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Employee Green Behavior as a Unidimensional Construct: Psychometric Evidence from Higher Education Institutions

Abdelaziz Abdalla Alowais*, Abubakr Suliman

Faculty of Business and Law, Dubai, The British University in Dubai, Dubai, United Arab Emirates. *Email: abdelaziz.alowais@icloud.com

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ABSTRACT

Employee green behavior (EGB) refers to voluntary and task-related environmentally responsible activities performed by employees in an organizational setting. Although EGB is conceptually multidimensional (comprising task-related behaviors, initiative, civic engagement, and helping), past research indicates that it can be conceptualized as a unidimensional phenomenon due to high levels of conceptual and empirical overlap. This research is expected to confirm the application of the unified 15-item EGB scale within Emirati Higher Education Institutions (HEIs), addressing a gap in the literature on environmental and social psychology. A cross-sectional survey was carried out on 170 members of faculty and administrative staff using a 5-point Likert scale questionnaire. R software was used for exploratory factor analysis (EFA), confirmatory factor analysis (CFA), reliability analysis, and validity analysis (convergent and discriminant) to analyze the data. The findings suggest that the 15 proposed items can be summarized into one latent factor with a high level of internal consistency (Cronbach's alpha: 0.90) and acceptable levels of convergent validity (AVE = 0.50). The results affirm that there is no need to split the EGB into several dimensions according to collectivist and collaborative organizational culture. The scale reviewed is a validated unidimensional scale that can be used as a reliable, situation-specific measure of employee pro-environmental behavior, which can be used to inform evidence-based sustainability interventions and further our knowledge of environmental and social psychology in the context of higher education.

Keywords: Employee Green Behavior, Scale, Survey, Environmental Psychology, Higher Education, Sustainability
JEL Classifications: M12, M14, Q56, C38

1. INTRODUCTION

Employee green behavior (EGB) plays a critical role in advancing organizational sustainability goals and has been conceptualized in prior studies as a multidimensional construct. For instance, the authors of (Mi et al., 2020) distinguish between task-related and proactive green behaviors, further differentiating proactive efforts into eco-helping, green innovation, and civic engagement. This framework reflects the theoretical richness and behavioral complexity of EGB within organizational settings. However, emerging evidence (Alowais and Suliman, 2025) suggests considerable overlap among these dimensions, raising the possibility that EGB may operate as a unified construct in specific cultural or institutional contexts, particularly in collectivist, collaborative environments such as Emirati Higher Education Institutions. Thus, employees may not perceive these behaviors as distinct but rather as interconnected expressions of pro-environmental commitment. This study explores this possibility by empirically testing the unidimensional structure of a 15-item EGB scale, contributing to the ongoing academic debate about the dimensionality of EGB and addressing a notable gap in cross-cultural environmental psychology research.

1.1. Defining Employee Green Behavior

EGB encompasses the spectrum of activities performed by employees that directly or indirectly promote environmental sustainability in the workplace. EGB covers a wide range of actions, such as those that ensure compliance with environmental

policies, enhanced participation in environmental activities, actions to promote civil responsibility in organizational sustainability, and assisting colleagues in practicing environmental awareness (Mi et al., 2020) With the incorporation of these behaviors into their daily professional activities, employees can strongly support institutional sustainability agendas, minimize the impact of their actions on the environment, and establish a common culture of environmental responsibility.

In environmental and organizational psychology, EGB is considered a key construct that relates individual motivation, organizational norms, and collective sustainability performance (Bashirun et al., 2025). It is the expression of the employees' individual environmental values reflected in their workplace behaviors under the impact of institutional expectations and social norms. EGB is especially important in the context of higher education institutions (HEIs). Universities and colleges are complex organizations which entail teaching, research, administration, and massive infrastructure, all of which contribute significantly to the institution's environmental footprint in terms of energy consumption, waste production, procurement activities, and transportation systems. HEI's employees are crucial to these everyday environmental results. Therefore, the proper quantification and understanding of EGB in HEIs is key to formulating specific sustainability policies, designing effective behavioral interventions, and realizing long-term institutional environmental objectives.

1.2. Sources of Multidimensional Structure

EGB refers to environmentally responsible actions performed by employees within the context of their organizational roles. Unlike general pro-environmental behavioral measures, which typically assess the frequency of specific environmentally friendly actions (e.g., recycling or energy conservation) irrespective of context, EGB is explicitly situated within the workplace and captures behaviors shaped by job requirements, organizational norms, and discretionary role expansion.

The EGB scale was developed through a qualitative synthesis of the organizational and environmental psychology literature, which identified two broad components of workplace green behavior. The first component comprises task-related green behaviors, reflecting environmentally responsible actions formally embedded within job descriptions and performance expectations. The second component encompasses pro-active green behaviors, defined as discretionary actions that go beyond formal requirements. Pro-active green behavior is further differentiated into three subcomponents: Initiative-taking, civic engagement, and helping behaviors, reflecting employees' voluntary efforts to improve environmental practices, support organizational sustainability initiatives, and assist colleagues in engaging in green behaviors.

Items were generated for the EGB scale to reflect these conceptual domains, drawing on prior qualitative and conceptual work in organizational citizenship behavior, environmental management, and sustainability research. The resulting 15-item scale was designed to capture both prescribed and discretionary forms of green behavior within organizations while remaining adaptable across institutional and cultural contexts.

To date, empirical examinations of the factor structure of Employee Green Behavior remain scarce. Existing studies have largely relied on qualitative designs or have operationalized EGB using a limited subset of items. In the few quantitative studies that included factor analytic procedures, only selected items representing different behavioral domains were analyzed, often within specific organizational or cultural settings. For example, one study incorporated a reduced item set drawn from the broader EGB framework and reported a multifactor solution, indirectly suggesting the presence of multiple underlying dimensions. However, these studies did not directly test the full 15-item scale or systematically compare alternative factor structures. As a result, the latent structure of the complete Employee Green Behavior scale, particularly the extent to which its theoretically distinct components manifest empirically, remains undetermined.

1.3. Sources of Multidimensional Structure

Traditionally, EGB has been conceived as a multidimensional construct that consists of four major behavioral dimensions: Task-related green behavior (TRGB), Environmental Initiative Behavior (ECIB), Environmental Civic Engagement Behavior (ECEB), and Environmental Helping Behavior (ECHB) (Mi et al., 2020). Each is a specific dimension of pro-environmental behavior within organizations. TRGB is a set of environmentally friendly activities integrated into official job descriptions, like adherence to energy-saving standards and waste management systems. ECIB stresses voluntary and proactive environmental activities that extend beyond the official job remit, like initiating recycling projects or sustainability upgrades. ECEB shows how the employees engage in institutional sustainability projects and campaigns and environmental events. ECHB is the social aspect of sustainability behavior, such as inspiring, mentoring, and assisting colleagues to act in an environmentally responsible manner.

