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## RESEARCH ARTICLE



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# Employee green behavior: A meta-analysis

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## Abstract

Due to climate change, the need to protect biodiversity and reduce pollution, and governmental regulations, many organizations are aiming to become more environmentally sustainable. In this context, researchers and practitioners are increasingly interested in the construct of employee green behavior (EGB). EGB has been considered by numerous empirical studies over the last two decades and its associations with demographic characteristics, individual differences, work-related perceptions, and job attitudes. To systematically synthesize the rapidly growing literature on EGB, we conducted a meta-analysis ( $k = 135$  independent samples; total  $N = 47,442$  employees). Results showed positive associations between EGB and, for example, pro-environmental attitudes, corporate social responsibility, and green psychological climate. We further report the results of a meta-analytic path model based on the theory of planned behavior, which showed that pro-environmental attitude, norms, perceived behavioral control, and intentions positively predicted EGB.

## KEYWORDS

employee green behavior, organizational sustainability, pro-environmental behavior

## 1 | EMPLOYEE GREEN BEHAVIOR: A META-ANALYSIS

Employee green behavior (EGB), defined as “scalable actions and behaviors that employees engage in that are linked with and contribute to or detract from environmental sustainability” (Ones & Dilchert, 2012, p. 87), is an increasingly important construct in the study of organizational behavior (OB). Research shows that human behavior is linked to global problems such as pollution and climate change (IPCC, 2014) and, through promoting EGB, organizations can contribute to environmental protection and sustainability efforts. EGB is associated with, for example, organizational support (Manika et al., 2015), organizational identification (Gkorezis & Petridou, 2017), and green human resources management practices (Dumont et al., 2017). A broad definition of EGB as a compound job performance dimension (Campbell & Wiernik, 2015) has allowed for a large body of research to accrue over the past 20 years. EGB has been

considered in various disciplines in addition to OB, including environmental psychology (e.g., Paillé & Mejía-Morelos, 2014) and tourism (e.g., Tuan, 2018).

Yet, there remain a number of unanswered questions, as the evidence for EGB is scattered across multiple literatures, uses various theoretical approaches and associated variables, and is in need of systematic theoretical and empirical synthesis. First, although research in environmental psychology has shown that pro-environmental behavior is related to various individual difference characteristics (e.g., personality; e.g., Gifford & Nilsson, 2014), it is unclear how EGB is associated with established constructs in the OB literature, such as job attitudes (e.g., job satisfaction) and work-related perceptions (e.g., perceived supervisor support). Additionally, Several *qualitative* reviews of this literature exist (e.g., Francoeur et al., 2021; Norton et al., 2015; Yuriev et al., 2018); however, this literature lacks a *quantitative* synthesis and review. Second, pro-environmental behavior is widely researched outside the field of OB, but it is currently unclear

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what OB research can learn from other disciplines, particularly environmental psychology. For instance, the theory of planned behavior (TPB; Ajzen, 1991) is the most commonly adopted framework for explaining pro-environmental behavior (Yuriev et al., 2020), but it lacks cohesive integration into frameworks for understanding EGB that exist in the OB literature (e.g., Norton et al., 2015). Relatedly, the relative importance of various correlates of EGB (e.g., pro-environmental attitude, perceived norms) is unclear, which limits the development of evidence-based practical interventions. Third, considering that organizations operate within a broader context, we lack an understanding of whether country-specific indicators of environmental performance and culture may shape the relationship between EGB and its potential antecedents.

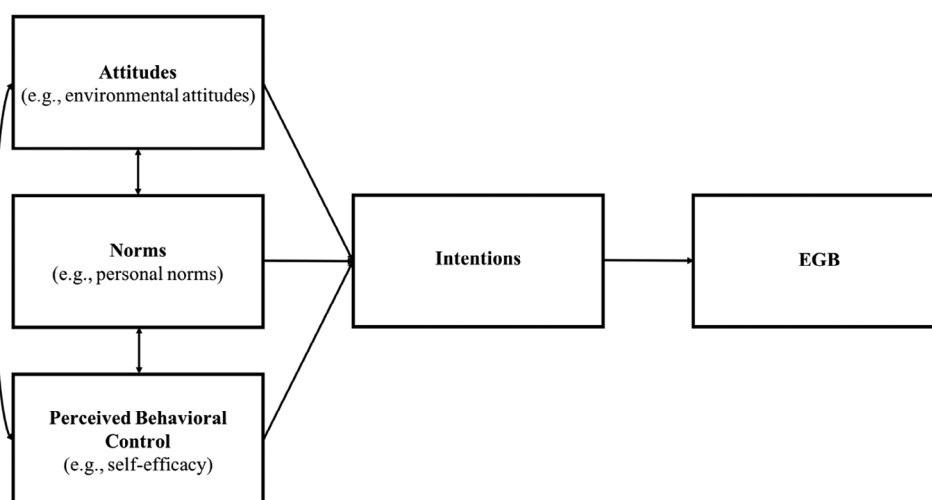
Accordingly, this article addresses three interrelated goals. The primary goal is to present the results of a comprehensive meta-analysis that synthesizes the literature on EGB and its relationships with various correlates (i.e., demographic characteristics, individual differences, work-related perceptions, job attitudes). The second goal is to use meta-analytic path modeling to test a model predicting EGB based on the TPB (Figure 1). This theory posits that behavior is determined by a combination of attitude, perceived norms, perceived behavioral control, and behavioral intentions, and it has been frequently invoked to explain EGB (e.g., Yuriev et al., 2020). However, TPB does not explain all correlate-EGB relationships, and there are several contextual factors that may moderate these links. Accordingly, our third goal is to consider several substantive moderators of the central attitude-EGB link postulated by TPB. Particularly, based on the idea that there is meaningful cross-national/cultural variation in the adoption of environmental policies and on theoretical propositions regarding the top-down influence of culture that manifests in national policy (e.g., Park et al., 2007), we evaluate the degree to which the nationality of each sample could systematically affect the strength of correlate-EGB relationships through various country-specific proxies.

