | 361 | B&R    | SR | CN  | 74.4 | 63.0 | 85.0 |
| Zagenczyk et al. (2014) S2     | OD | -.04 | 156 | Aquino | OR | PH  | 28.3 | 76.0 | 51.0 |
| Zagenczyk et al. (2014) S3     | OD | -.05 | 152 | Aquino | OR | PH  | 28.3 | 76.0 | 56.6 |
| Zagenczyk et al. (2014) S4     | OD | .01  | 259 | Aquino | OR | PH  | 28.3 | 76.0 | 64.9 |
| Zhao et al. (2013)             | ID | .01  | 239 | Y&D    | SR | CN  | 74.4 | 63.0 | 36.0 |
|                                | OD | -.11 | 239 | Y&D    | SR | CN  | 74.4 | 63.0 | 36.0 |
| Zoghbi-Manrique-de-Lara (2011) | OD | .03  | 270 | B&R    | SR | ES  | 68.2 | 89.0 | 35.4 |

*Note.* Abbreviations: ID = Interpersonal workplace deviance, OD = organizational workplace deviance, WD = overall workplace deviance, CDD = customer-directed workplace deviance, SDD = supervisor-directed deviance; B&R = Bennett & Robinson (2000), D&M = Douglas & Martinko (2001), Spector = Spector et al. (2006), CR = Company Records, Aquino = Aquino et al. (1999), Fox = Fox et al. (2001), G&S = Gruys & Sackett (2003), K&L = Kelloway & Loughlin (2002), F&S = Fox & Spector (1999), Stewart = Stewart et al. (2009), M&A = Mitchell & Ambrose (2007), Dalal = Dalal et al. (2009), C&G = Coyne & Gentile (2006), S&F = Skarlicki & Folger (1997), CC&M = Cohen-Charash & Mueller (2007), W&A = Williams & Anderson (1991), H&C = Hollinger & Clark (1982), B&A = Blau & Andersson (2005), S&F = Spector & Fox (2002), Kickul = Kickul et al. (2001), Y&D = Yang & Diefendorff (2009), Self = The questionnaire was either developed by the authors themselves or included items from different questionnaires; SR = self-rated WD, OR = supervisor- or coworker-rated WD, OB = WD rated by objective company records; PC = Pension Coverage, SC = Social Connections, %F = % Female, AU = Australia, BB = Barbados, CA = Canada, CN = China, DE = Germany, ES = Spain, EU = Europe, FR = France, HK = Hong Kong, IL = Israel, IT = Italy, KR = South Korea, MY = Malaysia, NG = Nigeria, NL = The Netherlands, PH = Philippines, PK = Pakistan, PL = Poland, RO = Romania, SI = Slovenia, TR = Turkey, TW = Taiwan, UA = Ukraine

## Definition of Variables

**Age.** The average age of participants in the individual studies ranged between 18.85 and 49.00 years, with an average age of 34.51 years ( $SD = 7.13$ ).

**Workplace deviance.** Workplace deviance can be assessed as an overall construct which encompasses all deviant behaviors ( $k = 49$ ). However, many articles differentiate between interpersonal and organizational deviance. Interpersonal workplace deviance includes all behaviors directed at other individuals in the organization ( $k = 66$ ). Examples of such behaviors are insulting a coworker or being rude to customers. Some studies measured other forms of interpersonal workplace deviance, such as customer-directed ( $k = 1$ ) or supervisor-directed deviance ( $k = 5$ ). These studies were only included in the overall analysis, but not in the moderator analyses. Organizational workplace deviance includes all deviant behaviors directed at the organization in which an individual is employed ( $k = 77$ ). Examples of organizational workplace deviance include stealing from the organization or not following the rules. If a study assessed only one very specific behavior, such as absenteeism, the effect size was not included.

## Moderator variables

We coded several study characteristics that vary across the studies included in the meta-analysis. The study characteristic we coded and the number of studies with coded effect sizes at each level of the coded variable are described below (see Table 1 for the codings)

*Workplace deviance measure.* Workplace deviance can be assessed with a variety of questionnaires. Of the 135 individual studies included in this meta-analysis, most of them used

Bennett and Robinson's (2000) questionnaire ( $k = 65$ ), followed by the questionnaires by Aquino et al. (1999,  $k = 15$ ) and Spector et al. (2006,  $k = 12$ ). The remaining studies used other questionnaires, a combination of questionnaires, or a self-made questionnaire ( $k = 40$ ). Three studies did not mention the questionnaire that was used.

*Source.* Several rating sources of workplace deviance have been used in the literature. Most commonly, self-report measures are used ( $k = 96$ ), followed by supervisor or coworker ratings ( $k = 39$ ), even though this procedure is questionable because employees who behave deviantly usually try to hide such behavior from others (Bennett & Robinson, 2000; Spector, 1994). In rare cases, workplace deviance is assessed with objective company records ( $k = 3$ ). A few studies included both self-ratings and other-ratings (i.e., Bruk-Lee & Spector, 2006; Dubbelt, Oostrom, Hiemstra, & Modderman, 2014; Iliescu, Ispas, Sulea, & Ilie, 2015; Liu, Kwong Kwan, Wu, & Wu, 2010). In those cases, we used the self-rating in the overall analyses and included the other-rating in the respective moderator analysis. However, we also report results including other-ratings instead of self-ratings of workplace deviance.

*Country characteristics.* Research on workplace deviance has been conducted in a wide variety of countries. Most studies were conducted in the USA ( $k = 65$ ), followed by the Philippines ( $k = 13$ ), Canada ( $k = 7$ ), and China ( $k = 7$ ). Other countries included in this sample are Australia, Barbados, France, Germany, Hong Kong, Israel, Italy, Malaysia, Nigeria, Pakistan, Poland, Romania, Slovenia, South Korea, Spain, Switzerland, Taiwan, Turkey, and Ukraine. For each country, we coded two variables taken from the Global Age Watch Index 2015, which is based on data from the United Nations Department of Economic and Social Affairs, the World Bank, the World Health Organization, International Labor Organizations, the UNESCO, and the Gallup World Poll (HelpAge International, 2015). We coded the *pension coverage* for each country, which is defined as the percentage of individuals over 65 years old who receive a pension (HelpAge International, 2015). In addition, we coded the average number of *social connections* in old age, defined as the percentage of individuals aged 50 or older who have friends or relatives they can count on when they experience problems (HelpAge International, 2015).

*Gender.* A recent meta-analysis (Ng et al., 2016) showed that male employees show higher levels of workplace deviance than female employees. Therefore, when available, we coded the percentage of female employees in the sample. Across all 134 studies which mentioned the percentage of female employees in their sample, it ranged between 7% and 95%, with an average of 56%.