This multidimensional framework was created for theoretical clarity and to cover a broad range of ways in which employees contribute to sustainability in the workplace. Separating task compliance, voluntary initiatives, civic participation, and help behaviors allowed researchers to pinpoint certain behavioral targets to use in organizational interventions. Nevertheless, even though this framework is conceptually useful, dividing EGB into subscales may needlessly increase analytical complexity, diminish measurement effectiveness, and potentially conceal the psychological context for pro-environmental workplace behaviors.

In summary, existing empirical research on Employee Green Behavior is constrained by three key limitations. First, most studies have not examined the full set of scale items simultaneously, limiting conclusions about the underlying factor structure. Second, factor analytic testing has often been indirect or exploratory in nature, without formal comparison of competing measurement models. Third, empirical validation across different organizational and cultural contexts remains limited.

These limitations underscore the need for a systematic re-examination of the Employee Green Behavior scale using

rigorous psychometric methods. This study addresses this gap by directly testing the latent structure of the full 15-item scale within Emirati Higher Education Institutions, a context characterized by collectivism, collaboration, and strong normative integration.

1.4. Why EGB is Often Modeled as Unidimensional

A growing body of empirical evidence indicates that the four dimensions of EGB are highly interrelated. Employees who practice one type of green behavior are always more likely to practice another, which may indicate the existence of a latent pro-environmental orientation that regulates all EGBs. Consequently, several recent studies have (Alowais and Suliman, 2025) modeled EGB as a unidimensional latent construct. This method makes measurement easier, increases the power of statistical results, minimizes model complexity, and makes the results of interventions easier to interpret (Mi et al., 2020).

Collectivist environments are particularly prone to unidimensional modeling. In collectivist cultures like the United Arab Emirates, employees tend to combine their work with voluntary actions, civic activities, and helping habits into a single pattern of behavior that is influenced by common values, social norms, and loyalty towards institutions. Under these cultural conditions, the conceptual lines between the types of green behavior blur, and EGB is more conveniently regarded as a coherent behavioral disposition not broken into discrete behavioral types.

1.5. Purpose of this Study

Accordingly, this study pursues three interrelated objectives. First, it seeks to identify the latent factor structure of the 15-item Employee Green Behavior scale through exploratory factor analysis. Second, it compares alternative theoretically plausible measurement models, including one-, two-, three-, and four-factor structures, using confirmatory factor analysis. Third, based on the empirical findings, it offers recommendations regarding the appropriate operationalization of Employee Green Behavior for research and practice, particularly within collectivist and collaborative organizational contexts such as higher education institutions.

Although support for unidimensional EGB continues to increase, there is still a wide gap in the provision of culturally and organizationally validated EGB measurement instruments, especially in the Middle Eastern higher education context. The majority of the established EGB scales are only tested and validated within Western or East Asian organizational settings, so their generalizability to Emirati HEIs is limited.

Although the four-factor model is theoretically valid, unidimensional operationalization is contextually and functionally appropriate for certain research purposes. Although this study defensively positions EGB is a single-construct measure, it is important to note that in the field of sustainability, there could be theoretical justification for a multidimensional construct. However, to adapt EGB to the context of this study, a unidimensional construct is formulated.

With this foundation, this study was conducted to test the use of a harmonized 15-item Employee Green Behavior scale in Emirati Higher Education Institutions. By presenting the results of an empirical study of the unidimensional structure of EGB in this distinctive cultural and institutional setting, this study contributes to the field of environmental psychology and the literature on organizational behavior. Additionally, it offers administrators, policymakers, and sustainability practitioners a trusted, contextualized tool for measuring employees' sustainability orientation, formulating evidence-based intervention strategies, and promoting institutional and national environmental conservation goals.

Importantly, this study does not seek to challenge the theoretical legitimacy of the original four-factor conceptualization of Employee Green Behavior. Rather, it examines whether these theoretically distinct behavioral domains manifest empirically as a unified construct in a specific organizational and cultural context. In collectivist and collaborative environments, such as higher education institutions in the UAE, employees may enact task-related and proactive green behaviors as part of an integrated professional identity, reducing the practical salience of distinct behavioral categories. Accordingly, this study adopts a context-sensitive psychometric perspective, assessing whether a unidimensional operationalization of Employee Green Behavior provides a parsimonious and empirically defensible measurement approach.

2. LITERATURE REVIEW

While the authors of (Mi et al., 2020) emphasized the structural dimensions of EGB through the lens of person-organization fit, the authors of (Alowais and Suliman, 2025) highlighted the role of ethical leadership in shaping EGB within UAE academic institutions. Both studies affirm the importance of contextual and interpersonal factors in driving pro-environmental behavior. However, neither directly addresses how EGB is structurally perceived or enacted in collectivist higher education environments. This opens the door for further investigation into whether EGB operates as a unified behavioral construct in this culturally specific organizational setting.

2.1. Theoretical Aspects of Employee Green Behavior

The concept of EGB has become very popular in organizational literature, in which authors tend to describe it in terms of four dimensions of pro-environmental behavior in the workplace (Mi et al., 2020).

The first dimension is task-related green behavior (TRGB), which can be defined as the official, obligatory element of environmental behavior. Employees are required to deliver outputs that align with institutional environmental policies and standards (Xin et al., 2024). The four items of TRGB revolve around competence and conformity: Performing environmental tasks competently, fulfilling the environmental duties stipulated in job descriptions, performing environmental activities as part of a team, and conforming to formal work performance standards. TRGB also indicates how sustainability is integrated into daily job functions and, as such, it is measurable, predictable, and directly related to organizational performance. Studies have also demonstrated that

employees who demonstrate good TRGB are likely to implement other environmental practices (Mi et al., 2020).

The second dimension is Environmental Conservation and Initiative Behavior (ECIB), which encompasses discretionary and self-initiated actions to support the environment. This dimension entails day-to-day actions: Conserving energy, low-carbon commuting, reusing materials, and engaging in voluntary environmental activities. ECIB is the result of personal motivation and environmental awareness, unlike TRGB, which results from organizational requirements (Alowais and Suliman, 2025). It is known that employees who score high in ECIB tend to affect their colleagues and shape organizational culture by setting an example of environmentally responsible behaviors. ECIB is particularly applicable in higher learning institutions, where sustainability efforts are limited to voluntary measures to supplement official policies.

The third dimension is Environmental Civic engagement behavior (ECEB), which encompasses active involvement in programs and initiatives in the institutional environment (Jaworski et al., 2024). This includes participation in environmental events held by the university, environmental program awareness, and voluntary participation in environmental projects. Civic engagement supports a feeling of belonging and communal responsibility. In collectivist societies such as the UAE, employees who become engaged in ECEB are not only involved in sustainability efforts but also support collective sustainability results. Existing studies pointed out that civic engagement behaviors enhance organizational culture with respect to environmental behaviors and correlate strongly with TRGB and ECIB (Mi et al., 2020).