In summary, we contribute to the literature on OB and the environment in three important ways. First, we report meta-analytic associations between EGB and a broad range of characteristics, including

demographics, individual differences, work-related perceptions, and job attitudes. This synthesis provides more accurate estimates of the true relationships among these constructs than primary studies, thus serving as a useful guide for future research and practice. Second, we meta-analytically test a TPB-based model of EGB, including key predictor variables that could be targeted in organizational interventions to enhance EGB (i.e., pro-environmental attitude, norms, perceived behavioral control). Finally, the investigation of contextual boundary conditions (i.e., country-level environmental performance, culture) of the relationship between pro-environmental attitude and EGB sheds light onto the question whether the individual-level associations addressed in our meta-analyses are similar or different across countries.

## 2 | EMPLOYEE GREEN BEHAVIOR: CONCEPTUALIZATIONS AND OPERATIONALIZATIONS

Organizational research has adopted various conceptual definitions and operationalizations over the past two decades. Indeed, reviews of EGB measurement have identified over 30 unique EGB scales (Francoeur et al., 2021; Ones et al., 2018). Table A in the Online Appendix summarizes popular EGB concepts, definitions, and example items from associated measures. The availability of a variety of EGB scales has created flexibility for research to consider specific behaviors (e.g., recycling, printing reduction, and energy saving behaviors; Manika et al., 2015), voluntary behaviors (e.g., Boiral & Paillé, 2012), task-related behaviors (e.g., Bissing-Olson et al., 2013), as well as behaviors that encourage, support, or promote organization-led initiatives for sustainability (e.g., Carmeli et al., 2017). On the contrary, Ciocirlan (2017) notes that EGBs do not necessarily serve a purpose to the larger organizational context, further broadening the EGB conceptualization. Emphasizing the voluntary nature of EGB, another popular conceptualization considers EGB as a form of organizational citizenship behavior (OCB), such that OCBs toward the environment



**FIGURE 1** A model of the theory of planned behavior and employee green behavior

(OCB-E) involve behaviors toward the benefit of the environment and exist outside the employees' recognition or compensation from the organization (Alt & Spitzack, 2016; Boiral, 2009). Reflecting the heterogeneity in conceptualizations, Ones and Dilchert (2012) consider EGB to include any behaviors that avoid environmental harm, conserve resources, contribute to working sustainably, influence others to behave sustainably, or take initiative to act sustainably. In our meta-analysis, we adopt this broad and inclusive approach to EGB.

### 3 | CORRELATES OF EMPLOYEE GREEN BEHAVIOR

#### 3.1 | Demographic characteristics

We first consider associations between key demographic characteristics and EGB, as demographic characteristics are potentially influential factors for organizational decisions to provide training targeting EGB (Klein et al., 2012). In particular, we explore how EGB is related to age, gender, education, and tenure. Considering age, another meta-analysis that focused on this specific association only found age to be positively associated with EGB, possibly due to increased concerns for future generations (i.e., generativity) among older workers (Wiernik et al., 2016). Consistently, we also expect a positive relationship between tenure and EGB. Regarding gender, previous research suggests that women engage in more environmentally friendly behavior than men (Zelezny et al., 2000), likely due to their heightened concern for the environment (Bord & O'Connor, 1997). Finally, research has found inconsistent relationships between green behavior and level of education, conditional upon the type of green behavior considered (D'Mello et al., 2011).

#### 3.2 | Individual differences

We expect EGB to be related to the Big Five personality characteristics (i.e., openness to experience, conscientiousness, extraversion, agreeableness, neuroticism), as well as moral reflexivity and self-efficacy. Research suggests that dispositional traits tend to influence employee behavior (Barrick et al., 2013). Specifically, regarding the Big Five personality characteristics, openness to experience is positively related to engaging in EGB because those high in openness tend to adopt stronger environmental values (Blok et al., 2015). Conscientiousness, too, is positively related to EGB because conscientious employees often engage in behaviors that are both consistent with their moral principles and organizational goals (Kim et al., 2017). Similarly, employees with high extraversion are expected to engage in EGB because assertiveness is necessary to overcome existing norms (i.e., those not promoting EGB) and engage in new behavior (Terrier et al., 2016). Employees with high agreeableness are likely engage in EGB because of their tendency to be helpful and supportive of others and their environment (Terrier et al., 2016). Employees with high

neuroticism should not engage in EGB, as they experience anxiety when considering the underlying reasons for why EGB has become important in recent years (e.g., climate change; Ojedokun, 2018). Moral reflectiveness refers to the tendency for individuals to regularly consider their morals (Reynolds, 2008) and is related to increased EGB because employees with high-moral reflectiveness often engage in behavior consistent with their moral motivations (Kim et al., 2017). Finally, research has suggested that employees with high-self-efficacy engage in EGB because, if employees have a desire to engage in EGB, self-efficacy increases the chances of employees actually showing that behavior (Kim et al., 2016).

#### 3.3 | Work-related perceptions

EGB is often examined in relation to employees' work-related perceptions. In our meta-analysis, we explore associations between EGB and green human resource management (HRM), corporate social responsibility (CSR), green psychological climate perceptions, and perceived organizational support. Each of these work-related perceptions reflects the context in which employees may enact EGB (see Johns, 2006). Because work context dimensions such as green HRM signal EGB norms and values, it is expected that employees who report higher levels of each work-related perception also engage in more frequent EGB (e.g., Dumont et al., 2017). Beyond broad perceptions of one's workplace, we also examine the association between leadership perceptions (i.e., green transformational leadership perceptions, environmental servant leadership, and perceived supervisor support) and EGB. Leadership impacts the enactment of EGB when leaders encourage employees to think beyond the context of their job or organization and, instead, focus on systemic or societal challenges (e.g., environmental sustainability) in the service of broader goals (Van Velsor & Quinn, 2012). In summary, we expect EGB to be positively related to these various favorable work-related perceptions.