### **Data Analysis**

We used the Pearson product moment correlation coefficient ( $r$ ) as a measure of effect size. All computations for this meta-analysis were conducted using Comprehensive Meta-Analysis Software (CMA; Biostat, USA). Based on the assumption that we did not sample all studies from the population of studies and that heterogeneity was present in the sample of effect sizes, we used a random effects model with inverse-variance weights (Borenstein et al., 2009). For our specific analysis, CMA performs the following steps:

1. For each study, the effect size data ( $r$  and  $N$ ) were reported. Because the variance in  $r$  is biased based on the magnitude of  $r$ ,  $r$  is converted to Fisher's  $z$ . CMA computes all analyses on Fisher's  $z$  and converts the final result back to  $r$ .
2. Each Fisher's  $z$  value was weighted according to the inverse-variance method (inverse of the sum of within- and between-study variance; DerSimonian & Laird, 1986).
3. A random-effects model was used to compute the overall mean weighted effect size of all studies. The overall  $r$  is the sum of the product of all  $r$  (expressed as Fisher's  $z$ ) and weights divided by the sum of all weights.

To assess heterogeneity between effect sizes, we computed a  $Q$  statistic and an  $I^2$  index, where  $I^2 = 100\% \times (Q - df) / Q$  with  $df = k - 1$  and  $k =$  number of effect sizes (Borenstein et al., 2009). The  $I^2$  index indicates variability in the effect size based on real (rather than chance) differences between effect sizes. Benchmark values for the interpretation of  $I^2$  are: 25% = low, 50% = medium, and 75% = high (Higgins, Thompson, Deeks, & Altman, 2003b). In the overall analysis, we combine the effect sizes for overall, interpersonal, and organizational workplace deviance if a study measures at least two of those to guarantee independence of effect sizes.

### **Publication Bias Analysis**

In scientific research, studies with statistically significant findings are more likely to be published than studies with non-significant findings (Borenstein et al., 2009). Such publication bias can inflate the overall results of a meta-analysis. Hence, we tested for publication bias using Begg and Mazumdar's (1994) rank correlation and Egger's regression intercept (Egger et al., 1997). These indicators assess if effect sizes and precision differ systematically. If that is the case, publication bias is present in the data. Note that publication bias is unlikely to exist because the majority of studies included in this meta-analysis were not carried out to explicitly examine the relationship between age and workplace deviance.

### **Sensitivity and Moderator Analyses**

The stability of the effect sizes over time was assessed by adding one study at a time to all previous studies (cumulative analysis). This allowed us to examine a trend over time. The influence of individual studies on the overall effect size was assessed by removing one study at a time from the overall analysis (one-study removed analysis). We used a mixed-effects model to test the influence of moderating factors on the overall effect size (subgroup analyses and meta-regressions). We opted against the use of a fixed-effects model because we did not assume to have sampled all studies from the population of studies, and because random and systematic variation in the effect size distribution can be assumed to be present. A limitation of this approach is that random- and mixed-effects models tend to be conservative and have an increased chance of Type II Errors (Lipsey & Wilson, 2001).

### **Two-Stage Meta-Analytical Structural Equation Modeling**

A two-stage random-effects meta-analytical structural equation modeling (MASEM) (Cheung, 2014, 2015) was conducted to test the mediation hypotheses (Hypotheses 2 and 3). To do so, we additionally examined all included studies to identify whether a measure of either one of the Big Five personality domain scales (i.e., Openness to Experience, Conscientiousness, Extraversion, Agreeableness, Neuroticism), or of negative affect was included. We coded the effect sizes between age, workplace deviance (overall, interpersonal, organizational), and the respective mediator (see Tables 2 through 7 for the codings).

MASEM combines meta-analysis with structural equation modeling and consists of two stages. In the first stage, the correlations between all the variables from all the primary studies are synthesized into an overall correlation matrix weighted by sample size. Whenever a study only reported correlations between interpersonal or organizational workplace deviance (and not for overall workplace deviance) and the mediator or age, we averaged the correlations for interpersonal and organizational workplace deviance to a correlation for overall workplace deviance. In the second stage, this meta-analytic correlation matrix is subjected to a structural equation model to test the mediations. In the current study, we test three outcome variables (overall, interpersonal, and organizational workplace deviance) and six mediators (five personality domain scales and negative effect), which result in 18 tested mediations. If the indirect effect is significant and the direct effect decreases in magnitude, or becomes non-significant, a mediation is present. These analyses were conducted in *R* using the metaSEM package (Cheung, 2014).



Table 2  
*Studies, Effect Sizes, and Codings included in the MASEM for Negative Affect*

| Study                        | <i>r</i>    |             |             |             |            |            |            | <i>N</i> |
|------------------------------|-------------|-------------|-------------|-------------|------------|------------|------------|----------|
|                              | Age -<br>NA | Age -<br>WD | Age -<br>ID | Age -<br>OD | NA -<br>WD | NA -<br>ID | NA -<br>OD |          |
| Alias et al. (2013)          | -.01        | -.02        | -.03        | .00         | -.28       | -.30       | -.25       | 429      |
| Bowling et al. (2011)<br>S1  | .01         | -.03        | -.02        | -.04        | .44        | .41        | .46        | 193      |
| Bowling et al. (2011)<br>S2  | -.11        | -.23        | -.21        | -.24        | .41        | .40        | .41        | 220      |
| Chen et al. (2013)           | -.07        | -.17        | ---         | ---         | .59        | ---        | ---        | 310      |
| Cohen et al. (2013)          | -.23        | -.27        | ---         | ---         | .47        | ---        | ---        | 411      |
| Duffy et al. (2006)          | -.08        | -.03        | ---         | ---         | .10        | ---        | ---        | 737      |
| Harvey et al. (2014)         | -.16        | ---         | ---         | .12         | ---        | ---        | -.01       | 396      |
| Holtz & Harold (2013)<br>S1  | -.11        | -.23        | -.20        | -.21        | .31        | .24        | .31        | 318      |
| Holtz & Harold (2013)<br>S2  | -.18        | -.23        | -.17        | -.26        | .15        | .04        | .22        | 122      |
| Khan et al. (2014)           | -.04        | .03         | ---         | ---         | .21        | ---        | ---        | 140      |
| Lee & Allen (2002)           | -.06        | .00         | ---         | ---         | .14        | ---        | ---        | 149      |
| Lian et al. (2012) S1        | -.05        | ---         | -.17        | ---         | ---        | .30        | ---        | 264      |
| Lian et al. (2012) S2        | -.25        | ---         | -.06        | ---         | ---        | .34        | ---        | 171      |
| Lian et al. (2012) S3        | -.27        | ---         | -.08        | ---         | ---        | .50        | ---        | 198      |
| Liu & Ding (2014)            | -.07        | -.25        | -.27        | -.23        | .13        | .12        | .14        | 460      |
| Liu et al. (2010) S1         | -.06        | ---         | -.18        | ---         | ---        | .15        | ---        | 283      |
| Mayer et al. (2012) S4       | -.08        | -.20        | -.20        | -.20        | .08        | .04        | .12        | 218      |
| Sakurai (2011)               | -.19        | -.27        | ---         | ---         | .14        | ---        | ---        | 202      |
| Salami (2010)                | -.15        | .20         | ---         | ---         | .34        | ---        | ---        | 422      |
| Sprung (2011)                | -.22        | -.27        | -.25        | -.28        | .61        | .61        | .60        | 208      |
| Tepper et al. (2009) S1      | -.04        | -.25        | -.19        | -.31        | .23        | .23        | .23        | 797      |
| Thau et al. (2009) S1        | -.08        | -.12        | -.13        | -.11        | .23        | .22        | .24        | 373      |
| Thau et al. (2009) S2        | -.26        | -.21        | -.21        | -.21        | .50        | .51        | .48        | 1477     |
| Wang et al. (2012)           | -.06        | -.12        | -.11        | -.12        | .15        | .18        | .11        | 283      |
| Yang & Diefendorff<br>(2009) | -.14        | -.11        | -.04        | -.17        | .181       | .17        | .19        | 231      |