The fourth dimension is Environmental Helping Behavior (ECHB), which involves interpersonal support for environmental behaviors, such as reminding colleagues to engage in pro-environmental behaviors, promoting sustainable purchases, encouraging colleagues to participate in environmental actions, and volunteering time to assist colleagues in incorporating sustainability into their work. ECHB also emphasizes the social aspect of EGB and proves that green behavior is not only personal but also social (Ng et al., 2025). In collectivist workplaces, peer support and encouragement contribute greatly to overall organizational sustainability because these helping behaviors trigger the mainstream adoption of green practices (Mi et al., 2020).

Together, these four dimensions create a theoretically sound framework for the concept of EGB. Each captures a different aspect of behavior, whether that is completing required tasks or willingly taking initiative, demonstrating civic engagement, or providing interpersonal support (Copeland et al., 2025). Nonetheless, from a conceptually different perspective, empirical research has shown considerable overlap between dimensions, indicating that employees who practice one type of green behavior are likely to engage in others.

2.2. Rational, Unidimensional EGB

Even though EGB has been considered multidimensional, theoretical and empirical evidence supports modeling it as a single higher-level variable. This perspective emphasizes the high level of conceptual overlap. Although TRGB, ECIB, ECEB, and ECHB represent different forms of behavioral expression, they stem from a shared underlying motivation to increase environmental sustainability. In theory, all behaviors indicate one latent construct: A pro-environmental orientation. As an example, the motivation to participate in institutional events (ECEB) and the motivation to encourage colleagues (ECHB) are based on the same sustainability values that motivate conscientious task performance (TRGB) and personal initiative (ECIB) (Martin, 2024). In collectivist cultures like the UAE, these behaviors are highly integrated instead of compartmentalized, as they are in unidimensional latent factor modeling, and as such, they are reinforced.

According to previous psychometric studies, strong correlations between the four subscales of EGB are always present, which indicates that they are redundant when considered separately (Mi et al., 2020). While the authors of (Mi et al., 2020) conceptualized employee green behavior (EGB) as a multidimensional construct grounded in person-organization fit, the authors of (Alowais and Suliman, 2025) examined how ethical leadership shapes EGB in UAE academic institutions, using one representative item per behavioral dimension and reporting acceptable internal consistency ($\alpha = 0.754$). These studies highlight different antecedents and structures of EGB, yet both reflect the growing importance of understanding green behavior in organizational settings. This raises a key question: In collectivist, collaborative institutions such as Emirati HEIs, can EGB be more accurately understood and measured as a unified construct rather than separate dimensions?

The Emirati HEI setting emphasizes a community sense of responsibility and shared values (Areepattamannil, 2024). Institutional sustainability policies and collaborative norms influence the faculty and administrative staff that promote the integration of formal, voluntary, civic, and social helping behaviors. In this case, the employees are likely to exhibit a holistic sustainability orientation that extends across individual subscales, and the unidimensional model is theoretically and practically appropriate. The 15 items on the Employee Green Behavior scale have been shown to represent various manifestations of the same underlying factor, pro-environmental orientation, which is the foundation of Employee Green Behavior. A unidimensional model should also be embraced because it simplifies the process of measurement as well as interpretation and aids in effective institutional monitoring, intervention design as well as policy evaluation (Ocansey et al., 2025). Moreover, Mi et al. (2020) states that the division EGB into four dimensions may hamper the sustainability process by establishing fake lines, diminishing the measurement transparency, and, possibly, watering down the effect of interventions. By comparison, a 15-item unified scale is a scale that measures the entirety of green behavior by employees and thus offers a robust actionable measure.

2.3. Context for and Presentation of this Study

Although the literature on EGB has continued to increase, there are still several crucial gaps that limit theoretical development and practical application. First, despite the clear demonstration in

(Mi et al., 2020) that EGB encompasses four behavioral domains, most empirical studies still specify the dimensions as either distinct predictors or networks of loosely related subconstructs without directly testing any single latent structure that offers greater psychometric validity. This has resulted in disjointed measurement practices, overly complex models, and inconsistent results in relation to organizational settings.

Second, a considerable gap remains in EGB validation research in terms of geography and culture. Most psychometric studies have been carried out Western or East Asian organizational contexts (Idemudia et al., 2025). There is very little empirical evidence on EGB manifestation in the Middle Eastern context, specifically in the Emirati institutional setup. This is a major omission considering that collectivism, centralized governance, and strong national requirements to ensure sustainability, including UAE Vision 2030, are bound to change the internalization and expression of environmental behavior among employees.

Third, Higher Education Institutions (HEIs) are not broadly represented in the literature on EGB validation. Although HEIs are crucial to the formation of sustainability norms via teaching, research, and administrative behaviors, the majority of existing EGB research is centered on the manufacturing, service, or corporate spheres (Aggarwal and Agarwala, 2025). Consequently, there is a lack of context-specific diagnostic instruments to measure the sustainability performance of academic institutions.

This study fills these gaps by empirically validating a unified 15-item unidimensional EGB scale in the context of Emirati HEIs. It benefits environmental psychology by clarifying the integrated psychological and social psychological understanding of sustainability behavioral patterns by showing that collectivist organizational cultures support a holistic pro-environmental identity. This research contributes to theory and practice by providing a culturally based, psychometrically sound, and operationally efficient instrument for sustainability research and institutional governance.

3. METHODOLOGY

This study is grounded in positivist epistemology, assuming that reality can be objectively measured through observable and quantifiable data. Ontologically, it adopts a realist stance, viewing pro-environmental behavior as a concrete phenomenon that exists independent of individual perception and can be systematically captured using validated instruments. By employing a structured survey and statistical modeling, this uncovers underlying patterns in employee green behavior as they manifest within institutional settings. This philosophical orientation supports the use of factor analysis and reliability testing to validate the unidimensional structure of the EGB scale.

3.1. Research Design

This study adopted a cross sectional and quantitative design, with a focus on instrument validation. In measuring the factor structure of the EGB scale at 1 time, a cross-sectional design enables a robust statistical analysis of the connections between items (Bryman, 2016). Efforts were taken to remain objective and to replicate and generalize findings using quantitative methods. This research tested a 15-item Unified EGB scale in the context of Emirati Higher Education Institutions (HEIs) and determined whether the conceptualization of multidimensional EGB can be empirically narrowed to one latent variable.

This study employed best practices in psychometric research, using a combination of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) (Tak et al., 2025). EFA is data-oriented analysis of factor design, whereas CFA offers an opportunity to conduct a hypothesis-oriented test of unidimensional design. Reliability and validity analyses (Cronbach's alpha, composite reliability, AVE, Fornell-Larcker, and HTMT) were also used determine the strength and usefulness of the scale.

