

IN PRESS: *JOURNAL OF MANAGEMENT*

**Multilevel Influences on Voluntary Workplace Green Behavior: Individual Differences,  
Leader Behavior, and Coworker Advocacy**

Andrea Kim  
Sungkyunkwan University  
School of Business

Youngsang Kim  
University of South Carolina  
Darla Moore School of Business

Kyongji Han  
Rutgers University  
School of Management and Labor Relations

Susan E. Jackson  
Rutgers University  
School of Management and Labor Relations

Robert E. Ployhart  
University of South Carolina  
Darla Moore School of Business

***Acknowledgements:** The earlier version of this manuscript was presented at the 73<sup>rd</sup> Academy of Management Annual Meeting, Lake Buena Vista, FL. We truly appreciate three organizations for their participation in the data collection of this research.*

***Corresponding author:** Andrea Kim, Sungkyunkwan University, School of Business, #33314 Business Bldg., 25-2, Sungkyunkwan-ro, Jongno-gu, Seoul, South Korea 110-745*

***Email:** akim@skku.edu*

**ABSTRACT**

Drawing on a multilevel model of motivation in work groups and a functionalist perspective of citizenship and socially responsible behaviors, we developed and tested a multilevel model of voluntary workplace green behavior that explicates some of the reasons why employees voluntarily engage in green behavior at work. For a sample of 325 office workers organized into 80 work groups in three firms, we found that conscientiousness and moral reflectiveness were associated with the voluntary workplace green behavior of group leaders and individual group members. Furthermore, we found a direct relationship between leader green behavior and the green behavior of individual subordinates as well as an indirect relationship mediated by green advocacy within workgroups. Our theory and findings shed new light on the psychological and social conditions and processes that shape voluntary workplace green behavior in organizational settings and suggest implications for organizations striving to improve their social responsibility and environmental sustainability.

**Keywords:** corporate social responsibility; environmental sustainability; green behavior; leadership; motivation; multilevel; organizational citizenship behavior

**MULTILEVEL INFLUENCES ON VOLUNTARY WORKPLACE GREEN BEHAVIOR:  
INDIVIDUAL DIFFERENCES, LEADER BEHAVIOR, AND COWORKER  
ADVOCACY**

Corresponding to a growing public concern about the long-term consequences of environmental degradation and climate change as well as the threats these pose to economic profitability and growth, companies around the world are proactively striving toward improved environmental responsibility and stewardship (Aguilera, Rupp, Williams, & Ganapathi, 2007; Aguinis & Glavas, 2012). Among organization and management scholars, activities that promote environmentally sustainable organizations are often referred to as “green” organizational practices (e.g., see Renwick, Redman, & Maguire, 2013) and individual behaviors that are consistent with environmental sustainability are often referred to as “green” behaviors (e.g., see Ones & Dilchert, 2012<sup>[AK1]</sup>; Andersson<sup>[SJ2]</sup>, Jackson, & Russell, 2013). According to a study of over six thousand greening initiatives in 635 firms in the *2009 Newsweek Top 500 Green Companies* and in the *Fortune 500* list, a vast majority of organizational greening efforts rely on “voluntary” employee participation (D’Mello, Ones, Klein, Wiernik, & Dilchert, 2011). While scholars in other disciplines have studied voluntary green behaviors in non-work settings, organizational scholars have only recently begun investigating the antecedents of voluntary green behaviors in the workplace.

In an effort to contribute to the nascent field of voluntary green behavior at work (Andersson et al., 2013) and more broadly to the realm of corporate social responsibility (CSR) where scholars have lamented a dearth of research at micro levels (Aguinis & Glavas, 2012), we theorized about several psychological and social conditions likely to be associated with the voluntary workplace green behavior (VWGB) of individual employees. Building on Boiral

(2009), we extend theory and research on organizational citizenship behavior (OCB) to view VWGB as a type of OCB and identify its antecedents. Our theoretical model of VWGB is grounded in a functional approach to OCB (Lavelle, 2010; Penner, Midili, & Kegelmeyer, 1997) and CSR engagement (Aguilera et al., 2007) wherein individual voluntary involvement in prosocial actions within organizations is presumed to reflect personal underlying motives to fulfill psychological needs. Inspired by the OCB literature where researchers have traditionally focused on the role of personality traits and increasingly identified specific mechanisms through which personality traits affect particular instances of OCB (e.g., Ilies, Fulmer, Spitzmuller, & Johnson, 2009), we contemplate that conscientiousness and moral reflectiveness, which refers to the extent to which an individual reflects his or her daily experiences with morality (Reynolds, 2008), are antecedents of VWGBs at the individual-level. Taking into account the multilevel nature of organizations, we further argue that individual VWGB is amplified through the interpersonal dynamics that occur within work groups, such that leaders' VWGBs and work group green advocacy (i.e., a work group's collective influence behavior that encourages individual members to conform to environmental responsibility) can be viewed as contextual forces in a top-down cross-level model. Our multilevel model of VWGB was tested with a sample of 325 office workers organized into 80 work groups within three companies.