*Note.* NA = Negative Affect, WD = Workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

Table 3  
*Studies, Effect Sizes, and Codings included in the MASEM for Conscientiousness*

| Study                        | <i>r</i>   |             |             |             |           |           |           | <i>N</i> |
|------------------------------|------------|-------------|-------------|-------------|-----------|-----------|-----------|----------|
|                              | Age -<br>C | Age -<br>WD | Age -<br>ID | Age -<br>OD | C -<br>WD | C -<br>ID | C -<br>OD |          |
| Alias et al. (2013)          | -.01       | -.02        | -.03        | .00         | -.26      | -.13      | -.36      | 429      |
| Bowling (2010)               | .17        | ---         | ---         | -.25        | ---       | ---       | -.35      | 209      |
| Bowling et al. (2010)        | .20        | ---         | ---         | -.24        | ---       | ---       | -.35      | 227      |
| Bowling et al. (2011)<br>S1  | .09        | -.03        | -.02        | -.04        | -.43      | -.37      | -.48      | 193      |
| Bowling et al. (2011)<br>S2  | .17        | -.23        | -.21        | -.24        | -.31      | -.28      | -.33      | 220      |
| Dahling et al. (2012)        | -.01       | -.03        | .00         | -.03        | -.29      | -.22      | -.30      | 211      |
| Ferris et al. (2009)         | .13        | ---         | ---         | -.17        | ---       | ---       | -.25      | 230      |
| Iliescu et al. (2015) S2     | -.02       | -.02        | ---         | ---         | -.25      | ---       | ---       | 245      |
| Jensen & Patel (2011)        | .01        | .03         | .02         | .04         | -.27      | -.41      | -.12      | 517      |
| Kluemper et al. (2011)<br>S1 | .01        | -.17        | -.11        | -.22        | -.06      | -.08      | -.04      | 220      |
| Kluemper et al. (2011)<br>S2 | -.05       | ---         | -.08        | ---         | ---       | .29       | ---       | 100      |
| Liao et al. (2004)           | .27        | -.19        | -.20        | -.17        | -.38      | -.38      | -.38      | 286      |
| Mawritz et al. (2014)        | .05        | ---         | ---         | -.04        | ---       | ---       | -.39      | 221      |
| Penney et al. (2011)         | .05        | -.15        | ---         | ---         | -.09      | ---       | ---       | 239      |
| Sackett et al. (2006)        | .15        | -.08        | -.03        | -.09        | -.41      | -.22      | -.42      | 805      |
| Semmer et al. (2010)<br>S2   | .25        | -.25        | -.14        | -.36        | -.34      | -.25      | -.42      | 205      |
| Spector & Zhou (2014)        | .12        | -.03        | -.03        | -.02        | -.33      | -.28      | -.37      | 915      |
| Sulea et al. (2012)          | .19        | -.02        | ---         | ---         | -.22      | ---       | ---       | 258      |
| Yang & Diefendorff<br>(2009) | .23        | -.11        | -.04        | -.17        | -.22      | -.20      | -.15      | 231      |

*Note.* C = Conscientiousness, WD = Workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

Table 4  
*Studies, Effect Sizes, and Codings included in the MASEM for Agreeableness*

| Study                        | <i>r</i>   |             |             |             |           |           |           | <i>N</i> |
|------------------------------|------------|-------------|-------------|-------------|-----------|-----------|-----------|----------|
|                              | Age -<br>A | Age -<br>WD | Age -<br>ID | Age -<br>OD | A -<br>WD | A -<br>ID | A -<br>OD |          |
| Alias et al. (2013)          | .06        | -.02        | -.03        | .00         | -.38      | -.35      | -.40      | 429      |
| Bowling et al. (2011)<br>S1  | .03        | -.03        | -.02        | -.24        | -.35      | -.36      | -.34      | 193      |
| Bowling et al. (2011)<br>S2  | .10        | -.23        | -.21        | -.24        | -.31      | -.32      | -.34      | 220      |
| Ferris et al. (2009)         | .05        | ---         | ---         | -.17        | ---       | ---       | -.27      | 230      |
| Iliescu et al. (2015) S2     | .08        | -.02        | ---         | ---         | -.09      | ---       | ---       | 245      |
| Jensen & Patel (2011)        | .02        | .03         | .02         | .04         | -.27      | -.23      | -.31      | 517      |
| Kluemper et al. (2011)<br>S1 | .02        | -.17        | -.11        | -.22        | .05       | .05       | .05       | 220      |
| Kluemper et al. (2011)<br>S2 | -.13       | ---         | -.08        | ---         | ---       | .27       | ---       | 100      |
| Liao et al. (2004)           | .05        | -.19        | -.20        | -.17        | -.35      | -.40      | -.30      | 286      |
| Sackett et al. (2006)        | .14        | -.08        | -.03        | -.09        | -.30      | -.33      | -.21      | 805      |
| Semmer et al. (2010)<br>S2   | .06        | -.25        | -.14        | -.36        | -.32      | -.42      | -.22      | 205      |
| Spector & Zhou (2014)        | .10        | -.03        | -.03        | -.02        | -.36      | -.40      | -.32      | 915      |
| Yang & Diefendorff<br>(2009) | .20        | -.11        | -.04        | -.17        | -.22      | -.24      | -.19      | 231      |

*Note.* A = Agreeableness, WD = Workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

Table 5  
*Studies, Effect Sizes, and Codings included in the MASEM for Neuroticism*

| Study                        | <i>r</i>   |             |             |             |           |           |           | <i>N</i> |
|------------------------------|------------|-------------|-------------|-------------|-----------|-----------|-----------|----------|
|                              | Age -<br>N | Age -<br>WD | Age -<br>ID | Age -<br>OD | N -<br>WD | N -<br>ID | N -<br>OD |          |
| Ferris et al. (2009)         | -.16       | ---         | ---         | -.17        | ---       | ---       | .08       | 230      |
| Iliescu et al. (2015) S2     | -.05       | -.02        | ---         | ---         | .20       | ---       | ---       | 245      |
| Jensen & Patel (2011)        | -.03       | -.03        | .02         | .04         | .22       | .21       | .22       | 517      |
| Kluemper et al. (2011)<br>S1 | -.07       | -.17        | -.11        | -.22        | .02       | .13       | -.10      | 220      |
| Kluemper et al. (2011)<br>S2 | .08        | ---         | -.08        | ---         | ---       | -.19      | ---       | 100      |
| Liao et al. (2004)           | -.15       | -.19        | -.20        | -.17        | .19       | .17       | .20       | 286      |
| Penney et al. (2011)         | -.20       | -.15        | ---         | ---         | .22       | ---       | ---       | 239      |
| Sackett et al. (2006)        | -.12       | -.08        | -.03        | -.09        | .32       | .29       | .26       | 805      |
| Spector & Zhou (2014)        | .00        | -.03        | -.03        | -.02        | .19       | .15       | .22       | 915      |