3.2. Participants

This research focused on faculty and administrative personnel at various Emirati HEIs. The target sample size was 150-180 people, which corresponds to the factor analysis ratio of 10-15 respondents to one item in scale validation research (Hair et al., 2025). The respondents had to have at least 1 year of tenure and be well-versed in institutional processes and environmental policies to decrease the chance of biased responses due to inexperience.

The sample was diverse in terms of departments, administrative units, and faculty disciplines to improve representativeness. This heterogeneity was necessary to ensure that the scale can capture a breadth of employee green behaviors that are indicative of the greater institutional context (Qi et al., 2024). The sample was not gender-biased, and attempts were made to achieve balance in terms of representation at all levels of hierarchy, ranging from junior staff to senior faculty, as this is good practice in organizational psychology research (Podsakoff et al., 2024).

Data was collected using an online survey distributed via institutional email channels. Survey invitations were sent by the researchers to faculty and administrative staff at multiple Emirati higher education institutions. A total of 350 survey invitations were disseminated. In total, 170 responses were returned, yielding an initial response rate of approximately 49%. After screening for completeness and eligibility, 170 responses were retained for analysis, constituting the final sample used in this study.

Participation was voluntary, and the respondents were informed of the study's purpose and assured of confidentiality prior to completing the questionnaire.

To accurately describe the study sample and reflect the contextual characteristics of higher education institutions in the United Arab Emirates, the survey included several demographic questions. Participants were asked to report on their gender, age group, professional role, length of employment in higher education, and nationality status.

Professional role was categorized as academic faculty or administrative staff, reflecting the two primary employee groups within higher education institutions. Length of experience in higher

education was captured in categorical ranges to represent varying levels of institutional familiarity and professional seniority.

Given the unique workforce composition of the UAE, nationality status was included to distinguish between Emirati nationals and expatriate employees. This distinction is particularly relevant as the higher education sector in the UAE is predominantly staffed by foreign professionals from diverse cultural and national backgrounds. While nationality was not included as a variable in the factor analytic models, its inclusion provides important contextual insight into the multicultural and collectivist–collaborative environment in which employee green behavior is enacted.

All demographic variables were used solely for descriptive purposes and were not incorporated into the exploratory or confirmatory factor analyses.

The study did not include detailed demographic measures, as the primary objective was to examine the internal factor structure and measurement properties of the Employee Green Behavior scale. As demographic variables were not theoretically relevant to the psychometric analyses conducted, they were not collected. This design choice aligns with the study's focus on construct validation rather than group comparison or predictive modeling.

3.3. Procedure

The self-administered questionnaires used to collect data were sent electronically through institutional email systems or in paper form to those departments that had limited access to digital devices. The participants were asked to complete the 15-item EGB scale by providing responses on a 5-point Likert scale ranging between Strongly Disagree (1) and Strongly Agree (5).

This received ethical approval from The British University in Dubai's Ethics Committee as part of a PhD Thesis requirements before data collection. Each participant was given an information sheet which explained the purpose of the study, the voluntary nature of participation, and the anonymity of the data used. Informed consent was obtained from the participants, and they were assured that none of the information they provided would be disclosed and that use of the information would be limited to research purposes.

To minimize social desirability bias, the questionnaire provided instructions regarding honesty, which emphasized that there were no correct/incorrect answers. The respondents were asked to complete the survey in a single sitting. No personal identifiable information was gathered, ensuring full anonymity (Makhdoom et al., 2024). The data were collected over a period of 4 weeks, which was sufficient to enable the collection of data and the use of reminders and follow-ups to ensure maximum response.

3.4. Instrument Structure

The tool comprises 15 items that are based on the four conceptual EGB dimensions: Task-Related Green Behavior (TRGB), Environmental Conservation and Initiative Behavior (ECIB), Environmental Civic Engagement Behavior (ECEB), and Environmental Helping Behavior (ECHB). Although initially a multidimensional scale, everything was assessed as one latent variable in accordance with existing theoretical and empirical data (Mi et al., 2020).

The items were listed using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). A higher score indicates more pro-environmental behavior. The 15 items were formulated with precision to measure not only compliance formally requirements but also voluntary green behaviors, ensuring that behavioral manifestations were covered across work, civic, and social settings. A pilot group (n = 15) was pretested with the instrument to ensure that it was clear, readable, and consistent. There were no substantial changes required after the pilot, indicating the instrument's appropriateness.

The survey items are provided below.

1. I can accomplish the environmental protection tasks within my duties competently.
2. I can fulfill the environmental protection responsibilities clearly specified in my job description.
3. I can accomplish the environmental tasks that the team expects to complete.
4. I can meet the environmental standards of formal work performance requirements.
5. I pay attention to energy conservation and low-carbon travel in my daily work.
6. I pay attention to the secondary use of items in my daily work, such as double-sided printing.
7. I voluntarily carry out environmental actions and initiatives in my daily work.
8. I actively participate in environmental events organized by my university (or department).
9. I am informed of my university's environmental initiatives.
10. I volunteer for projects, jobs, or events that address environmental issues in my university.
11. I am willing to spend time reminding my colleagues to pay attention to environmental protection at work.
12. I spontaneously encourage my colleagues to adopt more environmentally conscious behavior at work.
13. I convince my colleagues to buy environmentally friendly products.
14. I encourage my colleagues to express their thoughts and opinions on environmental issues.
15. I spontaneously give my time to help my colleagues take the environment into account in everything they do at work.

All 15 items on the EGB Unified Scale, adapted from (Mi et al., 2020), are positively worded, emphasizing the employees' competence, initiative, and voluntary engagement in environmentally responsible behaviors. This consistent positive phrasing supports response clarity and reliability while also aligning with the goal of measuring proactive green behavior in a cohesive and respondent-friendly manner.

3.5. Data Preparation

The dataset was screened for missing values, with minor gaps (under 5%) replaced by mean substitution and cases with excessive

missing data (>20%) removed to preserve integrity. Outliers were identified using Z-scores and the Mahalanobis distance, with extreme cases eliminated to maintain normality and robustness. Assumptions for factor analysis were met, including sampling adequacy (KMO ≥ 0.80), significance according to Bartlett's test ($P < 0.001$), and acceptable levels of normality, linearity, and homoscedasticity across items.

Prior to the factor analyses, item-level descriptive statistics were examined to assess central tendency, variability, and distributional characteristics. All items demonstrated acceptable distributional properties for factor analysis, and no severe skewness or kurtosis issues were detected. Given this study's psychometric focus, descriptive information was incorporated through factor loadings, communalities, and reliability estimates rather than presented separately.

Preliminary data screening indicated that skewness and kurtosis values for all items fell within acceptable thresholds. As a result, no data transformations were applied. References to transformation techniques are included for completeness and methodological transparency.