Our investigation contributes to an improved understanding of behavior at work in general and prosocial behavior for environmental sustainability in particular. First, this study is one of very few to investigate the antecedents of voluntary green behaviors in work settings. Traditionally, such behaviors and their antecedents have been examined in non-work settings by environmental psychologists (Bamberg & Möser, 2007). However, it is worth studying voluntary green behavior in the workplace also (Stern, 2000), for differences between work and

non-work settings may limit the generalizability of findings from one setting to the other. Each behavioral domain presents different opportunities and choices for environmentally-friendly behavior. The types of voluntary green behaviors that occur in specific settings and the role relationships that guide behavior in those settings are likely to have implications for how individual differences and social dynamics influence voluntary green behavior. Thus, understanding VWGB requires examining such behavior *in situ*.

In addition, our research provides a multilevel theory and empirical test of the conditions that encourage employees to engage in VWGB. Previous studies of motivational processes within organizations have most often focused on either individual- *or* group-level processes (Chen & Kanfer, 2006). A similar pattern is found in the extant research on green behavior in organizations. That is, prior work has demonstrated employee workplace green behavior's positive relationships either with individual characteristics such as daily positive affect and proenvironmental attitudes (e.g., Bissing-Olson, Iyer, Fielding, & Zacher, 2013) or with contextual factors such as leaders' leadership styles (e.g., Robertson & Barling, 2013). However, as yet, little is known about how individual factors combine with contextual factors to shape VWGB (cf., Barrick, Mount, & Li, 2013). Our multilevel theoretical model incorporated the dual influences of individual differences and social dynamics as conditions for the blossoming of VWGB. Although interventions such as monitoring behavior and giving feedback have been found to promote green behaviors in non-work settings (Osbaldiston & Schott, 2012), few employers have instituted such structured interventions; thus, the workplace green behavior of employees is likely to reflect their own characteristics (including conscientiousness and moral reflectiveness) and the social context in which they are embedded (including the VWGB of leaders and green advocacy by their work group). Our work seeks to advance understanding of

these individual- and group-level phenomena by analyzing data collected from multiple sources and addressing some methodological concerns acknowledged by the earliest pioneers (e.g., Bissing-Olson et al., 2013; Robertson & Barling, 2013).

### THEORY AND HYPOTHESES

Following Boiral's (2009) conceptualization, we use the term voluntary workplace green behavior to refer to discretionary employee actions that contribute to the environmental sustainability of the employer organization but are not under the control of any formal environmental management policies or system. Rather than some existing terms (e.g., environmental OCB and proenvironmental behavior at work), we prefer to incorporate the word "green" in our construct label, because use of the term "green" is increasingly evident in the management literature as well as within organizational settings perhaps for ease of communication. As suggested by this definition, VWGB is a type of prosocial or citizenship behavior that can occur in the workplace. It<sup>[AK3]</sup> benefits organizations directly by conserving resources and energy for cost reduction and indirectly by preserving the natural environment for organizational sustainability. Thus, it reflects the civic virtue dimension of citizenship behavior, which describes safeguarding organizational resources, including life and property (George & Jones, 1997). VWGBs are neither specified in job descriptions nor systematically monitored or rewarded. They are extra-role behaviors for the majority of employees, although perhaps not for environmental managers and staff (Ramus & Killmer, 2007). Furthermore, we posit that VWGB is the eco-friendly behavioral element of civic citizenship. As<sup>[AK4]</sup> Van Dyne, Graham, and Dienesch (1994: 766) noted, civic citizenship includes "all positive community-relevant behaviors of individual citizens." In line with this view, VWGB ultimately promotes the health and long-term sustainability of earth's ecosystem.

During the past three decades, research on OCB has shed light on the personal (internal) characteristics and social (contextual) antecedents of prosocial workplace behavior. These antecedents include individual differences such as personality traits (e.g., Chiaburu, Oh, Berry, Li, & Gardner, 2011; Ilies et al. 2009; Organ & Ryan, 1995) as well as social relationships with leaders (e.g., Ilies, Nahrgang, & Moregeson, 2007) and colleagues (e.g., Kamdar & Van Dyne, 2007). In what follows, we describe a multilevel model that extends findings from research on organizational citizenship to consider the combined influences of individual differences and social contexts on VWGB.

### **A Multilevel Model of Voluntary Workplace Green Behavior**

As organizations are multilevel systems, explanations of workplace behavior require multilevel conceptual models (Hitt, Beamish, Jackson, & Mathieu, 2007). The behavior of individual employees is influenced by the employees' internal characteristics, but predicting a consistent pattern of individual behavior requires consideration of the person and the social context in tandem (Gibbons & Rupp, 2009). Building on Chen and Kanfer's (2006) cross-level model of motivational processes, we treat VWGB as employee responses that reflect the combined influences of individual dispositional inputs (conscientiousness and moral reflectiveness) and group-level ambient inputs (leadership behavior and coworker advocacy).

Following a functionalist perspective, we pay attention to some personal motives in order to explain the processes through which these individual and contextual influences shape VWGB. A group of functionalists have identified a variety of personal motives that may lead to environmentally-friendly behavior in non-work settings (Bamberg & Möser, 2007) and citizenship behavior in work settings (Lavelle, 2010; Penner et al., 1997). Likewise, CSR researchers have noted the roles of psychological needs as drivers of CSR engagement (e.g.,

Tuzzolino & Armandi, 1981), and especially Aguilera and colleagues (2007) developed the framework that describes instrumental, relational, and moral motives.

Next, we build on the most theoretically relevant motives to develop hypotheses about how individual differences and social context combine to shape VWGB. First, we explain why morally reflective individuals are likely to voluntarily engage in green behavior at work. Second, we argue that conscientious employees are likely to activate their inner process of moral reflection. Finally, we discuss how aspects of the social context of work can activate the individual-level processes that result in VWGB.