#### 3.4 | Job attitudes

Finally, we examine relationships of EGB with three important job attitudes: job satisfaction, organizational commitment, and organizational identification. Research has suggested that job attitudes, such as commitment, may link organizational goals for sustainability and individual-level EGB (Mesmer-Magnus et al., 2012). Specifically, theories and research of commitment and social responsibility (e.g., Collier & Esteban, 2007) predict that employee commitment to and identification with organization-level sustainability initiatives are strong predictors of in-role and extra-role behaviors that serve those higher-order goals. Job satisfaction, as well as the other job attitudes considered here, has been found to be positively related to socially responsible business outcomes (Harter et al., 2002; Mesmer-Magnus et al., 2012). Thus, we expect to find that EGB is positively related to all three job attitudes in our meta-analysis.

## 4 | EMPLOYEE GREEN BEHAVIOR AND THE THEORY OF PLANNED BEHAVIOR

### 4.1 | Key predictors of EGB

TPB has been frequently employed as a theoretical framework to understand why individuals engage in pro-environmental behavior in general (see Yuriev et al., 2020, for a review) and in EGB specifically (Norton et al., 2017). This theory suggests that employees' attitude, norms, and perceived behavioral control predict behavioral intentions, which, in turn, predict behavior (Ajzen, 1991). In the context of pro-environmental behavior, research based on TPB has specifically focused on pro-environmental attitude, norms, perceived behavioral control, and intentions, respectively. As such, research has demonstrated a relationship between these TPB predictors in the environmental context and EGB behavioral intentions (Greaves et al., 2013) and EGB (Blok et al., 2015). Accordingly, we expect that these predictor variables proposed by TPB are positively associated with EGB in our meta-analysis.

### 4.2 | Moderators of the attitude-behavior relationship

The relationship between employees' pro-environmental attitudes and their EGB is a key aspect of TPB, and the one that has been most frequently examined in empirical studies (e.g., Norton et al., 2015; Norton et al., 2017). Therefore, we focus our moderator analysis on this relationship in particular, whereas we do not examine moderators of relationships between EGB and substantive correlates that have been less frequently examined in the literature. We explore two types of moderators of the relationship between employees' pro-environmental attitudes and their EGB: First, we examine the role of national environmental performance and, second, we evaluate nation-level cultural indexes as possible boundary conditions for the attitude-EGB relationship.

The environmental performance index (EPI) is a biannual index (i.e., EPI reporting began in 2006) of a country's overall environmental performance (Wendling et al., 2020). Although the EPI has evolved over the past two decades, each iteration of EPI is reported as a composite score derived from metrics of each country's environmental health (e.g., air quality, waste management) and ecosystem vitality (e.g., biodiversity, water resources). We expect that the positive relationship between pro-environmental attitude and EGB is stronger when environmental performance is high and weaker when environmental performance is low, because employees in countries with high-environmental performance should perceive stronger social norms and expectations regarding the engagement in EGB (Norton et al., 2017).

Moreover, we explore cultural dimensions based on two important taxonomies as moderators. First, Schwartz (1999) suggested that countries can be distinguished in terms of cultural values which, at the individual-level, guide behavioral choices. The dimensions of Schwartz' taxonomy are harmony (i.e., adjusting oneself into their natural world), mastery (i.e., active effort to adjust the natural and social environment in pursuit of group or personal goals), hierarchy (i.e., a disproportionate distribution of power,

roles, and resources is considered proper and advantageous), egalitarianism (i.e., prioritizing equal welfare over selfish interests), affective autonomy (i.e., individuals are encouraged to pursue positive experiences for themselves), and intellectual autonomy (i.e., individuals are emboldened to engage independently in their own positive experiences).

Another culture classification, developed by Hofstede (e.g., Hofstede & Bond, 1984), includes the dimensions of power distance (i.e., the degree to which power is unequally distributed among members), individualism (i.e., individual's tendency to care only for themselves and their immediate networks), indulgence (i.e., individuals are encouraged to engage in gratifying behavior for their basic and natural human), masculinity (i.e., a tendency to favor achievement, heroism, and materialism), uncertainty avoidance (i.e., the degree to which individuals experience discomfort when faced with uncertain or ambiguous contexts), and long-term orientation (i.e., balancing the past contemporary and future challenges).

We refrain from making precise predictions regarding the impact of each of these cultural dimensions on the relationship between employees' pro-environmental attitude and EGB. However, these possible associations are predicated on both Schwartz' (1999) and Hofstede and Bond's (1984) assumptions that individuals set goals and enact behaviors consistent with contextual cultural values (e.g., nation of residency). If one's nation of residency has values associated with increased pro-environmental behavior (e.g., as expressed by high-country levels of harmony or low-country levels of masculinity), it is likely that individuals engage in EGB more frequently than those living and working in contexts marked by less pro-environmental attitude and values.

## 5 | METHOD

### 5.1 | Supplemental information

All supplemental information (i.e., including Tables A–E and complete references to all studies included in the meta-analysis) can be found in our online appendix, accessible via OSF: <https://osf.io/cjb3y>

### 5.2 | Literature search

To identify studies for inclusion in our meta-analysis, an exhaustive, multi-step literature search strategy was used. Articles qualified for initial inclusion if they reported at least one empirical study that measured EGB as either a composite score from an EGB scale or as a discrete behavior (e.g., recycling at work). For a more detailed explanation of operational definitions of EGB, see Online Appendix Table A. The literature search was conducted between August 2020 and November 2020. In the first stage, a keyword search for "employee green behavior" was conducted in various search engines (i.e., Google Scholar, Science Direct, Web of Science, PsycINFO, ProQuest Dissertations and Theses, Emerald). In the second stage, we conducted iterative forward citation searches in Google Scholar for papers that have cited any of the EGB scales identified in recent review articles by Ones et al. (2018) (e.g., Kim et al., 2017) or

Francoeur et al. (2021) (e.g., Fryxell & Lo, 2003). Of all potential databases to use for this stage of the literature search, Google Scholar was chosen because it tends to have the highest degree of coverage compared to others (Harari et al., 2020). For each forward search, the authors noted the total number of studies returned from the search, the number of studies already found in previous searches, and the number of unique studies that failed to meet (i.e., exclude) or met (i.e., include) the initial inclusion criteria; full results of the iterative literature search can be found in the Online Appendix Table B. In total, we conducted 28 forward searches, one for each EGB scale. Our initial search identified  $k = 237$  studies that measure EGB.