*Note.* N = Neuroticism, WD = Workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

Table 6  
*Studies, Effect Sizes, and Codings included in the MASEM for Extraversion.*

| Study                        | <i>r</i>   |             |             |             |           |           |           | <i>N</i> |
|------------------------------|------------|-------------|-------------|-------------|-----------|-----------|-----------|----------|
|                              | Age -<br>E | Age -<br>WD | Age -<br>ID | Age -<br>OD | E -<br>WD | E -<br>ID | E -<br>OD |          |
| Iliescu et al. (2015) S2     | -.07       | -.02        | ---         | ---         | -.28      | ---       | ---       | 245      |
| Jensen & Patel (2011)        | .06        | .03         | .02         | .04         | -.09      | -.08      | -.09      | 517      |
| Kluemper et al. (2011)<br>S1 | -.12       | -.17        | -.11        | -.22        | .06       | .02       | .09       | 220      |
| Kluemper et al. (2011)<br>S2 | -.14       | ---         | -.08        | ---         | ---       | .30       | ---       | 100      |
| Liao et al. (2004)           | -.13       | -.19        | -.20        | -.17        | .01       | .06       | -.05      | 286      |
| Sackett et al. (2006)        | -.12       | -.08        | -.03        | -.09        | -.11      | -.02      | -.15      | 805      |

*Note.* E = Extraversion, WD = Workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

Table 7  
*Studies, Effect Sizes, and Codings included in the MASEM for Openness to Experience*

| Study                        | <i>r</i>   |             |             |             |           |           |           | <i>N</i> |
|------------------------------|------------|-------------|-------------|-------------|-----------|-----------|-----------|----------|
|                              | Age -<br>O | Age -<br>WD | Age -<br>ID | Age -<br>OD | O -<br>WD | O -<br>ID | O -<br>OD |          |
| Iliescu et al. (2015) S2     | .00        | -.02        | ---         | ---         | .10       | ---       | ---       | 245      |
| Jensen & Patel (2011)        | .05        | .03         | .02         | .04         | -.08      | -.07      | -.09      | 517      |
| Kluemper et al. (2011)<br>S1 | .12        | -.17        | -.11        | -.22        | .17       | .22       | .11       | 220      |
| Kluemper et al. (2011)<br>S2 | -.15       | ---         | -.08        | ---         | ---       | .02       | ---       | 100      |
| Liao et al. (2004)           | -.18       | -.19        | -.20        | -.17        | -.05      | .02       | -.12      | 286      |
| Sackett et al. (2006)        | -.10       | -.08        | -.03        | -.09        | -.06      | -.06      | -.04      | 805      |

*Note.* O = Openness to Experience, WD = Workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

## Results

### Relationship Between Age and Workplace Deviance

A small negative but significant correlation between age and workplace deviance was found,  $r = -.088$ , 95% confidence interval (CI)  $[-.107, -.069]$ ,  $p < .001$ ,  $k = 135$ . There was high variability in the effect size distribution ( $I^2 = 81.137$ ,  $Q = 711.751$ ,  $df = 134$ ,  $p < .001$ ), which justifies the use of a random-effects model. The above effect size is based on self-ratings if a study included both self- and other-ratings of workplace deviance. However, the overall weighted effect size does not change substantially when including other-ratings instead:  $r = -.086$ , 95% CI  $[-.105, -.066]$ ,  $p < .001$ ,  $k = 135$ . Hence, we perform all following analyses using self-ratings when both self- and other-ratings were included in a study, in order to increase consistency between studies.

### **Publication Bias and Sensitivity Analysis**

Study effect sizes and precision did not differ significantly according to Begg and Mazumdar's (1994) rank correlation ( $p = .119$ ) and Egger's regression intercept ( $p = .077$ ; Egger et al., 1997). Overall, we can conclude that it is very unlikely that our results were influenced by publication bias. The cumulative analysis showed that the mean weighted  $r$  did not change significantly as effect sizes were added one at a time from 1990 to 2016. The overall mean weighted effect size was also not strongly influenced by one individual effect size as indicated by the one-study removed analysis, because the overall effect size only differed slightly ( $r$  between  $-0.086$  and  $-0.091$ ).

### **Categorical Moderator Analyses**

We assessed whether the magnitude of effect sizes was moderated by the form of workplace deviance, but no significant difference emerged,  $Q(2) = 4.510$ ,  $p = .105$ . Organizational deviance had the largest correlation with age, followed by interpersonal deviance and overall workplace deviance (see Table 8 for results of all categorical moderator analyses). Comparing only interpersonal with organizational workplace deviance did not result in a statistically significant difference either,  $Q(1) = 1.692$ ,  $p = .193$ .

We also examined if the overall weighted effect size was moderated by the questionnaire used to assess workplace deviance. To be able to draw valid comparisons, we only compared the three most commonly used questionnaires with each other (Bennett & Robinson, 2000; Aquino et al., 1999; Spector et al., 2006). The correlation between age and workplace deviance was significantly moderated by the workplace deviance questionnaire used in the respective studies,  $Q(2) = 7.662$ ,  $p = .022$ . Studies using Bennett and Robinson's (2000) questionnaire showed the largest effect size ( $r = -.123$ ), while studies using Aquino et al.'s (1999,  $r = -.040$ ) and Spector et al.'s (2006,  $r = -.061$ ) found smaller average effect sizes. These results were similar when examining interpersonal or organizational workplace deviance separately. For organizational workplace deviance, studies using Bennett and Robinson's (2000) questionnaire showed the largest effect size ( $r = -.132$ ,  $k = 45$ ), followed by Spector and colleagues' questionnaire (2006,  $r = -.108$ ,  $k = 4$ ), and subsequently by Aquino et al.'s (1999,  $r = -.031$ ,  $k = 12$ ). This difference in effect sizes was significant,  $Q(2) = 8.975$ ,  $p = .011$ . For interpersonal workplace deviance, a similar pattern in overall weighted effect sizes emerged: Bennett and Robinson (2000):  $r = -.116$ ,  $k = 33$ ; Aquino et al. (1999):  $r = -.115$ ,  $k = 4$ ; Spector et al. (2006):  $r = -.060$ ,  $k = 4$ , but this difference was non-significant,  $Q(2) = 1.036$ ,  $p = .596$ .