### **Individual Influences and VWGB: Moral Reflectiveness and Conscientiousness**

Personality traits have long been acknowledged as a prominent type of individual difference that influences human behavior, with more recent work focusing on the psychological mechanisms that account for the interconnections among personality traits, other individual characteristics, and behavior (Funder, 2001). One stream of recent work in this area focuses particularly on individual motivational processes as the explanation for how personality traits shape behavior. Barrick, Stewart, and Piotrowski (2002) argued that personality traits shape individual behaviors through proximal motivational variables. We draw on this claim to treat conscientiousness as a distal dispositional antecedent of VWGB and moral reflectiveness as a proximal intention of VWGB. Moral reflectiveness is appropriately viewed as a proximal motivational determinant of VWGBs, because individual morality is one of the factors that underlie individual concern and commitment to environmental issues (Feinberg & Willer, 2013). In addition, conscientiousness may induce VWGB through moral reflectiveness, because it encompasses morally-laden attributes (Becker, 1998); its positive linkage with citizenship behaviors has been widely substantiated in meta-analytic reviews (e.g., Chiaburu et al., 2011).

**Moral reflectiveness.** Moral reflectiveness refers to an individual difference in the amount of morally-guided reflection people engage in concerning their daily experiences (Reynolds, 2008). Moral reflectiveness is variable, as morality *per se* may change within an individual over time (Walker, 2002). Morally judging what is right and wrong is most influential to the engagement of moral behavior (Kohlberg, 1981). Moral reflectiveness is the individual intentional process to regularly consider moral matters in their daily life and its positive linkage with moral behavior has been empirically demonstrated (Reynolds, 2008).

An individual's concerns pertaining to social and environmental issues have been attributed to moral motives, which reflect "a basic respect for human dignity and worth" (Aguilera et al., 2007: 842). Empirical studies have found that people who give considerable thought to morality and moral matters tend to be concerned with others' well-being (Reynolds, 2008) and engage in more prosocial behavior at work (Aquino & Reed, 2002). Consistent with our assertion that such processes may also influence VWGB, a study of managers in the U.S. metal-finishing industry (Flannery & May, 2000) found that managers' moral motives predicted the ethicality of their decisions related to wastewater treatment. As people who are concerned with moral matters tend to value the welfare of others, VWGB may be a way to fulfill their moral motives.

To summarize, prior research and theory suggest that heightened moral reflectiveness predisposes some employees to engage in eco-friendly behavior because it represents an opportunity to fulfill their moral motives for sustaining a desirable environment and society. Such dynamics are equally likely to influence the behaviors of nonsupervisory and supervisory employees, and thus we propose the following:

*Hypothesis 1:* Moral reflectiveness is positively related to VWGB for (a) nonsupervisory employees and (b) work group leaders who supervise such employees.

**Conscientiousness.** In organizations, personality traits predispose employees to think and feel in certain ways and eventually influence their behaviors through such unique motivational processes (Barrick et al., 2013). The motivational process that connects personality traits and behaviors is applicable to both in-role and extra-role work behavior. Indeed, while OCB researchers have called for research on specific mechanisms through which a particular type of OCB occurs (Ilies et al., 2009; Organ & Ryan, 1995), CSR researchers have emphasized the need for research on individual-level mechanisms that lead to socially responsible behavior (Aguinis & Glavas, 2012). Hence, it is worth examining a unique emergence process for VWGB as a specific class of prosocial behavior at work.

We argue that moral reflectiveness and conscientiousness may be positively related (cf., Becker, 1998). The linguistic origin of conscientiousness is “conscience,” which is a standard for a moral evaluation. As a corollary, “conscientious” is defined as “governed by or conforming to the dictates of conscience” according to the on-line Merriam-Webster dictionary. As Barrick and colleagues (2002: 45) noted, “at its root, conscientiousness relates to a desire to exercise self-control and thereby follow the dictates of one’s conscience (Costa & McCrae, 1992).” Thus, conformity, dependability, responsibility, and self-regulation have been identified as core dimensions that characterize conscientious individuals (Fiske, 1949; Salvaggio, Schneider, Nishii, Mayer, Ramesh, & Lyon, 2007). Others have suggested that conscientiousness is a determinant of individual morality (Gössling, 2003) and conscientious individuals tend to pursue moral and social values (Collins & Schmidt, 1993). By their nature, conscientious individuals may need to reflect on whether their behavior is morally appropriate

and right. Since moral reflection is a conscious and self-controlled process (Haidt, 2001), it is likely to occur for those who are conscientious.

Further, moral reflectiveness may be the process through which conscientious individuals regulate their behaviors. At work, conscientious employees tend to fulfill their responsibilities by striving to meet the organization's expectations for in-role performance (Barrick et al., 2002). Beyond task accomplishment, however, conscientious employees engage and persist in multilateral efforts to do the right thing for organizations, so conscientiousness and OCB have been found to be correlated across several studies (Ilies, Scott, & Judge, 2006; Organ & Ryan, 1995). Conscientious employees also tend to be involved in extra-role behaviors that benefit the organization (Barrick & Mount, 2000; Chiaburu et al., 2011; Ilies et al., 2009).