### 5.3 | Inclusion criteria

In addition to the initial criterion that primary studies must measure EGB, three more inclusion criteria were determined for studies to be included in the EGB-correlates meta-analysis. First, studies must include effect sizes of bivariate relationships (e.g., correlations), derived from original data, of EGB and at least one of the correlates in of interest. Next, if studies reported relationships at multiple time points, only time-one data were included when available. If correlates were measured at a subsequent time-point, those relationships were included unless an experimental or other type of intervention was implemented between time-points. Additional inclusion criteria were set for studies to qualify for inclusion in the supplementary analyses. To be considered in the moderator analyses, studies must have reported either the country in which the data were collected (i.e., so that the appropriate environmental performance index metric could be coded), average organizational tenure, average age, or which measure of EGB was used.

### 5.4 | Coding of studies

Coding took place between November and December of 2020. Two trained coders coded the same 10% of the article database to ensure calibration on coding decisions. Comparisons between the two coders coding sheets revealed nearly unanimous agreement on EGB reliability (96.6%) and study characteristics (96.7%) and unanimous agreement on correlate reliability, the effect size, and sample size. After discussing the discrepancies, perfect agreement was reached on all coding decisions. Each week after the initial 10% of studies were coded, the two coders

continued to code unique articles from the database. While coding, each coder recorded detailed notes of coding issues (e.g., missing reliabilities) and these issues were discussed during regular coding meetings. After applying the inclusion criteria and completing the coding procedure, the EGB-correlates database contained  $k = 135$  independent samples comprised of  $n = 47,442$  workers.

### 5.5 | Meta-analytic procedures

To derive the zero-order effects between EGB and its correlates, Hunter and Schmidt's (2004) random-effects procedure was used. This meta-analysis was done using the "psychmeta" package (Dahlke & Wiernik, 2019) for the R statistical computing environment (R Core Team, 2020). A variety of statistical artifacts were accounted for including sampling error by sample size-weighting correlations and unreliability in both EGB and its correlates. If studies did not report a reliability estimate for either EGB or a correlate, an artifact distribution was used (Hunter & Schmidt, 2004). In addition to the sample size-weighted correlation ( $r$ ) and the sample size-weighted and reliability-corrected correlation ( $r_c$ ), we report the 80% credibility intervals and 95% confidence intervals associated with the corrected correlation. To provide information regarding heterogeneity in effect sizes, we report both the standard deviation of the reliability corrected ( $SD_{rc}$ ) and uncorrected correlations ( $SD_r$ ).

## 6 | RESULTS

### 6.1 | Correlate-employee green behavior relationships

Full results of the meta-analysis can be found in Table 1 (Demographics), Table 2 (Individual differences), Table 3 (Work perceptions), Table 4 (Job attitudes), and Table 5 (TPB correlates).

#### 6.1.1 | Demographic characteristics

Age was positively related to EGB ( $r_c = 0.08$ ) indicating that older workers engage in somewhat more EGB than younger workers. Next, gender was not significantly related to EGB ( $r_c = 0.01$ )

**TABLE 1** Demographics as correlates of EGB

| Correlate              | $k$ | $N$    | $r$  | $SD_r$ | $\rho$ | $SD_{rc}$ | CI <sub>L</sub> | CI <sub>U</sub> | CV <sub>L</sub> | CV <sub>U</sub> |
|------------------------|-----|--------|------|--------|--------|-----------|-----------------|-----------------|-----------------|-----------------|
| Age                    | 66  | 23,421 | 0.08 | 0.09   | 0.08   | 0.09      | 0.06            | 0.11            | −0.01           | 0.18            |
| Gender (female higher) | 56  | 18,034 | 0.01 | 0.11   | 0.01   | 0.12      | −0.02           | 0.04            | −0.12           | 0.14            |
| Tenure                 | 50  | 19,171 | 0.05 | 0.08   | 0.06   | 0.09      | 0.03            | 0.08            | −0.04           | 0.15            |
| Education              | 42  | 15,799 | 0.06 | 0.09   | 0.07   | 0.09      | 0.04            | 0.10            | −0.03           | 0.17            |

Note:  $k$  = number of samples included in meta-analysis;  $r$  = mean observed correlation;  $SD_r$  = observed standard deviation of correlations;  $\rho$  = mean sample size weighted correlation corrected for unreliability in both measures;  $SD_{rc}$  = observed standard deviation of corrected correlations;  $SD_\rho$  = residual standard deviation of corrected correlations; CI = 95% confidence interval for  $\rho$ ; CV = 80% credibility interval for  $\rho$ .