Table 8  
*Results of the Categorical Moderator Analyses*

|                     | Subgroups                    | <i>k</i> | <i>N</i> | Mean<br>weighted <i>r</i> | <i>CC</i> <sub>LL</sub> | <i>CC</i> <sub>UL</sub> | <i>p</i> <sub>two-tailed</sub> |
|---------------------|------------------------------|----------|----------|---------------------------|-------------------------|-------------------------|--------------------------------|
| WD form             | WD                           | 49       | 12,009   | -.070                     | -.104                   | -.035                   | .000                           |
|                     | ID                           | 66       | 22,027   | -.090                     | -.118                   | -.062                   | .000                           |
|                     | OD                           | 77       | 25,371   | -.116                     | -.142                   | -.089                   | .000                           |
| WD<br>questionnaire | Aquino et al. (1999)         | 15       | 3,496    | -.043                     | -.094                   | .009                    | .104                           |
|                     | Bennett &<br>Robinson (2000) | 65       | 28,673   | -.119                     | -.145                   | -.092                   | .000                           |
|                     | Spector et al.<br>(2006)     | 12       | 6,238    | -.063                     | -.136                   | .012                    | .098                           |
| Rater               | Self                         | 96       | 46,200   | -.103                     | -.127                   | -.080                   | .000                           |
|                     | Other                        | 39       | 10,428   | -.030                     | -.062                   | .001                    | .056                           |
|                     | Company Records              | 3        | 4,126    | -.078                     | -.108                   | -.048                   | .000                           |

*Note.* Abbreviations: ID = Interpersonal workplace deviance, OD = organizational workplace deviance, WD = overall workplace deviance; *k* = cumulative number of studies; *N* = cumulative sample size; mean weighted *r* = sample size weighted correlation; *CC*<sub>LL</sub> and *CC*<sub>UL</sub> = lower and upper limit of the 95% confidence interval for *r*

The source of workplace deviance ratings significantly moderated the relationship between age and workplace deviance,  $Q(2) = 13.406, p < .01$ . Self-ratings ( $r = -.113$ ) showed a larger negative correlation with age than other-ratings ( $r = -.032$ ) or official company records ( $r = -.078$ ). The difference in effect sizes is specifically apparent when comparing only self- and other-ratings,  $Q(1) = 13.400, p < .001$ . This difference in effect sizes between self- and other-ratings was significant for organizational workplace deviance (self:  $r = -.138, k = 56$ ; other:  $r = -.049, k = 22$ ;  $Q(1) = 10.476, p < .001$ ) but not for interpersonal workplace deviance (self:  $r = -.094, k = 54$ ; other:  $r = -.055, k = 13$ ;  $Q(1) = 1.763, p = .184$ ).

Lastly, we tried to replicate results from Ng and Feldman (2008) who showed that the relationship between age and workplace deviance follows a negative, concave slope. In their meta-analysis based on a small number of studies, they created three age groups (less than 25 years; 25-39 years old; older than 40) based on the average age of the sample, and found that the effect size became more negative with increasing average age of the sample ( $r = -.01$ ;  $r = -.12$ ;  $r = -.17$ , respectively). In the current meta-analysis, we could not replicate these results. We found that the effect size is less negative for studies in the youngest average age category (for the same average age groups:  $r = -.06, r = -.10, r = -.09$ , respectively). This difference in effect sizes was non-significant,  $Q(2) = 4.926, p = .085$ .

### Continuous Meta-Regressions

A univariate meta-regression showed that the overall weighted effect size distribution was not dependent on the average *percentage of females employees* in each study ( $k = 132, \beta =$

-0.097,  $p = .128$ ; see Table 9). The *pension coverage* in the country in which data was collected significantly moderated the relationship between age and workplace deviance ( $k = 118$ ,  $\beta = -0.002$ ,  $p = .001$ ), such that the relationship was more negative in countries with higher pension coverage. Lastly, the effect size distribution was significantly dependent on *social connections* of older individuals ( $k = 118$ ,  $\beta = -0.004$ ,  $p = .045$ ).

Table 9

*Results of the Continuous Meta-Regressions*

| Predictor          | $k$ | Slope   | $R^2$ | Slope $p_{\text{two-tailed}}$ |
|--------------------|-----|---------|-------|-------------------------------|
| % Female           | 132 | -0.0967 | 0.00  | .128                          |
| Pension Coverage   | 118 | -0.0015 | 0.10  | .001                          |
| Social Connections | 118 | -0.0041 | 0.01  | .045                          |

Note.  $k$  = cumulative number of studies.

**MASEM Test of Mediations**

Table 10 shows the results of the separate meta-analyses conducted in the first stage of the two-stage MASEM. The overall weighted effect sizes found in this smaller subset of studies ( $k = 4 - 20$ ) resemble those found in the overall age-workplace deviance meta-analysis ( $k = 135$ ) and in other meta-analyses of personality and workplace deviance (Berry et al., 2012, 2007; Salgado, 2002). Negative affect correlates moderately negatively with workplace deviance ( $r = .274$  to  $.290$ ), and only the subset of studies measuring negative affect finds slightly larger effect sizes for the age-workplace deviance relationships ( $r = -.142$  to  $-.162$ ).

Table 11 shows the results of the meta-analytic mediations used to test Hypotheses 2 and 3. The chi-square statistic for these mediation models is always 0 and the goodness-of-fit indices for structural equation models do not apply, because all mediation models were just identified (Cheung, 2015). As hypothesized, negative affect, Conscientiousness, Agreeableness, and Neuroticism all partially or fully mediate the relationship between age and workplace deviance. Only Extraversion and Openness to Experience do not mediate the relationship between age and overall, interpersonal, or organizational workplace deviance (see Table 11). When testing the three significant personality mediators (i.e., Conscientiousness, agreeableness, Neuroticism) in one model ( $k = 5$ ,  $N = 2073$ ), all three indirect effects remain significant. The total effect of age on workplace deviance then is  $-.078$  (95% CI:  $-.142$ ,  $-.014$ ), while the direct effect when adding the three mediators to the model becomes non-significant,  $-.017$  (95% CI:  $-.086$ ,  $.053$ ). All three indirect effects are statistically significant; Conscientiousness:  $-.034$  (95% CI:  $-.064$ ,  $-.010$ ), Agreeableness:  $-.015$  (95% CI:  $-.031$ ,  $-.004$ ), and Neuroticism:  $-.017$  (95% CI:  $-.029$ ,  $-.008$ ). This indicates that the relationship between age

and workplace deviance is fully mediated by Conscientiousness, Agreeableness, and Neuroticism, but that the effect for Conscientiousness is strongest.