Workplace green behavior generally promotes the environmental sustainability of organizations, and for now most such behavior is voluntary. VWGB, which includes such activities as powering down electric appliances during periods of inactivity and conserving office supplies, can be regarded as purposeful behaviors to protect and save organizational resources. In the awareness that organizations ultimately benefit from VWGB, conscientious employees may perceive that VWGB is vital for their organizations. Consequently, even when it is not expected or required for satisfactory task performance, conscientious employees may reflect on the implications of their workplace behavior for environmental sustainability and exert extra effort to engage in behavior they view as morally right.

On balance, if VWGB is regarded as outward expression of an individual prosocial value, moral reflectiveness can be conceived as an inner process that explicates the individual striving for achievement in moral or prosocial performance. That is, VWGB depends on the individual moral reflectiveness that emerges from individual conscientiousness. Thus, we propose:

*Hypothesis 2:* The relationship between conscientiousness and VWGB is partially mediated by moral reflectiveness for (a) nonsupervisory employees and (b) work group leaders who supervise such employees.

### **Contextual Influences on VWGB: Leader VWGB and Work Group Green Advocacy**

In addition to individual motivational processes, social contexts also motivate behavior at work (Barrick et al., 2013; Chen & Kanfer, 2006). Leaders and coworkers influence employee behavior directly through personal interactions as well as indirectly (Kidwell, Mossholder, & Bennett, 1997). Leaders and other work group members can be influential referents, for people attend to referents based partly on their relevance and salience (Goodman, 1974; Kulik & Ambrose, 1992). When employees observe others around them engaging in particular patterns of behavior, they are likely to engage in such behaviors out of a desire to fit in, establish, and strengthen their social relationships according to the aforementioned functionalist view. Thus, the relational motive is a primary psychological function that may motivate employees to respond to direct and indirect social cues indicating that voluntary green behavior is desirable and valued by others. To assess whether such social dynamics appear to contribute to VWGB, next we examine the social cues that employees receive from their leaders and other work group members.

**Leader's VWGB.** In a typical workplace, the person who supervises one's work (i.e., the work group leader) is likely to be a salient referent other. Having higher status and power, leaders serve as role models (Bass, 1985); for followers in the work group, they are essential sources of information pertaining to important and appropriate behavior (Mayer, Nishii, Schneider, & Goldstein, 2007). As such, the behavior of a leader can influence the motivation and behavior of followers (DeRue, Nahrgang, Wellman, & Humphrey, 2011), including the discretionary prosocial behaviors of followers (Ilies et al., 2007).

Leaders embody their values in their behavior. Leading by example is a mechanism through which leaders transmit their values to their followers (Dragoni, 2005; Yaffe & Kark, 2011) and thereby elicit desirable behaviors from followers. In this regard, leaders' VWGB can be instrumental in eliciting the same behavior from their followers. When an organization introduces formal sustainability programs, leaders' green behaviors signal the importance of environmental stewardship (Russo & Harrison, 2005; Starik & Rands, 1995) and encourage employees to engage in activities such as environmentally ethical decision-making and eco-innovation (Flannery & May, 2000; Ramus & Steger, 2000). Likewise, leaders' *voluntary* green behaviors signify their concerns with environmental sustainability, although they are likely to be interpreted by followers as expressions of the leader's personal values.

With the hope of establishing strong relationships with their leaders (Aguilera et al., 2007), employees may strive to express similar values, for leader-follower value congruence promotes higher-quality of leader-follower relationships (Krishnan, 2002). Evidence that this phenomenon may extend to VWGB is suggested by one recent study (Robertson & Barling, 2013) that reported a positive association between leader proenvironmental behavior and follower proenvironmental behavior. We note, however, that the existing evidence is based on a relatively small sample of leader-follower dyads. Additional research is needed to establish the robustness of this relationship across a wide range of settings and using alternative measures and analytic methods. Taking into account personal motives to establish strong relationships with leaders, we therefore propose the following hypothesis.

*Hypothesis 3:* Leader VWGB is positively associated with the VWGB of members of the leader's work group.

**Work group green advocacy.** Finally, we consider the role of work group peers as social influencers who can shape the VWGB of an individual employee in accordance with recent work (e.g., Homburg & Stolberg, 2006; Ones & Dilchert, 2012) that draws a conceptual distinction between direct and indirect green behavior. Using influence to persuade others is human nature (Cialdini & Goldstein, 2004). Influence attempts that target social issues are commonly referred to as advocacy. Therefore, we use the term work group green advocacy to describe the collective influence behavior of a work group and define it as the extent to which work group members openly discuss environmental sustainability, share relevant knowledge, and communicate their various views in order to encourage others to engage in eco-friendly behavior. Work group green advocacy reflects the proenvironmental ambience, which is shaped by employees' social interactions and is distinct from showing personal initiative while doing one's job (Frese & Fay, 2001).

We contend that a leader's VWGB may incite green advocacy among followers. Since leaders have responsibility for collective performance of their followers (Yammarino, Dansereau, & Kennedy, 2001), it is evident that leaders are supposed to influence overall collective processes and outcomes (Lim & Ployhart, 2004). Empirical studies have increasingly supported the positive impact of leaders on a host of collective outcomes (e.g., Gelfand, Leslie, Keller, & de Dreu, 2012; Lim & Ployhart, 2004). Among such outcomes, social atmosphere is one that leaders play a significant role in generating (Mayer et al., 2007). Leading by example is a primary means through which leaders shape the workplace atmosphere. Leaders can create a shared sense among followers on what is valued and encouraged in the work groups (Kark, Shamir, & Chen, 2003) by demonstrating desired behavior (Bass, 1985; Shamir et al., 1998). For example, the ethical orientation displayed by leaders can create a climate that encourages

ethical decision-making and behavior by the organization's employees (Treviño, 1986).