**TABLE 2** Individual differences as correlates of EGB

| Correlate         | <i>k</i> | <i>N</i> | <i>r</i> | <i>SD<sub>r</sub></i> | $\rho$ | <i>SD<sub>rc</sub></i> | CI <sub>L</sub> | CI <sub>U</sub> | CV <sub>L</sub> | CV <sub>U</sub> |
|-------------------|----------|----------|----------|-----------------------|--------|------------------------|-----------------|-----------------|-----------------|-----------------|
| Openness          | 6        | 1508     | 0.31     | 0.24                  | 0.37   | 0.29                   | 0.07            | 0.68            | −0.04           | 0.79            |
| Conscientiousness | 10       | 2414     | 0.27     | 0.17                  | 0.32   | 0.20                   | 0.17            | 0.47            | 0.06            | 0.58            |
| Extraversion      | 4        | 1008     | 0.30     | 0.25                  | 0.36   | 0.29                   | −0.11           | 0.83            | −0.11           | 0.83            |
| Agreeableness     | 3        | 695      | 0.39     | 0.30                  | 0.48   | 0.36                   | −0.42           | 1.37            | −0.18           | 1.13            |
| Neuroticism       | 4        | 1008     | −0.26    | 0.30                  | −0.32  | 0.36                   | −0.90           | 0.26            | −0.90           | 0.27            |
| Moral reflexivity | 6        | 1683     | 0.33     | 0.15                  | 0.38   | 0.17                   | 0.20            | 0.55            | 0.15            | 0.61            |
| Self-efficacy     | 6        | 1276     | 0.31     | 0.17                  | 0.40   | 0.21                   | 0.18            | 0.62            | 0.12            | 0.68            |

Note: *k* = number of samples included in meta-analysis; *r* = mean observed correlation; *SD<sub>r</sub>* = observed standard deviation of correlations;  $\rho$  = mean sample size weighted correlation corrected for unreliability in both measures; *SD<sub>rc</sub>* = observed standard deviation of corrected correlations; *SD<sub>ρ</sub>* = residual standard deviation of corrected correlations; CI = 95% confidence interval for  $\rho$ ; CV = 80% credibility interval for  $\rho$ .

**TABLE 3** Work perceptions as correlates of EGB

| Correlate                                     | <i>k</i> | <i>N</i> | <i>r</i> | <i>SD<sub>r</sub></i> | $\rho$ | <i>SD<sub>rc</sub></i> | CI <sub>L</sub> | CI <sub>U</sub> | CV <sub>L</sub> | CV <sub>U</sub> |
|---|----------|----------|----------|-----------------------|--------|------------------------|-----------------|-----------------|-----------------|-----------------|
| Green HRM                                     | 23       | 7196     | 0.34     | 0.19                  | 0.40   | 0.22                   | 0.31            | 0.50            | 0.12            | 0.68            |
| CSR   | 15       | 5605     | 0.54     | 0.19                  | 0.64   | 0.22                   | 0.52            | 0.77            | 0.36            | 0.93            |
| Green psychological climate perceptions       | 19       | 6944     | 0.43     | 0.14                  | 0.49   | 0.16                   | 0.42            | 0.57            | 0.29            | 0.69            |
| Perceived organizational support              | 18       | 9125     | 0.20     | 0.10                  | 0.23   | 0.11                   | 0.18            | 0.29            | 0.10            | 0.36            |
| Green transformational leadership perceptions | 11       | 2888     | 0.44     | 0.21                  | 0.49   | 0.24                   | 0.33            | 0.65            | 0.18            | 0.81            |
| Environmental servant leadership              | 7        | 3931     | 0.30     | 0.07                  | 0.37   | 0.09                   | 0.28            | 0.45            | 0.26            | 0.47            |
| Supervisor support                            | 14       | 5021     | 0.31     | 0.18                  | 0.35   | 0.20                   | 0.23            | 0.46            | 0.09            | 0.61            |

Note: HRM = human resources management; CSR = corporate social responsibility; *k* = number of samples included in meta-analysis; *r* = mean observed correlation; *SD<sub>r</sub>* = observed standard deviation of correlations;  $\rho$  = mean sample size weighted correlation corrected for unreliability in both measures; *SD<sub>rc</sub>* = observed standard deviation of corrected correlations; *SD<sub>ρ</sub>* = residual standard deviation of corrected correlations; CI = 95% confidence interval for  $\rho$ ; CV = 80% credibility interval for  $\rho$ .

**TABLE 4** Job attitudes as correlates of EGB

| Correlate                     | <i>k</i> | <i>N</i> | <i>r</i> | <i>SD<sub>r</sub></i> | $\rho$ | <i>SD<sub>rc</sub></i> | CI <sub>L</sub> | CI <sub>U</sub> | CV <sub>L</sub> | CV <sub>U</sub> |
|-------------------------------|----------|----------|----------|-----------------------|--------|------------------------|-----------------|-----------------|-----------------|-----------------|
| Organizational commitment     | 17       | 6383     | 0.25     | 0.16                  | 0.30   | 0.19                   | 0.20            | 0.40            | 0.06            | 0.54            |
| Organizational identification | 13       | 4044     | 0.30     | 0.12                  | 0.35   | 0.14                   | 0.27            | 0.43            | 0.18            | 0.52            |
| Job satisfaction              | 10       | 3770     | 0.13     | 0.10                  | 0.15   | 0.12                   | 0.07            | 0.23            | 0.01            | 0.29            |

Note: *k* = number of samples included in meta-analysis; *r* = mean observed correlation; *SD<sub>r</sub>* = observed standard deviation of correlations;  $\rho$  = mean sample size weighted correlation corrected for unreliability in both measures; *SD<sub>rc</sub>* = observed standard deviation of corrected correlations; *SD<sub>ρ</sub>* = residual standard deviation of corrected correlations; CI = 95% confidence interval for  $\rho$ ; CV = 80% credibility interval for  $\rho$ .

which suggests no meaningful difference between men and women on EGB. Considering organizational tenure, there was a positive relationship between organizational tenure and EGB ( $r_c = 0.06$ ). Lastly, there was a positive relationship between level of education and EGB ( $r_c = 0.07$ ).

### 6.1.2 | Individual differences

Considering the Big Five personality characteristics, EGB was positively related to openness to experience ( $r_c = 0.37$ ) and conscientiousness ( $r_c = 0.32$ ). As the confidence intervals of the respective

estimates included zero, EGB was not significantly related to extraversion, agreeableness, and neuroticism. Additionally, EGB was positively related to moral reflexivity ( $r_c = 0.38$ ), and self-efficacy ( $r_c = 0.40$ ).