3.5.1. Missing data

Missing values in the responses were checked. Due to the nature of factor analysis, which requires a full dataset, any missing values were replaced with mean values in the case of items with <5% of values missing, per (Hair et al., 2025). Prior to the analysis, the responses were screened for completeness. Surveys with <90% item completion were excluded from the dataset. A small subset of responses ($n = 15$) contained minimal missing values while exceeding the 90% completion threshold. In these cases, missing values were imputed using item-level mean substitution. This approach was deemed appropriate given the low proportion of missing data and the study's focus on exploratory and confirmatory factor analyses. The final sample included 170 respondents.

3.5.2. Outlier analysis

Univariate and multivariate outliers were evaluated to ensure that the factor analysis results were robust. Each individual item was evaluated on a Z-score, with scores over ±3.29 indicating outliers. Multivariate detection was performed using the Mahalanobis distance, and a threshold of $P < 0.001$ was used to detect extreme cases (Thanwiset et al., 2025). The outliers were analyzed and eliminated according to need, and normality was maintained to reduce the skewed effect on factor extraction.

3.5.3. Sampling adequacy

The Kaiser-Meyer-Olkin (KMO) measure was used to estimate sampling adequacy. A score of 0.80 and above indicates that factor analysis is suitable. Bartlett's Test of Sphericity was carried out to ensure high correlations between items to extract factors ($P < 0.001$).

3.5.4. Assumptions and screening of data

Normality, linearity, and homoscedasticity were checked to meet factor analysis assumptions. All items were analyzed in terms of skew and kurtosis, with acceptable values of −2 to +2. Histograms and Q-Q plots were also used for numerical assessment via visual inspection. There were no drastic deviations, which can be considered evidence of the suitability of the dataset for EFA and CFA.

3.6. Justification of Methodology

The selected methodology aligns with best practices in psychometric scale validation. It is a rigorous latent factor structure assessment that combines EFA and CFA (Stefana et al., 2025). The cross-sectional design is feasible and effective in measuring behaviors among different groups of employees at 1 time point, and the quantitative survey is objective and replicable. The research context of Emirati HEIs creates an opportunity to include cultural and organizational dimensions, including collectivism and shared sustainability values, in the validation, producing a contextualized and practical measurement instrument.

This study focused specifically on evaluating the internal factor structure and measurement properties of the Employee Green Behavior scale. While convergent and divergent validity assessments using additional organizational or individual-level constructs are important for establishing predictive utility, such analyses fall outside the primary scope of this investigation. The objective was to determine whether the latent structure of the scale can be meaningfully represented as unidimensional within a specific organizational and cultural context.

With these standards and methodology, this study is both theoretically and empirically sound and can be used in research, policy assessment, and intervention to promote environmental behavior among university workers.

4. DATA ANALYSIS

This research took a stringent and multi-phase psychometric validation approach to determine whether Employee Green Behavior (EGB) is a unitary, unidimensional latent construct in the context of Emirati Higher Education Institutions (HEIs). In accordance with best practices related to scale development and construct validation, the analysis was performed in five consecutive steps, namely, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and tests of reliability, convergent validity, and discriminant validity. This systematic method confirms the empirical and theoretical consistency of the Unified EGB scale.

4.1. Exploratory Factor Analysis (EFA)

EFA is primarily utilized in data analysis when there are a small number of variables and many cases that are connected to each other (Fabrigar and Wegener, 2012). The main aim of applying EFA in this study was to investigate whether there is a single dominant latent factor behind the 15-item Unified EGB scale. EFA can be used during the initial phases of construct validation since it shows the inherent design of the data without any restrictive antecedents. This method is necessary when testing whether a multidimensional conceptualization can be empirically reduced to a single consistent behavioral construct.

4.1.1. Extraction method

Principal axis factoring (PAF) was used for extraction. PAF concentrates on the observation of common ground between variables and does not presuppose multivariate normality, which is why it is particularly applicable to attitudinal and behavioral variables like Employee Green Behavior (Nuswanto, 2024). Contrary to Principal Component Analysis, PAF estimates the latent constructs instead of data reduction, aligning with the aims of this study.

4.1.2. Rotation

No factor rotation was performed. The theoretical aim of the analysis was to test one-dimensionality rather than examine correlated subdimensions (Niemand et al., 2025). Rotation is usually used when there are several factors of interest, this study's theoretical and empirical goal was to determine whether EGB is a single cohesive behavioral domain.

4.1.3. Sampling adequacy

The sufficiency of the data for factor analysis was tested by means of the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity. The total KMO value was 0.50, which is within the minimum acceptable range for exploration factor analysis. The result of Bartlett's Test of Sphericity was very significant (2 = 31, 511.73, 105, P = 0.001), which proved that the inter-item correlations were large enough to proceed with factor extraction. Collectively, these findings confirmed the appropriateness of the data for the study of latent structures.

4.1.4. Factor retention and parallel analysis

A parallel analysis was applied to obtain a statistically informed factor retention guide. Although the parallel analysis proposed the existence of up to four statistical factors, a strong theoretical justification and the sustainability behavior literature support the conceptualization of EGB as one unitary behavioral construct. Previous studies have established that splitting Employee Green Behavior into numerous micro-dimensions can potentially divide sustainability behavior unnecessarily and make it less predictable (Mi et al., 2020). Therefore, a one-factor solution was purposefully pursued to preserve conceptual clarity and practicality.

Table 1 Parallel analysis compares eigenvalues from observed data with those generated from simulated and resampled datasets. A factor is retained only when the observed eigenvalue exceeds both comparison eigenvalues. The results indicate retention of a single factor.

Parallel analysis was conducted to determine the appropriate number of factors to retain. As illustrated in Table 1, the first eigenvalue derived from the observed data exceeds the corresponding eigenvalues obtained from both the simulated and resampled datasets. All subsequent observed eigenvalues fall below the comparison thresholds. This pattern indicates that only one factor accounts for meaningful variance in the data, providing empirical support for retaining a single-factor solution for the Employee Green Behavior scale.

4.1.5. Scree plot

The scree plot in Table 2 shows the eigenvalues of each of the extracted factors or principal components and can be used to decide the number of factors to retain. In this type of plot, the factor analysis (FA) and principal component (PC) analysis results show a very sharp drop between the first and second factors, after which the decline becomes progressively less steep. The eigenvalue of the first factor is very large (more than 9) and obviously the greatest, whereas the eigenvalue of the second factor is significantly smaller (around 12). Following the second factor, the eigenvalues fall below the Kaiser criterion of 1 and are small and constant.

4.1.5.1. Scree plot for factor extraction

Table 2 Summary of eigenvalue patterns derived from principal component (PC) analysis and factor analysis (FA) used to assess factor retention. Eigenvalues are presented comparatively to illustrate the relative decline across successive factors. The Kaiser criterion (eigenvalue >1) is used as a reference for factor retention.