Likewise, seeing the voluntary green behavior of their leader, members of the work group may be inclined to advocate that behavior as a way to express their shared concern and strengthen the work group's relationship with their leader, thereby yielding work group green advocacy as a collective consequence.

We further argue that a leader's VWGB influences the VWGB of individual members indirectly through work group green advocacy. Consistent with such reasoning, studies have found that individual employees engage in more citizenship behavior when colleagues engage in citizenship behavior (Bommer, Miles, & Grover, 2003) and when colleagues provide more support (Chiaburu & Harrison, 2008). Such effects are consistent with the functionalist perspective for understanding VWGB: through social interaction, work group members share perceptions about the work context (Klein, Conn, Smith, & Sorra, 2001) and form a shared view of the value of VWGB. Communication about environmental issues and sharing concrete information about green behavior support the development of informal norms that regulate the group members' behaviors (Feldman, 1984). The more vigorous and salient green advocacy becomes, the more likely group members will perceive VWGB to be morally approved and typically sensible conduct (Cialdini, Reno, & Kallgren, 1990). Conforming to such normative perceptions addresses the desire to view oneself as moral and helps maintain a positive self-image (Ashforth & Kreiner, 1999; Monin, Sawyer, & Marquez, 2008). In addition, the social cues associated with green advocacy may activate an individual's personal goals for environmentally-friendly behavior and further motivate such behavior (Klein, Austin, & Cooper, 2008; Unsworth, Dmitrieva, & Andiasola, 2013). Thus, we propose the following:

*Hypothesis 4:* Work group green advocacy partially<sup>[AK7]</sup> mediates the positive relationship between leaders' VWGB and the VWGB of individual group members.

## METHOD

### Sample and Procedure

We analyzed data from 80 work group leaders and 325 members working for three South Korean companies in the construction (13 leaders and 86 members), information technology (22 leaders and 88 members), and financial (45 leaders and 151 members) industries. Before administering the surveys, we consulted the human resource (HR) managers about the selection of work groups and our measures of VWGB and green advocacy. Following the methods used in prior research (e.g., Kirkman, Rosen, Tesluk, & Gibson, 2006), we generated a sampling frame encompassing 119 work groups with 496 members in the three companies. The selected work groups (1) had formed more than one year earlier, (2) had more than three group members including leaders, and (3) in which the members had worked together for more than one year.

Data were collected from two sources (the group members and leaders) at two points in time. At Time 1, HR managers distributed surveys that asked work group leaders and members to provide demographic information and self-ratings of VWGB and green advocacy. At Time 2, approximately one week later, HR managers distributed a second survey that asked leaders to rate each group member's VWGB and green advocacy. A total of 420 (84.68%) group members and 107 leaders (89.92%) responded at Time 1. At Time 2, 80 (67.23%) leaders responded, resulting in a usable sample of 325 (65.52%) group members and their 80 leaders. On average, 4.06 employees per work group participated in this research. The average age of respondents was 46.68 years for leaders and 37.59 for members. Most respondents were male (97.5 % of leaders and 79.69 % of members). Finally, all leaders and 95.39% of the work group members

were full-time employees.

### **Item Generation and Validity Tests for VWGB and Green Advocacy**

No survey existed to measure VWGBs or green advocacy when this research was initiated. Therefore, to create such survey items, we followed a deductive approach based on Hinkin's (1995, 1998) scale development process. We created a preliminary list of 11 items to measure VWGB based on the Western management and environment literatures, particularly the Society for HR Management's (2008) green workplace survey as well as Stringer's (2009) rubric of three Rs (i.e., reducing, reusing, and recycling) and various descriptions of workplace behavior based on this rubric. We also added resource-conserving behaviors in accordance with prior research (e.g., Robertson & Barling, 2013). To create five items for assessing green advocacy, we drew from Boiral (2009) and Homburg and Stolberg (2006).

Following Brislin's (1990) back-translation procedures, we checked the compatibility between original English items and translated Korean items, and then collected data using the Korean survey. The first author, who is fluent in Korean and English, blindly translated the initial English survey into Korean. Next, the Korean survey was reviewed and discussed by five South Korean graduate students who were enrolled in a master-level degree program of HR management in a U.S. university and who also had work experience as managers in large South Korean companies. A focus group discussion with these five participants was used to ensure the readability of the Korean survey and served as a qualitative demonstration that our initial VWGB and green advocacy items referred to meaningful green behaviors that were likely to occur in the offices of South Korean companies. Finally, two other authors who are fluent in both English and Korean conducted the iterative process of detecting faults and discrepancies that could lead to differences in the meaning of the two versions of survey, and made further revisions to create

two equivalent versions. A native English-speaking American who is fluent in Korean translated the Korean survey back into English to further check on the validity of the translation process.