### 6.1.3 | Work perceptions

Considering work perceptions, EGB was positively related to perceptions of green HRM ( $r_c = 0.40$ ), perceptions of CSR ( $r_c = 0.64$ ), perceptions of a green psychological climate ( $r_c = 0.49$ ), perceived organizational support ( $r_c = 0.23$ ), perceptions of green

**TABLE 5** TPB variables as correlates of EGB

| Correlate                               | <i>k</i> | <i>N</i> | <i>r</i> | <i>SD<sub>r</sub></i> | $\rho$ | <i>SD<sub>rc</sub></i> | <i>CI<sub>L</sub></i> | <i>CI<sub>U</sub></i> | <i>CV<sub>L</sub></i> | <i>CV<sub>U</sub></i> |
|---|----------|----------|----------|-----------------------|--------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Pro-environmental attitude              | 67       | 25,542   | 0.37     | 0.17                  | 0.45   | 0.20                   | 0.40                  | 0.50                  | 0.21                  | 0.69                  |
| Pro-environmental norms                 | 18       | 7310     | 0.42     | 0.16                  | 0.46   | 0.17                   | 0.37                  | 0.54                  | 0.25                  | 0.66                  |
| Pro-environmental PBC                   | 20       | 7836     | 0.32     | 0.19                  | 0.41   | 0.24                   | 0.30                  | 0.53                  | 0.11                  | 0.72                  |
| Pro-environmental behavioral intentions | 13       | 3912     | 0.39     | 0.15                  | 0.45   | 0.17                   | 0.35                  | 0.56                  | 0.24                  | 0.67                  |

Note: *k* = number of samples included in meta-analysis; *r* = mean observed correlation; *SD<sub>r</sub>* = observed standard deviation of correlations;  $\rho$  = mean sample size weighted correlation corrected for unreliability in both measures; *SD<sub>rc</sub>* = observed standard deviation of corrected correlations; *SD<sub>ρ</sub>* = residual standard deviation of corrected correlations; *CI* = 95% confidence interval for  $\rho$ ; *CV* = 80% credibility interval for  $\rho$ .

transformational leadership ( $r_c = 0.49$ ), perceptions of green servant leadership ( $r_c = 0.37$ ), and supervisor support ( $r_c = 0.35$ ).

#### 6.1.4 | Job attitudes

EGB was positively related to all job attitudes included here, that is, organizational commitment ( $r_c = 0.30$ ), organizational identification ( $r_c = 0.35$ ), and job satisfaction ( $r_c = 0.15$ ).

#### 6.1.5 | TPB constructs

For a comprehensive list of specific constructs included in each TPB correlate synthetic grouping, see Online Appendix Table C. EGB was positively related to pro-environmental attitude ( $r_c = 0.45$ ), norms ( $r_c = 0.46$ ), perceived behavioral control ( $r_c = 0.41$ ), and behavioral intentions ( $r_c = 0.45$ ).

### 6.2 | A meta-analytic path model based on the theory of planned behavior

In addition to considering zero-order meta-analytic relationships between EGB and TPB constructs, we also used meta-analytic path analysis to test a model. Specifically, in this model, pro-environmental attitude, norms, and perceived behavioral control influence intentions, and these, in turn, influence EGB. To accomplish this, we conducted an ancillary meta-analysis of intercorrelations among TPB correlates. Specifically, we specified six separate meta-analytic models to derive all possible pairwise meta-analytic correlations between pro-environmental attitude, norms, perceived behavioral control, and intentions. Combined with the results described above, this resulted in a “full” correlation matrix of relationships between (and among) TPB constructs and EGB. This correlation matrix was then used as the input for a path analysis to test the indirect relationships between pro-environmental attitude, norms, and perceived behavioral control on EGB through intentions as proposed by TPB (Ajzen, 1991). These models were specified in “lavaan” (Rosseel, 2012) using corrected correlations ( $r_c$ ). Consistent with recommended practice (Landis, 2013), the sample size used for these analyses was the harmonic mean the sample sizes representing each cell of the correlation matrix ( $n = 4371$ ).

In summary of our findings, pro-environmental attitude ( $B = 0.306$ ,  $SE = 0.012$ ,  $p < 0.001$ ), norms ( $B = 0.253$ ,  $SE = 0.013$ ,  $p < 0.001$ ), and perceived behavioral control ( $B = 0.380$ ,  $SE = 0.012$ ,  $p < 0.001$ ) were each statistically significant predictors of pro-environmental intentions; these relationships constitute the “a-paths” in this model. Moreover, and constituting the “b-path” in this model, pro-environmental intentions were a statistically significant predictor of EGB ( $B = 0.108$ ,  $SE = 0.021$ ,  $p < 0.001$ ).

Combining “a-path” and “b-path” estimates from this model results in three possible indirect effect by which pro-environmental attitude, norms, and perceived behavioral control could affect EGB through intentions. We assessed the statistical significance of each indirect effect using the Monte Carlo method of assessing mediation (MCMAM; Preacher & Selig, 2012). Lending some support to the (assumed) theoretical process outlined by the TPB, in each case, this indirect effect was statistically significant: pro-environmental attitude ( $B_{ab} = 0.033$ , 95% CI: 0.020; 0.046), norms ( $B_{ab} = 0.027$ , 95% CI: 0.016; 0.039), and perceived behavioral control ( $B_{ab} = 0.041$ , 95% CI: 0.025; 0.057). This model accounted for 63.30% ( $R^2 = 0.633$ ) of the variance in intentions, and 27.40% ( $R^2 = 0.274$ ) of the variance in EGB.