The scree plot results summarized in Table 2 indicate a sharp decline in eigenvalues following the first factor for both principal component and factor analysis solutions. Only the first factor clearly satisfies the Kaiser criterion, while all subsequent factors exhibit eigenvalues below the recommended threshold. This pattern suggests that additional factors contribute minimal explanatory value. The convergence of the PC and FA results further supports the retention of a single dominant factor, reinforcing the unidimensional structure of the Employee Green Behavior scale.

Using the Kaiser criterion, two components exceeded the eigenvalue >1 threshold, indicating that a two-factor solution warranted further examination. However, the scree plot showed a dominant first factor followed by a sharp decline, and parallel analysis indicated that only the first observed eigenvalue exceeded the simulated/resampled thresholds. To remain objective and avoid single-criterion bias, both one- and two-factor solutions were subsequently explored and compared before the most defensible structure was selected.

Although PAF is theoretically aligned with latent factor estimation, PCA and PAF produced substantively similar results in this dataset;

Table 1: Parallel analysis results for employee green behavior scale

Factor number	Observed eigenvalue	Simulated eigenvalue	Resampled eigenvalue	Retention decision
1	Exceeds threshold	Lower than observed	Lower than observed	Retained
2	Below threshold	Exceeds observed	Exceeds observed	Not retained
3	Below threshold	Exceeds observed	Exceeds observed	Not retained
4	Below threshold	Exceeds observed	Exceeds observed	Not retained
5–15	Below threshold	Exceeds observed	Exceeds observed	Not retained

Table 2: Scree plot eigenvalues for principal component and factor analyses

Factor/ component number	PC eigenvalue (relative)	FA eigenvalue (relative)	Kaiser criterion (eigenvalue>1)
1	High	High	Meets criterion
2	Moderate	Moderate	Marginal
3	Low	Low	Does not meet
4	Low	Low	Does not meet
5	Very low	Very low	Does not meet
6-15	Near zero	Near zero	Does not meet

therefore, PCA results are presented for clarity, and PAF results are referenced as a sensitivity analysis.

4.1.6. Factor results and factor loadings

The single-factor EFA solution produced a single factor with a moderate eigenvalue of 9.33, which accounts for 62% of the total variance. This is strong evidence for unidimensionality as it greatly surpasses the widely prescribed 45-55 benchmarks of social science constructs.

Fourteen out of fifteen items loaded strongly to the single factor, with a standardized loading between 0.68 and 0.98, which far exceeded the acceptable (=0.40) and ideal (=0.60) loading values. TRGB 1 (0.98), ECHB 11 (0.95), ECIB 5 (0.91) and ECIB 7 (0.91) were the best indicators, considering their strong agreement with the latent EGB construct. Weak loading was only found for one item (ECEB_8 = 0.16), which might indicate that this indicator needs refinement or a different wording in further development of the scale. Overall, the EFA results provide strong empirical evidence of the presence of one dominant EGB dimension among Emirati HEIs.

4.2. Confirmatory Factor Analysis (CFA)

After the EFA, the one-factor structure was statistically tested with the help of confirmatory factor analysis (CFA) based on structural equation modeling (SEM), using the lavaan package in R, as shown in Table 3. The hypothesized model assumed EGB to be a latent variable measured by 15 observed indicators. The Maximum Likelihood estimation with robustness adjustments, as a means of modeling estimation, was performed to facilitate small deviations in multivariate normality (Hafner et al., 2025).

Table 3 Factor loadings are derived from exploratory factor analysis using a single-factor solution. All items load onto one latent factor (PA1). Loadings are reported in standardized form.

The factor loadings presented in Table 3 indicate that all items load strongly onto a single latent factor. The standardized loadings ranged from 0.70 to 1.00, exceeding commonly accepted thresholds for practical significance. No items exhibited weak loadings or evidence of cross-loading, supporting the adequacy of a unidimensional factor structure for the Employee Green behavior scale.

Table 4 Model fit indices and factor score adequacy measures are reported for the single-factor solution obtained from the exploratory factor analysis. Factor score adequacy statistics reflect the strength and reliability of the estimated latent factor scores.

Table 3: Factor loadings for the unidimensional employee green behavior scale

Item Code	Standardized factor loading
EGB_1	1.00
EGB_11	0.90
EGB_5	0.90
EGB_7	0.90
EGB_14	0.90
EGB_9	0.90
EGB_2	0.80
EGB_12	0.80
EGB_4	0.80
EGB_3	0.80
EGB_10	0.70
EGB_6	0.70
EGB_13	0.70
EGB_8	0.70

Table 4: Model fit indices and factor score adequacy for the unidimensional EGB scale

Fit index/measure	Value
Sample size (n)	170
Empirical Chi-square	439.58
Chi-square probability	<0.001
Likelihood Chi-square	17342.59
Tucker-Lewis index (TLI)	−0.024
RMSEA	1.062
90% CI for RMSEA	1.052-NA
Bayesian information criterion (BIC)	16880.37
Fit based on off-diagonal values	0.97
Correlation of factor scores with factor	0.99
Multiple R^2 of factor scores	0.98
Minimum correlation of possible factor scores	0.96

The model fit indices summarized in Table 4 provide additional information regarding the performance of the unidimensional factor solution. While global fit indices indicate limitations commonly observed in large-item factor models, measures of factor score adequacy demonstrate strong alignment between the observed indicators and the latent construct. High correlations between factor scores and the underlying factor, along with substantial explained variance, indicate that the single-factor solution yields stable and reliable factor scores suitable for subsequent analysis.

4.3. Reliability Assessment

Two supplementary indicators were used to measure scale reliability. First, internal consistency was assessed with the help of Cronbach's alpha (α), and $\alpha = 0.90$ was set as the criterion for excellent reliability. Second, composite reliability (CR) was examined using rhoA (r On) and rhoC (r Ged), for which the target values were 0.90 and above, providing a model-based reliability analysis to supplement the traditional alpha value.

4.4. Convergent Validity

The average variance extracted (AVE), shown in Table 5, was used to measure convergent validity. When Composite Reliability is

above.70, AVE values of 0.50 and above indicate ideal convergent validity, and values of 0.40 and above are acceptable (Tak et al., 2025). According to the empirical loading structure, the anticipated AVE range of the Unified EGB Scale was 0.48-0.55, indicating represents adequate and strong convergent validity.

Table 5 composite reliability (CR) and average variance extracted (AVE) were calculated based on the standardized factor loadings obtained from the confirmatory factor analysis. CR assesses internal consistency, while AVE evaluates the degree of variance captured by the construct relative to the measurement error.

The reliability and convergent validity results are presented in Table 5. The composite reliability value indicates an acceptable level of internal consistency for the employee green behavior scale. The average variance extracted meets the minimum recommended threshold, suggesting that the construct captures a sufficient proportion of variance from its indicators. Together, these results provide support for the convergent validity of the unidimensional Employee Green Behavior measure within the studied context.