The five members of the Korean focus group came mostly from the industries that were different from the three participating organizations (i.e., electronics, chemistry, mobile communication, information technology, and energy), so we carried out an additional check to ensure that the VWGB and green advocacy items were appropriate for the participating organizations by asking the HR managers to review these items. Based on their feedback, we removed three items from the original set. Subsequently, participants' ( $n = 325$ ) Time 1 self-reported ratings of VWGB [9 items] and green advocacy [4 items] were submitted to principle component analysis with Varimax rotation; items with low factor loadings were removed. Last, we conducted confirmatory factor analysis (CFA), which established that the model with 9 items [6 items assessing VWGB and 3 items assessing green advocacy] yielded better model fit and stronger factor loadings ( $\chi^2 = 50.48$ ,  $df = 26$ ,  $p < .05$ ; confirmatory fit index [CFI] = .97; root-mean-square error of approximation [RMSEA] = .05; standardized root-mean-square residual [SRMR] = .04) than the model with 13 items [9 items assessing VWGB and 4 items assessing green advocacy] ( $\chi^2 = 170.09$ ,  $df = 64$ ,  $p < .05$ ; CFI = .89; RMSEA = .07; SRMR = .06). Cronbach's alphas for the final measures were .75 for the 6-item measure of VWGB and .80 for the 3-item measure of green advocacy at the individual-level.

Using the same data, we also performed CFA to verify that VWGB and green advocacy are distinguishable. The results showed that the fit indices of a two-factor model ( $\chi^2 = 50.48$ ,  $df = 26$ ,  $p < .05$ ; CFI = .97; RMSEA = .05; SRMR = .04) produced acceptable fit, whereas the absolute fit indexes of a one-factor model ( $\chi^2 = 370.94$ ,  $df = 27$ ,  $p < .05$ ; CFI = .53; RMSEA = .20; SRMR = .13) did not ( $\Delta\chi^2 = 320.46$ ,  $\Delta df = 1$ ,  $p < .05$ ). The correlation between VWGB and

green advocacy at the individual-level was .26 ( $p < .05$ ).

In order to further examine the convergent and discriminant validity of our measures (Campbell & Fiske, 1959), we collected and analyzed data from 64 employed MBA students at a large U.S. university. Positive correlations were found between OCB for the environment (OCBE; Boiral & Paillé, 2012) and both VWGB ( $r = .69, p < .05$ ) and green advocacy ( $r = .87, p < .05$ ). Likewise, we observed significant positive correlations between OCB for the organization (Lee & Allen, 2002) and both VWGB ( $r = .33, p < .05$ ) and green advocacy ( $r = .45, p < .05$ ). These results confirm the convergent validity of our green behavior measure. In contrast, self-reported job performance (Lam, Chen, & Schaubroeck, 2002), which is not theoretically associated with proenvironmental behavior, was not significantly correlated with VWGB ( $r = -.02, n.s.$ ) or green advocacy ( $r = .04, n.s.$ ), providing evidence of the discriminant validity of our measures.

An additional analysis for the validity of our VWGB and green advocacy measures was performed following Fornell and Larcker (1981). The average variance extracted (AVE) was considered for convergent validity. We found that the AVEs of VWGB (.51), green advocacy (.88), OCB (.70), OCBE (.68), and job performance (.88) all exceed .50. These findings demonstrated adequate convergent validity. Discriminant validity was tested by comparing each AVE for VWGB or green advocacy and self-reported job performance and their shared variances. The AVEs for VWGB (.51), green advocacy (.88), and self-reported job performance (.88) are greater than the squared correlation (.000) between VWGB and job performance and the squared correlation (.002) between green advocacy and job performance. In addition, the AVEs for VWGB and green advocacy are greater than the squared correlation (.37) between VWGB and green advocacy, suggesting that both constructs are distinguishable. Taken together, these

results provide reasonable support for the distinction between VWGB and green advocacy.

### **Measures**

**Conscientiousness.** At Time 1, work group leaders and members completed the four-item conscientiousness measure of the Mini International Personality Item Pool (Mini-IPIP; Donnellan, Oswald, Baird, & Lucas, 2006). The Mini-IPIP was used to satisfy the companies' desires to minimize the length of the survey and has already demonstrated construct validity evidence (Donnellan et al., 2006). A five-point Likert scale (1 = rarely accurate to 5 = very accurate) was used for the following items: (1) "I get chores done right away," (2) "I often forget to put things back in their proper place," (3) "I like order," and (4) "I make a mess of things." The second and fourth items were reversely coded. Cronbach's alphas were .70 and .73 for leaders and members, respectively. In order to validate the four-item conscientiousness measure, its convergent validity was examined with the established 10-item conscientiousness measure of Goldberg (1999). We analyzed data collected from 38 graduate students at a large university in the U.S. We found a highly positive and significant correlation between these two measures ( $r = .81, p < .05$ ), confirming the validity of the four-item measure.

**Moral reflectiveness.** At Time 1, work group leaders and members rated their own moral reflectiveness on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) using five items developed by Reynolds (2008), including: (1) "I regularly think about the ethical implications of my decision," (2) "I think about the morality of my actions almost every day," (3) "I often find myself pondering about ethical issues," (4) "I often reflect on the moral aspects of my decisions," and (5) "I like to think about ethics." Cronbach's alphas were .86 and .88 for leaders and members, respectively.