#### 6.3 | Moderator tests

To address issues of heterogeneity in the effect sizes reported here, we conducted a series of moderator tests of the relationship between pro-environmental attitude, as construed in our TPB model (see Online Appendix Table C for a comprehensive list of constructs considered as “attitude”), and EGB. The attitude-behavior relationship was chosen for further investigation for several reasons. Of all of the correlates included in the meta-analysis, the attitude-EGB relationship was derived from the largest number of independent samples ( $k = 67$ ). Because moderator information was not present in every primary study included in the main analysis (for a variety of reasons outlined below), the number of samples that could be included in the moderator analyses was lower than the amount included in the main meta-analysis. Therefore, the attitude-EGB relationship provided the best opportunity to provide a robust test of possible moderators. Additionally, the link between attitudes and behavior both for general work behaviors (e.g., Bosco et al., 2015) and for specific pro-environmental behaviors (e.g., Yuriev et al., 2020) remain somewhat



unclear and the presence of factors affecting those context-specific relationships is likely.

For each set of moderators, multiple regression analyses were used via the “psychmeta” package (Dahlke & Wiernik, 2019). Akin to the main analyses, which follow the Hunter-Schmidt random-effects procedure, reliability corrected and sample-size weighted attitude-EGB correlations were used in these models. In each model, all moderators were mean centered and standardized.

### 6.3.1 | Environmental performance index

In summary, EPI was unrelated to the magnitude of the attitude-EGB relationship ( $B_{EPI} = -0.001$ ) and full results of this model can be found in the Online Appendix (Table D).

### 6.3.2 | Schwartz' cultural dimensions

Based on the multiple regression analysis, two of the six cultural dimensions were found to systematically impact the attitude-EGB relationship (see Online Appendix Table E). First, as the hierarchy dimension increases, the strength of the attitude-EGB relationship strengthens ( $B_{hierarchy} = 0.158$ ). Second, the mastery dimension and the strength of the attitude-EGB relationship are inversely related ( $B_{mastery} = -0.202$ ) suggesting that the relationship weakens as a function of mastery.

### 6.3.3 | Hofstede's cultural dimensions

Hofstede's cultural dimension scores were coded from the publicly available Culture Compass (Hofstede, 2015). The multiple regression analysis returned no significant relationship between any of the Hofstede cultural dimensions and the strength of the attitude-EGB relationship (see Online Appendix Table).

## 7 | DISCUSSION

EGB is a compound job performance construct that has, especially due to growing organizational concerns with environmental sustainability, received increased attention by researchers and practitioners over the past two decades (Norton et al., 2015). Accordingly, we pursued three interrelated goals with this meta-analysis. First, we examined associations of EGB with various correlates reported by employees. Results showed that EGB was significantly associated with certain demographic characteristics, individual differences, work perceptions, and job attitudes. In particular, we found rather weak associations between EGB and age, tenure, and education, and no significant association with gender. Most of the associations between EGB and the other constructs considered were positive and moderate (and some even strong; for example, perceptions of CSR). Exceptions

were nonsignificant associations between EGB and the personality characteristics extraversion, agreeableness, and neuroticism. The pattern of relationships with personality traits makes sense theoretically, as conscientiousness is associated with EGB similarly to other forms of work performance, and openness is consistent with the focus of EGBs on environmental causes. In contrast, extraversion, agreeableness, and neuroticism are socially-focused traits that are more likely to be related to prosocial and interpersonal behaviors. Overall, these findings suggest that EGB is related to key individual difference predictors, such as openness, conscientiousness, moral reflexivity, and self-efficacy, but also to employees' perceptions of their work and organizational context, and particularly their job attitudes and the extent to which their organization and their supervisor are concerned with environmental sustainability.

Second, we tested a meta-analytic path model based on the TPB, a frequently used social psychological theoretical framework in the literature on environmental sustainability (Yuriev et al., 2020). Consistent with propositions of TPB, results showed that employees' pro-environmental attitude, norms, and perceived behavioral control had moderate and positive effects on their pro-environmental intentions, which in turn, had a relatively weak positive effect on EGB. Moreover, attitude, norms, and perceived behavioral control had significant indirect effects on EGB through intentions according to the path model results. These findings advance research on EGB by demonstrating the importance of variables typically considered in social and environmental psychology and less so in the field of OB. Moreover, they provide guidance to organizational practitioners aiming to encourage EGB.

Finally, we explored a number of country-level moderators of the association between pro-environmental attitude and EGB and found only a few significant effects. In particular, the environmental performance index and Hofstede's cultural dimensions did not have significant moderating influences. Among Schwartz' cultural dimensions, only hierarchy and mastery had strengthening and weakening effects on the attitude-EGB relationship, respectively. Whereas the weakening effect of mastery on this relationship could be explained by the fact that mastery involves active efforts in a given culture to adjust the natural environment in pursuit of group or personal goals, and that such “adjustment” (rather than protection or conservation efforts) may be detrimental to environmental sustainability. In contrast, the strengthening effect of hierarchy, which involves a dominant view in a culture that the disproportionate distribution of power and resources is proper and advantageous, is not easily explained based on theorizing in cross-cultural psychology and requires further research.

### 7.1 | Theoretical and practical implications

Our findings have a number of important implications for theory development and organizational practice. First, our findings on EGB correlates may help to advance theorizing and empirical research on multilevel antecedents, correlates, and outcomes of EGB (Norton et al., 2015). In particular, future research should consider individual difference



characteristics, including the Big Five personality characteristics openness and conscientiousness, moral reflexivity, and self-efficacy, as well as work-related perceptions, including job attitudes as well as organizational and supervisor support for environmental sustainability, as well-established correlates of EGB. Accordingly, theorizing and empirical research needs to demonstrate incremental effects of new potential antecedents of EGB above and beyond these characteristics that have moderate to large associations with EGB.