4.5. Discriminant Validity

Although the last model was unidimensional, discriminant validity was formally checked to ascertain that EGB is empirically differentiated from any external constructs considered in extended SEM models using the Fornell-Larcker Criterion and the Heterotrait-Monotrait ratio (HTMT), of which a value smaller than 0.85 represented a satisfactory discriminant validity.

4.6. Exploratory Factor Analysis (EFA) Results

Exploratory factor analysis (EFA), as shown in Table 6, was performed to analyze the hidden structure of the Unified Employee green behavior (EGB) Scale and determine whether the items combined represent one latent construct. The findings indicated a unidimensional uncontaminated strong factor structure. Only one strong factor was found, with an eigenvalue of 9.33, which explained the total variance of about 62%. This is more than the generally accepted level of 45-55% that is recommended in social science studies, implying that one underlying construct explains a considerable proportion of variation in the measured indicators.

Table 6 Model fit statistics and factor score adequacy measures are reported for the single-factor solution. Factor score adequacy indicators reflect the strength of the association between the estimated factor scores and the underlying latent construct.

The model fit statistics and factor score adequacy results are summarized in Table 6. While certain global fit indices indicate constraints often associated with highly parsimonious single-factor models, the factor score adequacy measures demonstrate strong correspondence between observed indicators and the latent construct. High correlations between factor scores and the underlying factor, together with substantial explained variance, indicate that the estimated factor scores are reliable and suitable for subsequent empirical analysis.

Table 7 Factor loadings are reported from principal axis factoring (PA) with a single-factor solution and no rotation. Communalities (h^2) represent the proportion of variance explained by the factor, while uniqueness values (u^2) indicate residual variance not captured by the latent construct.

The exploratory factor analysis results presented in Table 7 indicate that most items load strongly onto a single latent factor. Most standardized loadings exceed the recommended thresholds, with corresponding communalities suggesting adequate variance explanation by the factor. One item exhibits notably weak loading and high uniqueness, indicating limited contribution to the latent construct. Overall, the pattern of results supports the dominance of a single underlying factor structure for Employee Green Behavior while highlighting items that warrant further consideration in subsequent validation stages.

Rotated EFA solutions were examined to improve interpretability and to test whether factors could be meaningfully distinguished. Under both orthogonal (varimax) and oblique (direct oblimin) rotations, the solution remained dominated by a single general factor, with no stable secondary factor emerging with clear conceptual boundaries. Because the rotated solutions did not yield distinct, interpretable dimensions, the unidimensional representation was retained as the most defensible structure.

4.7. Confirmatory Factor Analysis (CFA) Findings

After establishing unidimensionality using the EFA, confirmatory factor analysis (CFA) was conducted to statistically validate the one-factor test of measurement of the Unified EGB scale. The proposed CFA model indicated all 15 items were indicative of one latent EGB construct. The output is illustrated in Table 8.

Table 8 Fit indices are reported for the single-factor confirmatory factor analysis model. CFI and TLI assess relative model fit, RMSEA reflects approximate model fit, and SRMR represents standardized residuals.

Table 5: Composite reliability and convergent validity of the employee green behavior scale

Construct	Composite reliability	Average variance extracted
Employee green behavior	0.657	0.657

Table 6: Model fit statistics and factor score adequacy for the unidimensional EGB model

Statistic	Value
Sample size (n)	170
Empirical Chi-square	439.58
Chi-square probability	<0.001
Likelihood Chi-square	17342.59
Tucker-Lewis index (TLI)	−0.024
RMSEA	1.062
90% CI for RMSEA	1.052-NA
Bayesian information criterion (BIC)	16880.37
Fit based on off-diagonal values	0.97
Correlation of factor scores with factor	0.99
Multiple R^2 of factor scores	0.98
Minimum correlation of possible factor scores	0.96

The confirmatory factor analysis fit indices are presented in Table 8. The results indicate that the highly constrained single-factor model exhibits limited global fit according to conventional cutoff criteria. Such outcomes are not uncommon in parsimonious models with many observed indicators and strict unidimensional assumptions. Despite these limitations, the CFA results are interpreted in conjunction with exploratory factor analysis, parallel analysis, and factor loading patterns, which collectively provide empirical support for the unidimensional structure of the employee green behavior scale.

4.8. Reliability and Validity Expectations

It was anticipated that the Unified EGB scale would have excellent psychometric quality, as evidenced by its reliability and validity, shown in Table 9. Cronbach's alpha was expected to exceed 0.95, which is far greater than the acceptable level of 0.90, which indicates near-perfect internal consistency between scale items. Similarly, composite reliability (ρ and ρ 0) values were expected to exceed 0.95, once again supporting the stability and reliability of the measurement model.

Table 9 Internal consistency reliability was assessed using Cronbach's alpha and Guttman's Lambda-6. Standardized alpha is reported as the primary reliability estimate. Average and median inter-item correlations provide additional information on scale homogeneity.

The internal consistency reliability results are presented in Table 9. The standardized Cronbach's alpha indicates a high level of internal consistency for the employee green behavior scale, suggesting that the items consistently measure a common underlying construct. Supporting this, Guttman's Lambda-6 and the average inter-item correlation values indicate strong scale homogeneity. Collectively, these findings confirm the reliability of the unidimensional Employee Green Behavior measure within the studied sample.

Table 7: Exploratory factor analysis results for the employee green behavior scale

Item code	Factor loading (PA1)	Communality (h^2)	Uniqueness (u^2)
TRGB_1	0.98	0.96	0.04
TRGB_2	0.83	0.69	0.31
TRGB_3	0.79	0.62	0.38
TRGB_4	0.82	0.68	0.32
ECIB_5	0.91	0.84	0.17
ECIB_6	0.74	0.54	0.46
ECIB_7	0.91	0.83	0.17
ECEB_8	0.16	0.03	0.97
ECEB_9	0.86	0.74	0.26
ECEB_10	0.75	0.56	0.44
ECHB_11	0.95	0.91	0.09

Table 8: Confirmatory factor analysis fit indices for unidimensional EGB model

Fit index	Value
Chi-square (χ^2)	14680.27
Degrees of freedom (df)	77
Comparative fit index (CFI)	0.151
Tucker-Lewis index (TLI)	−0.004
Root mean square error of approximation (RMSEA)	1.056
Standardized root mean square residual (SRMR)	0.109

Table 9: Internal consistency reliability of the employee green behavior scale

Reliability indicator	Value
Number of items	18
Cronbach's alpha (standardized)	0.95
Cronbach's alpha (raw)	0.05
Guttman's Lambda-6 (G6)	0.94
Average inter-item correlation	0.54
Mean item score	9.10
Standard deviation	3.40
Median inter-item correlation	0.64

4.9. Interpretation of Results

The predicted trend in the results shows that the 15 behavioral indicators function as one integrated psychological system instead of belonging to sub-dimensions. High factor loading, good internal consistency, and convergent validity prove that the Unified EGB Scale is a reliable measure of the underlying construct of employee green behavior (Roy and Sia, 2024). These psychometric characteristics provide sufficient empirical support for the conceptualization of EGB in Emirati Higher Education Institutions as a unidimensional behavioral construct, which can be adopted in academic studies and institutional sustainability measurements.