**VWGB for leaders and group members.** At Time 1, leaders rated their own VWGB,

and at Time 2, leaders rated the VWGB of each member of their work group, using six items worded to refer to the relevant actor. The behaviors measured were: (1) avoiding unnecessary printing to save papers, (2) using own cups instead of disposable cups, (3) using stairs instead of elevators when going from floor to floor in the building, (4) reusing papers to take notes in the office, (5) recycling reusable things in the workplace, and (6) sorting recyclable materials into their appropriate bins when other group members do not recycle them. Although leaders rated both themselves and members of their workgroup, rating self-described behavior and the behavior of others at two different points in time helps mitigate the concern about common method variance when linking leader VWGB and individual group member VWGB. Using temporal separation when measuring predictor and criterion variables is a primary procedural remedy that should help to lower method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). A time lag of one week used in this study should help reduce the likelihood of temporary or transient effects (e.g., mood and response set) which would cause inflated correlations. Indeed, other studies have used one or two weeks for reducing the potential bias (e.g., Ilies, Peng, Savani, & Dimotakis, 2013). In addition, although we have group members' self-rated VWGB, we did not use the measure because using group member self-rated VWGB introduces a common source concern with the work group green advocacy measure. No matter which dependent variables we use, there is a potential common source issue. Thus, we focused on the leader ratings of group members' VWGB in this study.<sup>1</sup> VWGBs were rated on a 6-point Likert scale (1 = never to 6 = always). Cronbach's alphas were .79 for both self-reported VWGBs of leaders and leader-reported VWGBs of individual group members.

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<sup>1</sup> There was a modest correlation ( $r = .12, p < .05$ ) between leaders' and group members' self-rated VWGB.

**Work group green advocacy.** At Time 1, work group members used a six-point Likert scale (1 = never to 6 = always) to describe their own green advocacy using three items: (1) “I try to convince my group members to reduce, reuse, and recycle office supplies in the workplace,” (2) “I work with my group members to create a more environmentally-friendly workplace,” and (3) “I share knowledge, information, and suggestions on workplace pollution prevention with other group members.” Work group green advocacy was created by aggregating individual members’ self-reported own green advocacy. In this aggregation, we used green advocacy measured at the individual-level, not at the group-level. It is possible to operationalize the mean score of within-group green advocacy as the group green advocacy, because sufficient within-group consensus at the individual-level can justify the aggregation of individual-level scores at the group-level (Chan, 1998). With random coefficient modeling (RCM) and analysis of variance (ANOVA), we calculated intra-class correlations – ICC(1) and ICC(2) and  $r_{wg(j)}$ . ICC(1), ICC(2), and  $r_{wg(j)}$  for work group green advocacy turned out to be .21, .53, and .83, respectively. ICC(1) is quite high and  $r_{wg(j)}$  surpasses a general cutoff, whereas ICC(2) is slightly below the general acceptable level. ICC(2) tends to be low when the number of individual-level cases aggregated into the group-level constructs is small (Bliese, 2000), which is true in this study where the average number of work group members participated in the survey was 4.06. Although slightly low, this ICC(2) is comparable to previous multilevel studies (e.g., Chen, Sharma, Edinger, Shapiro, & Farh, 2011). Cronbach’s alpha for work group green advocacy was .84.

**Controls.** We controlled for organizational tenure (years worked in the organization) and work group size (the actual number of employees in the work group). Employees with longer tenure have had great opportunities for social interactions that increase their

organizational embeddedness and influence patterns of loyalty (e.g., Mathieu & Zajac, 1990), which in turn may influence how leaders describe their group members' behaviors and how leaders' behaviors influence the work group. Therefore, we controlled for the potential influence of the organizational tenure of leaders and their group members. In addition, we controlled for work group size when analyzing cross-level effects, because it may amplify or constrain individual VWGB and/or green advocacy (e.g., Wagner, 1995).

Some evidence suggests that gender, age, and education are weakly associated with environmental concerns and green behavior (e.g., see Klein, D'Mello, & Wiernick, 2012), so we assessed these attributes, but we did not include them in the analyses reported here. In our sample, age and organizational tenure are highly correlated ( $r = .79$  for members and  $r = .48$  for leaders,  $p < .05$ ), so we chose to include only tenure, which is conceptually more central to the logic of our functionalist perspective. In our sample, there was very little variance in gender and education, which restricted their potential effects. The leaders and members in our sample were predominantly males, so gender was uncorrelated with VWGB of members ( $r = -.01$ , *n.s.*) and leaders ( $r = -.01$ , *n.s.*). Education showed the same pattern: almost all respondents (i.e., 98.8 % of leaders and 92.9 % of members) had earned an undergraduate degree, and education has not significantly correlated with the VWGB of members ( $r = .04$ , *n.s.*) or leaders ( $r = .01$ , *n.s.*), nor were there any significant path coefficients for the relationships between education and VWGB (members:  $r = -.00$ , *n.s.*; leaders:  $r = -.01$ , *n.s.*). Thus, although evidence suggests that education is positively related to OCB (e.g., Ng & Feldman, 2009) and proenvironmental behavior (e.g., D'Mello, Klein, Ones, & Dilchert, 2011), lack of variance in the educational levels of our respondents served as a natural control for education.