Second, given the empirical support for TPB predictors of EGB from our meta-analytic path model, future theorizing and empirical research in the field of OB should integrate these predictors typically considered in social and environmental psychology (Yuriev et al., 2020) with recent theorizing on predictors of EGB in the OB literature. In addition to including TPB predictors in future research and demonstrating incremental validity of new potential predictors above and beyond these factors, our findings also emphasize that pro-environmental intentions have only a relatively weak effect on EGB. Thus, future theory development should consider various multilevel moderators of the association between pro-environmental intentions and EGB. Along these lines, a study by Norton et al. (2017) found that high levels of perceived pro-environmental organizational policy and climate strengthen the positive within-person effect of pro-environmental intentions on EGB. Future theory development could consider additional characteristics, including individual (e.g., self-efficacy, perceived behavioral control), leadership and team (e.g., supervisor and team support for environmental sustainability), organizational (e.g., green HRM), and broader societal and cultural characteristics as moderators that may explain the “gap” between intentions and EGB.

Third, the initial exploratory consideration of selected country-level and cultural characteristics as moderators of the individual-level attitude-EGB association represents a contribution of our article. However, it also constitutes a challenge for future theorizing and research to better understand whether, how, and why (or why not) these characteristics may influence the direction and magnitude of links between pro-environmental attitude (and possibly other individual level antecedents, such as intentions) and EGB. Above and beyond our preliminary and exploratory findings, such future work requires the integration of theory from the field of cross-cultural psychology with social and organizational psychology theorizing on pro-environmental behavior and EGB.

In terms of practical implications, organizations and HR managers aiming to enhance their employees' EGB could focus on selecting job applicants based on individual difference characteristics identified as important correlates of EGB in our meta-analysis (e.g., openness and conscientiousness). Practitioners should also employ HR instruments (e.g., work design, retention strategies) to increase self-efficacy, favorable job attitudes (e.g., job satisfaction, organizational identification and commitment), and work-related perceptions of organizational and supervisor support for environmental sustainability. Moreover, given the broad evidence base for the TPB in the literature (Yuriev et al., 2020), practitioners could design and implement

interventions that systematically improve employees' pro-environmental attitude, perceived norms, and perceived behavioral control to enhance their pro-environmental intentions (Steinmetz et al., 2016). At the same time, however, it is important to implement HR practices to ensure that employees' pro-environmental intentions also “translate” into higher levels of EGB (e.g., by creating and communicating pro-environmental organizational policies and climates; Norton et al., 2017).

## 7.2 | Limitations and future directions

There are several limitations of this meta-analysis. First, as a broad criticism of the EGB literature, the majority of bivariate relationships included in our meta-analysis were based on cross-sectional data. Relatedly, EGB and the majority of correlates considered were captured via self-report survey methods. Together, these issues contribute to concerns about common method variance, which could artificially inflate the meta-analytic estimates. Future research should adopt non-exclusive self-report EGB and its correlates as well as adopt unique methodologies in this area including experimental (Unsworth & McNeill, 2017), observational (Lange & Dewitte, 2019), as well as daily diary and longitudinal (Bissing-Olson et al., 2013) designs. These methodological limitations have implications for the interpretation of the meta-analytic path model of TPB, as well. Specifically, because the correlations used to estimate the model were cross-sectional, the path model does not provide evidence for causality. Future work to disentangle causal ordering of these constructs must be done at the primary study level.

Additionally, a shared limitation of this meta-analysis and the EGB literature is the limited consideration of EGB correlates and outcomes (see Norton et al., 2015). First, there are likely important correlates of EGB that ought to be considered, including locus of control and team-level constructs. Despite their relevance and importance to the enactment of EGB, we were unable to consider some important correlates in the meta-analysis due to the lack of primary studies that provide relationships between EGB and such correlates. Second, as an important individual-level behavior (Campbell & Wiernik, 2015), one would anticipate that other forms of behavior (e.g., contextual performance, task performance) would be correlates of EGB. Beyond the individual level, we identified few studies that considered organizational-level outcomes (e.g., firm performance, firm green performance) of EGB. The conceptualization of EGB could be one factor that has contributed to this limitation. Ones et al. (2018) note that the definition of EGB is limiting, “by focusing on what employees actually do, EGB exclude environmental outcomes that are outside individual control” (p. 87). However, this literature is not devoid of disagreement as to whether EGB is a facet of task or contextual performance (e.g., Campbell & Wiernik, 2015; Lamm et al., 2013).

Another limitation of this meta-analysis is the inability to explain heterogeneity between studies by study-level moderators (i.e., cultural variables, EPI). Indeed, a high degree of variability exists

between primary studies; however, additional boundary conditions not able to be considered here likely account for that heterogeneity. Specifically, one notable difference between primary studies included in the meta-analysis is how EGB was measured. As noted throughout the manuscript, we identified several different operationalizations of EGB and while each measured EGB, consistent with our adopted conceptualization, it is possible that each scale provides unique insight into EGB. To start disentangling operationalizations, future research ought to investigate psychometric and validation differences between the various EGB scales, particularly regarding possible differential predictive validity of each operationalization. A clearer guide for choosing an operationalization for EGB would produce more consistent and directed research.

Finally, we believe there is value in future research examining EGB in comparison of two related types of behavior. First, research should compare meta-analytic findings from the literature on general pro-environmental behavior (e.g., Bamberg & Möser, 2007; Gifford & Nilsson, 2014) and the results presented here. There are possible differences between magnitude of relationships due to more constraints being present in the work context (i.e., job requirements, organizational policies) than when individuals are free to perform pro-environmental behavior on their own accord. Second, we focused our efforts on positive behaviors; however, there is ongoing contemporary research considering “counterproductive” forms of EGB, such as wasting resources or polluting the environment (see Dilchert, 2018).

## 8 | CONCLUSION

As many organizations are aiming to become more environmentally sustainable, researchers and practitioners have paid increasing attention to EGB. In this meta-analysis, we found meaningful associations between EGB and several demographic characteristics, individual differences, work-related perceptions, and job attitudes. In addition, we found support for a model based on the TPB that conceptualized attitudes, norms, perceived behavioral control, and intentions as predictors of EGB. In contrast, only few moderators of the attitude-EGB link emerged. Overall, these findings highlight the relative importance of potential key predictors of EGB, thus providing guidance for future research and organizational practice.

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