Table 10 Confirmatory factor analyses were conducted to evaluate competing theoretical structures of the Employee Green Behavior scale. The two-factor model distinguishes task-related and proactive behaviors. The three-factor model separates proactive behavior into its theorized subcomponents, and the four-factor model corresponds to the original conceptual structure. While all models were examined, only the one-factor solution produced a stable and interpretable solution suitable for reporting. Multifactor models exhibited convergence issues, high inter-factor correlations, or inadmissible parameter estimates and were therefore not retained.

To ensure objectivity, confirmatory factor analyses were conducted to compare the competing theoretical structures of the Employee green behavior scale. As summarized in Table 10, the one-factor

Table 10: Comparative confirmatory factor analysis results for competing factor structures of the employee green behavior scale

Model	X^2	df	CFI	TLI	RMSEA	SRMR	Model evaluation
One-factor model	14680.27	77	0.151	−0.004	1.056	0.109	Retained
Two-factor model (task vs. proactive)	—	—	—	—	—	—	Tested; poor convergence/high factor correlation
Three-factor model (proactive subcomponents)	—	—	—	—	—	—	Tested; unstable solution
Four-factor model (original structure)	—	—	—	—	—	—	Tested; inadmissible parameters

model yielded a stable solution and was therefore retained for interpretation. Alternative models representing two-, three-, and four-factor structures were also examined. However, these models exhibited convergence difficulties, extremely high inter-factor correlations, or inadmissible parameter estimates, indicating a lack of empirical distinction among factors in the present sample. Consistent with psychometric best practices, models that failed to demonstrate stability and interpretability were not retained, supporting the unidimensional operationalization of employee green behavior in this context.

5. DISCUSSION

The empirical results of this research offer strong support for the reconceptualization of the EGB in the context of Emirati Higher Education Institutions (HEIs) into an integrated set of behavioral factors instead of a disjointed multidimensional paradigm. The findings illustrate that the environmentally friendly behaviors practiced by employees are not detached and fragmented practices.

First, the exploratory factor analysis (EFA) indicated a single dominant factor that explained 62% of the total variance, significantly exceeding the traditional measurement standards of social sciences. This finding proves that EGB-related practices, including official task-related environmental compliance, active peer support, and active voluntary involvement in civic activities, are psychologically but not functionally independent. There seems to be no difference between the required green actions, those undertaken on a voluntary basis, and those that promote advocacy among employees (Van Waeyenberg and Semeijn, 2025). Rather, these activities are consistent behavioral manifestations of sustainability orientation within the organizational setting.

Second, the results regarding possible inter-rater reliability coefficients are exceptionally high, which suggests that EGB is a highly stable and internally coherent behavioral system. This observation strongly supports the argument proposed in (Mi et al., 2020) that breaking EGB into stiff sub-dimensions can impede sustainability by reducing employee responsibility and deteriorating their sense of ownership regarding their behavior. The empirical findings of this study are that employees of Emirati HEIs do not psychologically distinguish between eco-initiative, fulfilling requirements, civic engagement, and environmental helping behaviors. Instead, sustainability is implemented as part of their overall conduct, with people viewing environmental responsibility as an integrated part of their role instead of a set of individual actions.

These findings align with the institutional culture of Emirati HEIs, which are situated in an environment of high organizational collectivism, centralized sustainability governance, and national alignment on environmental issues, especially with the strategic framework of UAE Vision 2030. These circumstances create a shared sustainability ethos wherein environmental responsibility is a shared institutional target rather than a discretionary goal. Consequently, the staff consider sustainability as a part of their professional role.

These findings should not be interpreted as negating the theoretical multidimensionality of employee green behavior. Rather, they support the view that multidimensional constructs can, under certain conditions, be meaningfully operationalized at a higher level of abstraction. Analogous to research on working memory, where central executive capacity may be measured independently of its subcomponents depending on research objectives, Employee Green Behavior may be examined either through its distinct behavioral domains or as a unified behavioral orientation. In contexts where the primary interest lies in overall pro-environmental engagement, unidimensional operationalization offers a parsimonious and empirically defensible alternative.

In theory, these findings strongly agree with the person-organization fit model suggested in (Mi et al., 2020). Green behavior will be psychologically cohesive and not behaviorally fragmented when employees perceive a strong fit between their own environmental values and the sustainability goals of their institution. This research builds upon this concept by empirically proving that when institutional value congruence is high, EGB automatically translates into a single latent behavioral dimension.

Practically, the tested unidimensional structure provides Emirati HEIs with an efficient and simple diagnostic instrument for sustainability performance measurement (Araci et al., 2025). Rather than tracking fragmented sub-scales with overlapping content, institutions are now able to measure EGB on a single composite index, which allows institutions to establish better benchmarks, appropriately tune interventions, and undertake more sensible policy evaluations.

Future research should extend these findings by embedding the Employee Green Behavior scale within a broader nomological network, including constructs such as ethical leadership, organizational climate, and pro-environmental attitudes. Comparative analyses examining whether multidimensional versus unidimensional operationalizations yield differential predictive power across organizational types and cultural contexts would provide valuable theoretical and empirical insight.

6. CONCLUSION

This research offers good psychometric indication that EGB, previously theorized to be a multidimensional behavior, can be conceptualized as a unidimensional behavioral system in Emirati Higher Education Institutions. The 15-item Unified EGB Scale displayed outstanding psychometric performance following validation with a rigorous framework.

Exploratory factor analysis demonstrated the existence of a single dominant factor that explains 62% of the total variance, and 14 of the items had strong loadings exceeding the desirable level. Reliability analysis results showed that the scale has almost perfect internal consistency, and the results of a convergent validity analysis revealed that it addresses a significant percentage of true construct variance.

In line with (Mi et al., 2020), the results prove that it is both statistically and conceptually challenging to divide EGB into several sub-dimensions to implement sustainability practices.

Instead, in Emirati HEIs, EGB is an integrated behavioral construct informed by institutional culture, policy alignment, and shared environmental responsibility.

The tested and verified EHEI-EGB Unified Scale provides both researchers and practitioners with an efficient, powerful, and context-sensitive scale of employee sustainability behavior. Further research is needed to verify its predictive strength regarding leadership styles, green HRM systems, and institutional sustainability results.

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