Table 10

*Meta-Analytic Results used to Test the Mediation Hypotheses.*

|                                     | <i>k</i> | <i>N</i> | <i>r</i> | CI <sub>LL</sub> | CI <sub>UL</sub> | <i>p</i> | <i>I</i> <sup>2</sup> |
|-------------------------------------|----------|----------|----------|------------------|------------------|----------|-----------------------|
| <b>Age – Negative Affect – WD</b>   |          |          |          |                  |                  |          |                       |
| Age – NA                            | 20       | 7144     | -.114    | -.150            | -.077            | <.001    | .559                  |
| Age – WD                            | 20       | 7144     | -.142    | -.197            | -.088            | <.001    | .816                  |
| NA – WD                             | 20       | 7144     | .290     | .218             | .362             | <.001    | .917                  |
| <b>Age – Negative Affect – ID</b>   |          |          |          |                  |                  |          |                       |
| Age – NA                            | 17       | 6245     | -.119    | -.162            | -.076            | <.001    | .640                  |
| Age – ID                            | 17       | 6245     | -.155    | -.191            | -.118            | <.001    | .495                  |
| NA – ID                             | 17       | 6245     | .284     | .208             | .360             | <.001    | .912                  |
| <b>Age – Negative Affect – OD</b>   |          |          |          |                  |                  |          |                       |
| Age – NA                            | 14       | 5725     | -.109    | -.152            | -.066            | <.001    | .604                  |
| Age – OD                            | 14       | 5725     | -.162    | -.221            | -.102            | <.001    | .807                  |
| NA – OD                             | 14       | 5725     | .274     | .190             | .359             | <.001    | .920                  |
| <b>Age – Conscientiousness – WD</b> |          |          |          |                  |                  |          |                       |
| Age – C                             | 14       | 4974     | .108     | .062             | .155             | <.001    | .622                  |
| Age – WD                            | 14       | 4974     | -.082    | -.122            | -.041            | <.001    | .486                  |
| C – WD                              | 14       | 4974     | -.275    | -.326            | -.041            | <.001    | .738                  |
| <b>Age – Conscientiousness – ID</b> |          |          |          |                  |                  |          |                       |
| Age – C                             | 12       | 4332     | .107     | .056             | .158             | <.001    | .634                  |
| Age – ID                            | 12       | 4332     | -.058    | -.095            | -.020            | <.01     | .243                  |
| C – ID                              | 12       | 4332     | -.217    | -.305            | -.020            | <.001    | .895                  |
| <b>Age – Conscientiousness – OD</b> |          |          |          |                  |                  |          |                       |
| Age – C                             | 15       | 5119     | .121     | .079             | .163             | <.001    | .559                  |
| Age – OD                            | 15       | 5119     | -.127    | -.180            | -.073            | <.001    | .730                  |
| C – OD                              | 15       | 5119     | -.315    | -.374            | -.257            | <.001    | .816                  |
| <b>Age – Agreeableness – WD</b>     |          |          |          |                  |                  |          |                       |
| Age – A                             | 11       | 4266     | .086     | .054             | .119             | <.001    | .046                  |
| Age – WD                            | 11       | 4266     | -.092    | -.145            | -.039            | <.001    | .652                  |
| A – WD                              | 11       | 4266     | -.272    | -.342            | -.203            | <.001    | .833                  |
| <b>Age – Agreeableness – ID</b>     |          |          |          |                  |                  |          |                       |
| Age – A                             | 11       | 4021     | .074     | .034             | .115             | <.001    | .279                  |
| Age – ID                            | 11       | 4021     | -.062    | -.107            | -.018            | <.01     | .421                  |
| A – ID                              | 11       | 4021     | -.259    | -.371            | -.147            | <.001    | .935                  |
| <b>Age – Agreeableness – OD</b>     |          |          |          |                  |                  |          |                       |
| Age – A                             | 11       | 4251     | .087     | .055             | .119             | <.001    | .029                  |
| Age – OD                            | 11       | 4251     | -.128    | -.195            | -.061            | <.001    | .793                  |
| A – OD                              | 11       | 4251     | -.266    | -.328            | -.203            | <.001    | .789                  |
| <b>Age – Neuroticism – WD</b>       |          |          |          |                  |                  |          |                       |
| Age – N                             | 7        | 3227     | -.082    | -.129            | -.034            | <.001    | .410                  |
| Age – WD                            | 7        | 3227     | -.073    | -.124            | -.021            | <.01     | .486                  |
| N – WD                              | 7        | 3227     | .198     | .137             | .259             | <.001    | .663                  |
| <b>Age – Neuroticism – ID</b>       |          |          |          |                  |                  |          |                       |
| Age – N                             | 6        | 2843     | -.060    | -.110            | -.010            | <.05     | .386                  |
| Age – ID                            | 6        | 2843     | -.052    | -.107            | .002             | >.05     | .422                  |
| N – ID                              | 6        | 2843     | .146     | .048             | .245             | <.01     | .842                  |



|                                |   |      |       |       |       |      |      |
|--------------------------------|---|------|-------|-------|-------|------|------|
| <b>Age – Neuroticism – OD</b>  |   |      |       |       |       |      |      |
| Age – N                        | 6 | 2873 | -.082 | -.132 | -.032 | <.01 | .402 |
| Age – OD                       | 6 | 2873 | -.094 | -.164 | -.024 | <.01 | .697 |
| N – OD                         | 6 | 2873 | .152  | .057  | .247  | <.01 | .850 |
| <b>Age – Extraversion – WD</b> |   |      |       |       |       |      |      |
| Age – E                        | 5 | 2073 | -.068 | -.137 | .001  | >.05 | .580 |
| Age – WD                       | 5 | 2073 | -.076 | -.146 | -.007 | <.05 | .584 |
| E – WD                         | 5 | 2073 | -.091 | -.180 | -.003 | <.05 | .748 |
| <b>Age – Extraversion – ID</b> |   |      |       |       |       |      |      |
| Age – E                        | 5 | 1928 | -.078 | -.154 | -.002 | <.05 | .598 |
| Age – ID                       | 5 | 1928 | -.066 | -.139 | .007  | >.05 | .556 |
| E – ID                         | 5 | 1928 | .030  | -.067 | .127  | >.05 | .736 |
| <b>Age – Extraversion – OD</b> |   |      |       |       |       |      |      |
| Age – E                        | 4 | 1828 | -.069 | -.151 | .014  | >.05 | .663 |
| Age – OD                       | 4 | 1828 | -.099 | -.194 | -.005 | <.05 | .742 |
| E – OD                         | 4 | 1828 | -.071 | -.151 | .009  | >.05 | .606 |
| <b>Age – Openness – WD</b>     |   |      |       |       |       |      |      |
| Age – O                        | 5 | 2073 | -.023 | -.121 | .074  | >.05 | .787 |
| Age – WD                       | 5 | 2073 | -.083 | -.158 | -.008 | <.05 | .644 |
| O – WD                         | 5 | 2073 | .004  | -.084 | .093  | >.05 | .740 |
| <b>Age – Openness – ID</b>     |   |      |       |       |       |      |      |
| Age – O                        | 5 | 1928 | -.044 | -.148 | .059  | >.05 | .787 |
| Age – ID                       | 5 | 1928 | -.075 | -.150 | .001  | >.05 | .581 |
| O – ID                         | 5 | 1928 | .015  | -.081 | .112  | >.05 | .752 |
| <b>Age – Openness – OD</b>     |   |      |       |       |       |      |      |
| Age – O                        | 4 | 1828 | -.025 | -.139 | .089  | >.05 | .824 |
| Age – OD                       | 4 | 1828 | -.102 | -.199 | -.005 | <.05 | .759 |
| O – OD                         | 4 | 1828 | .014  | -.077 | .106  | >.05 | .714 |

*Note.*  $k$  = cumulative number of studies;  $N$  = cumulative sample size; mean weighted  $r$  = sample size weighted correlation;  $CC_{LL}$  and  $CC_{UL}$  = lower and upper limit of the 95% confidence interval for  $r$ ; NA = Negative affect; C = Conscientiousness, A = Agreeableness, N = Neuroticism, E = Extraversion, O = Openness to Experience; WD = workplace deviance, ID = interpersonal workplace deviance, OD = organizational workplace deviance.

Table 11  
*Total, Indirect, and Direct Effects for all Six Tested Meta-Analytic Mediation Models*

|                               | k  | N    | Total Effect          | Indirect Effect       | Direct Effect         | Mediation |
|-------------------------------|----|------|-----------------------|-----------------------|-----------------------|-----------|
| <b>Negative Affect</b>        |    |      |                       |                       |                       |           |
| Age – WD                      | 20 | 7144 | -.142 (-.197, -.088)* | -.032 (-.046, -.020)* | -.111 (-.166, -.055)* | Partial   |
| Age – ID                      | 17 | 6245 | -.155 (-.191, -.118)* | -.032 (-.048, -.019)* | -.122 (-.161, -.084)* | Partial   |
| Age – OD                      | 14 | 5725 | -.162 (-.221, -.102)* | -.028 (-.045, -.016)* | -.134 (-.194, -.073)* | Partial   |
| <b>Conscientiousness</b>      |    |      |                       |                       |                       |           |
| Age – WD                      | 14 | 4974 | -.082 (-.122, -.041)* | -.029 (-.044, -.016)* | -.053 (-.094, -.011)* | Partial   |
| Age – ID                      | 12 | 4332 | -.058 (-.095, -.020)* | -.023 (-.040, -.011)* | -.035 (-.074, .005)   | Full      |
| Age – OD                      | 15 | 5119 | -.127 (-.180, -.073)  | -.037 (-.053, -.023)* | -.090 (-.144, -.035)* | Partial   |
| <b>Agreeableness</b>          |    |      |                       |                       |                       |           |
| Age – WD                      | 11 | 4266 | -.092 (-.145, -.039)* | -.023 (-.035, -.011)* | -.069 (-.122, -.017)* | Partial   |
| Age – ID                      | 11 | 4021 | -.062 (-.107, -.018)* | -.019 (-.035, -.008)* | -.043 (-.088, .002)   | Full      |
| Age – OD                      | 11 | 4251 | -.128 (-.195, .061)   | -.022 (-.033, -.013)* | -.105 (-.173, -.038)* | Partial   |
| <b>Neuroticism</b>            |    |      |                       |                       |                       |           |
| Age – WD                      | 7  | 3227 | -.073 (-.124, -.021)* | -.016 (-.028, -.006)* | -.057 (-.109, -.005)* | Partial   |
| Age – ID                      | 6  | 2843 | -.052 (-.107, .002)   | -.009 (-.020, -.001)* | -.044 (-.098, .011)   | Full      |
| Age – OD                      | 6  | 2873 | -.094 (-.164, -.024)* | -.012 (-.025, -.001)* | -.082 (-.153, -.012)* | Partial   |
| <b>Extraversion</b>           |    |      |                       |                       |                       |           |
| Age – WD                      | 5  | 2073 | -.076 (-.146, -.007)* | .007 (-.000, .019)    | -.083 (-.153, -.013)* | No        |
| Age – ID                      | 5  | 1928 | -.066 (-.139, .007)   | -.002 (-.013, .007)   | -.064 (-.137, .009)   | No        |
| Age – OD                      | 4  | 1828 | -.099 (-.194, -.005)* | .005 (-.001, .018)    | -.105 (-.199, -.011)* | No        |
| <b>Openness to Experience</b> |    |      |                       |                       |                       |           |
| Age – WD                      | 5  | 2073 | -.083 (-.158, -.008)* | -.000 (-.006, .006)   | -.083 (-.158, -.007)* | No        |
| Age – ID                      | 5  | 1928 | -.075 (-.150, .001)   | -.001 (-.009, .007)   | -.074 (-.150, .002)   | No        |
| Age – OD                      | 4  | 1828 | -.102 (-.199, -.005)* | -.000 (-.008, .006)   | -.102 (-.199, -.004)* | No        |

Note. *k* = cumulative number of studies; *N* = cumulative sample size; WD = workplace deviance; ID = interpersonal workplace deviance, OD = organizational workplace deviance; Values in brackets are 95% confidence intervals, \*  $p < .05$ .

### Discussion

In the current meta-analysis, which is based on more than 100 studies, we find a small but statistically significant negative correlation between age and workplace deviance. Our findings add to the literature in a number of ways. By including a much large number of studies than previous meta-analyses (Berry et al., 2012, 2007; Ng & Feldman, 2008) we can draw firmer conclusions about the relationship between age and workplace deviance. In addition, we tested two explanatory mechanisms based on the *socio-emotional selectivity theory* (Carstensen, 1992) and the *neo-socioanalytical model of personality change* (Roberts & Wood, 2006). Furthermore, we were able to conduct a finer-grained investigation of important moderating factors, such as a country's pension coverage or self- versus other-reports of workplace deviance. Below, we will discuss our findings and their implications in more detail.

Socioemotional selectivity theory (Carstensen, 1992) states that as individuals age, they self-select into emotionally meaningful and positive experiences, therefore experiencing less negative affect. For example, older, compared to younger, individuals focus more on goals related to generativity and emotions (Penningroth & Scott, 2012), and show less confrontational behavior when having disagreements with others in the workplace (Davis, Kraus, & Capobianco, 2009). More importantly, older individuals have been found to appraise and respond to emotional events differently than younger individuals, and to regulate their emotional reaction to those events better (Scheibe & Zacher, 2013). These age differences in emotional experiences at work, their behavioral consequences, and especially the reduced levels of negative affect are one of the explanatory mechanisms for our finding that levels of workplace deviance decrease with age. Individuals experience less negative affect with increasing age, which is, in turn, associated with reduced levels of workplace deviance. An additional and/or alternative explanation is based on the neo-socioanalytical model of personality change, which posits that personality changes across the adult lifespan (Roberts & Wood, 2006). Personality characteristics that change over time (Agreeableness, Conscientiousness, and Neuroticism; Roberts & Mroczek, 2008; Roberts, Walton, & Viechtbauer, 2006) have all been found to be negatively related to levels of workplace deviance (Berry et al., 2007). The results of the current meta-analysis confirm the hypothesis that the Big Five personality domain scales Conscientiousness, Agreeableness, and Neuroticism mediate the relationship between age and workplace deviance. In addition to the mediating effects of negative affect and personality, cohort effects might partly drive the effect of age on workplace deviance. Individuals who share some temporal experience, such as a similar year of birth,

could behave differently at work due to the different experiences they have had compared to those born in a later time period (i.e., cohort effect).

### **Practical, Social and Societal Implications**

Various studies have shown that older individuals are disadvantaged in selection and employment decisions (e.g., Ahmed et al., 2012; Bendick et al., 1997; Duncan & Loretto, 2004), which is unjustified from a strictly performance-based view (leaving ethical and moral views aside; Ng & Feldman, 2008). In combination with the current findings, this suggests that organizations that hire and promote a higher percentage of older individuals might reap competitive benefits by observing lower levels of workplace deviance among their employees than those that do not. Considering the costly nature of workplace deviance, organizations should take further steps to reduce age discrimination in employment decisions. For example, Finkelstein, Burke, and Raju (1995) suggested that highlighting job-relevant information and deemphasizing less important characteristics, such as age, have been shown to reduce age biases in hiring decisions

The percentage of pension coverage in a given country moderated the relationship between age and workplace deviance. Examining the slope of the meta-regression, it becomes apparent that there was no significant relationship between age and workplace deviance in countries that did not have a good pension coverage. In countries where a high percentage of individuals received a pension after retirement, the relationship between age and workplace deviance became significantly more negative. Previous research (e.g., Reisel, Probst, Chia, Maloles, & König, 2010; Tian, Zhang, & Zou, 2014) has repeatedly shown that job security works as a protective factor against workplace deviance. Our results now suggest that, especially for older employees who worry more about financial security after retirement than younger employees do, a good pension coverage is associated with lower levels of workplace deviance. Thus, countries and organizations will be more likely to reap the benefits of an age-related decrease in workplace deviance if they implement a good pension system with coverage for all citizens or employees.

In addition to the buffering effect of financial security after retirement, we found a significant moderating effect for the number of social connections individuals have in middle to old age in a given country. In countries in which individuals aged 50 and older had a relatively lower number of significant social connections, age was not significantly correlated with workplace deviance, whereas in countries in which those individuals had a larger number of social connections, older employees were less likely to behave deviantly at work. This suggests that social connections in middle to old age might be another explanatory factor for

the age-workplace deviance relationship, and it extends findings suggesting that deviant workplace behavior (i.e., ethical rule breaking) can be predicted from a social bonding perspective according to which individuals with low attachment and involvement with their supervisors are more likely to break rules (Sims, 2002). Our findings show that in older employees, not just strong social ties at work, but possibly also a strong social environment comprising friends and family outside of work can protect against the occurrence of workplace deviance. Overall, these findings highlight the importance of social and financial security in preventing deviant workplace behaviors.

### **Methodological Implications**

We found evidence for a few significant moderators of the age-workplace deviance relationship which have important methodological implications for future studies of workplace deviance. The finding that older employees show lower levels of workplace deviance than younger employees was not qualified by a difference between interpersonal and organizational workplace deviance. At least when it comes to analyzing the relationship between age and workplace deviance, distinguishing between interpersonal and organizational workplace deviance seems redundant, which might question the viability of a two factor structure of workplace deviance. This is in accordance with at least one influential study that failed to replicate the proposed two-factor structure of interpersonal and organizational workplace deviance (Lee & Allen, 2002) and suggests that workplace deviance can be treated as one overall construct when its relationship with age is of interest.

We also examined whether the most common questionnaires used to assess workplace deviance moderated the relationship between age and workplace deviance. Compared to the questionnaires by Aquino and colleagues (1999) and Spector and colleagues (2006), the questionnaire developed by Bennett and Robinson (2000) showed the largest negative effect size. This indicates that the three most commonly used workplace deviance questionnaires are differently susceptible to age differences (at least when assessing organizational workplace deviance). One possibility is that the items in Bennett and Robinson's (2000) questionnaire are more sensitive to age-related changes in respondents, such as in personality or emotional perception. However, because these three questionnaires do not differ in their conceptual or overt approach to measuring workplace, further research is needed to explain their differing susceptibility to age differences in respondents.

A long debate has focused on the source of the rating of workplace deviance. It has been argued that self-reports of workplace deviance suffer from a self-enhancing bias, whereas other-reports might not validly assess the extent of workplace deviance due to the hidden nature of

these behaviors (Berry et al., 2007; Jones, 2009). A previous meta-analysis showed that self- and other-ratings are moderately correlated (Berry et al., 2012). In the current meta-analysis, self-ratings of workplace deviance showed a significantly stronger negative correlation with age than other-ratings did (this finding held for organizational workplace deviance, but not for interpersonal workplace deviance when examining these two forms of deviance separately). Given that other-ratings explain relatively little incremental variance over and above self-ratings of workplace deviance and that self-raters admit engaging in more deviant behaviors than what is captured by other-ratings (Berry et al., 2012), the current results suggest that self-ratings of workplace deviance might capture age-related changes that are associated with lower levels of workplace deviance more accurately. It might also be that younger employees are more willing to honestly self-report on their deviant behaviors than older employees. Future research should examine this issue in more detail and researchers studying workplace deviance in age-diverse samples should be attentive to these age-related differences and corroborate their findings with different questionnaires and both self- and other-reports.

We also examined whether the percentage of female employees in each study played a moderating role, but found no such effect. While Ng and colleagues (2016) found a significant gender difference in workplace deviance (a finding that was also moderated by age for self-ratings of interpersonal workplace deviance), our findings suggest that the relationship between age and workplace deviance was not qualified by an interaction with gender. This might indicate that age-related changes in levels of workplace deviance are not affected by gender.

### **Limitations and Future Research**

The current meta-analysis has some limitations. First, the studies included in this meta-analysis use a cross-sectional design that does not allow for an inference of causality. However, age is a constant demographic characteristic, rendering the use of it as a predictor of negative affect, personality, and subsequently workplace deviance reasonable. A similar limitation pertains to the tested mediations, which are all based on correlational data. However, given the vast amount of literature on both personality (Berry et al., 2012; Bolton et al., 2010; Hastings & O'Neill, 2009; O'Neill et al., 2011; Salgado, 2002) and negative affect (e.g., Aquino et al., 1999; Chen, Chen, & Liu, 2013; Lee & Allen, 2002b; Samnani, Salamon, & Singh, 2013) as predictors of workplace deviance, it is reasonable to assume that they determine workplace deviance. Second, the moderators *pension coverage* and *social connections* were based on country-level characteristics. It might be that those characteristics are not generalizable to the individual employees included in the studies. In addition to that, these country-level characteristics were measured in 2015, while the studies included in our meta-analysis were

conducted between 1990 and 2016. Unfortunately, these country-level data were not available for all years of publication. Thus, these results should be interpreted with caution until future studies have examined whether those country-level characteristics also moderate the relationship between age and workplace deviance on an individual level. Lastly, the analyses used to test the mediating effect of the personality domain scales Extraversion and Openness to Experience as well as the full mediation model with Conscientiousness, Agreeableness, and Neuroticism, are based on a small number of included studies ( $k = 4 - 5$ ) and should therefore be interpreted with caution. If possible, future research should investigate these mediating mechanisms with a larger number of included studies. Another limitation pertaining to this issue is that we would have liked to test one complete mediation model with all three significant personality mediators *and* negative affect to pit predictions based on the socio-emotional selectivity theory and the neo-socioanalytical model of personality change against each other. However, none of the studies included in this meta-analysis measured both personality and negative affect in the same sample. Future research should therefore investigate the extent to which age-related changes in negative affect or in personality (or in both) explain the relationship between age and workplace deviance.

### **Conclusion**

Age is negatively related to workplace deviance, and personality (i.e., Conscientiousness, Agreeableness, Neuroticism) and negative affect mediate this relationship. As such, these results demonstrate the underlying mechanisms for the negative relation between age and workplace deviance for the first time. As older workers are disadvantaged in employment and promotion decisions (e.g., Ahmed, Andersson, & Hammarstedt, 2012), despite having similar job performance levels as younger employees (Ng & Feldman, 2008), we hope that our findings could make organizations further aware of the unfair selection bias against older workers. In light of our findings, hiring and selecting older employees might even provide competitive benefits to organizations. This meta-analysis further provides valuable insights into the study of workplace deviance in age-diverse samples, because it highlights several important methodological and practical moderators of the relationship between age and workplace deviance.