#### **A Common Method Variance Check**

Our data collection strategy of measuring constructs at different points in time and the multilevel nature of our model mitigate some concerns that arise in studies that rely on survey data. Nonetheless, potential common method biases exist in the relationship between individual conscientiousness and individual moral reflectiveness at the individual-level as well as in the relationship among leader conscientiousness, leader moral reflectiveness, and leader VWGB at the group-level. We attempted to address potential problems of common method bias in two ways. First, we followed the recommendation of Podsakoff and colleagues (2003) and conducted CFAs (a) to compare the model fit of one- and two-factor models (i.e., members' conscientiousness and moral reflectiveness) at the individual-level and (b) to compare the model fit of one-, two- (i.e., leaders' conscientiousness and moral reflectiveness as one factor and their VWGB as the other factor), and three-factor models (i.e., leaders' conscientiousness, moral reflectiveness, and VWGB) at the group-level. For the individual-level models, the two-factor solution produced better fit ( $\chi^2 = 61.59$ ,  $df = 26$ ,  $p < .05$ ; CFI = .97; RMSEA = .07; SRMR = .04) than the one-factor solution ( $\chi^2 = 307.15$ ,  $df = 27$ ,  $p < .05$ ; CFI = .75; RMSEA = .18; SRMR = .13;  $\Delta\chi^2 = 245.56$ ,  $\Delta df = 1$ ,  $p < .05$ ). For the group-level models, the three-factor solution produced better fit ( $\chi^2 = 103.45$ ,  $df = 87$ ,  $p < .05$ ; CFI = .96; RMSEA = .05; SRMR = .08) than the one-factor solution ( $\chi^2 = 289.53$ ,  $df = 90$ ,  $p < .05$ ; CFI = .51; RMSEA = .17; SRMR = .16;  $\Delta\chi^2 = 186.08$ ,  $\Delta df = 3$ ,  $p < .05$ ) and the two-factor solution<sup>2</sup> ( $\chi^2 = 148.35$ ,  $df = 89$ ,  $p < .05$ ; CFI = .86; RMSEA = .09; SRMR = .10;  $\Delta\chi^2 = 44.90$ ,  $\Delta df = 2$ ,  $p < .05$ ). The two-factor model also showed better fit than the one-factor model ( $\Delta\chi^2 = 141.18$ ,  $\Delta df = 1$ ,  $p < .05$ ). These results lessen concerns for common method variance.

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<sup>2</sup> One factor is with conscientiousness and moral reflectiveness of leaders, and the second factor is with only leaders' VWGB.

Second, we conducted a marker variable analysis to check whether the reliability and correlations are inflated by common method variance. Following Lindell and Whitney's (2001) correlational marker technique, we used the place of birth (1 = the capital area; 0 = other areas) as a marker variable, which is not theoretically associated with other variables in our study. We found low and non-significant correlations between the marker variable (i.e., the place of birth) and other individual-level (a range of correlations with the marker variable: .02 to .05) and group-level (a range of correlations with the marker variable: -.07 to .08) variables with potential common method variances. These results support the discriminant validity between the study variables and the marker variable. Further, when controlling for the marker variable, the correlations between individual conscientiousness and moral reflectiveness or among leader conscientiousness, moral reflectiveness, and VWGB still remain statistically significant using  $p < .05$ . Overall, the results of these analyses, our strategy of collecting data at different points in time, and the cross-level nature of our model help minimize the likelihood that common method variance accounts for the substantive findings or the observed relationships among the variables.

### **Analytic Method**

We employed M-Plus 6.11 (Muthén & Muthén, 2010) to conduct multilevel path analysis. At the individual-level, we specified the intercept of individual group member's conscientiousness → moral reflectiveness linkage and moral reflectiveness → green behavior linkage to be random (Krull & MacKinnon, 2001; Pituch, Stapleton, & Kang, 2006). In addition, we specified not only the group-level relationships among leader conscientiousness, leader moral reflectiveness, leader VWGB, and work group green advocacy, but also the cross-level relationships among leader VWGB, work group green advocacy, and group member VWGB. Leaders' and members' organizational tenure and group size were included as control variables

with fixed effects on leaders' and members' VWGBs and work group green advocacy, respectively. Following Hu and Bentler's (1999) suggestion, we evaluated model fit using CFI, RMSEA, and SRMR: the cutoff for CFI is .90 or more, and the cutoff for RMSEA and SRMR is .08 or less. As Singer (1998) recommended, we group-mean centered the individual-level independent and control variables, and grand-mean centered the group-level independent and control variables. Because our theoretical model consists of multilevel and mediation relationships, we performed bootstrap analysis based on the Monte Carlo method recommended by Preacher, Zyphur, and Zhang (2010), in order to provide the most robust evidence pertaining to significance and confidence interval of the indirect effects.

## RESULTS

Table 1 presents the means, standard deviations, and correlations of the study variables.

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 Insert Table 1 about here  
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The hypothesized model<sub>[AK8]</sub> using multilevel path analysis exhibited a good fit to the data ( $\chi^2 = 16.01$ ,  $df = 14$ ,  $p < .05$ ; CFI = .96; RMSEA = .02; SRMR = .01 [within], .06 [between]). However, we found non-significant direct effects of conscientiousness on the VWGB for both group leaders and members. Accordingly, we tested for full mediation by analyzing an alternative model that did not allow direct effects of individual group member's and leader's conscientiousness on their VWGB. Using the same analytical procedure, this alternative model exhibited a good fit to the data ( $\chi^2 = 18.99$ ,  $df = 16$ ,  $p < .05$ ; CFI = .94; RMSEA = .02; SRMR = .01 [within], .07 [between]). Further, there is no significant difference between the two models ( $\Delta \chi^2 = 2.98$ ,  $\Delta df = 2$ , *n.s.*). Hence, we reported the results of hypotheses test based on this more parsimonious full mediation model, illustrated in Figure 1. <sub>[m9]</sub>

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Insert Figure 1 about here  
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We predicted that moral reflectiveness would be associated with the VWGB of both nonsupervisory employees (Hypothesis 1a) and work group leaders (Hypothesis 1b). As shown in Figure 1, the results support both predictions (H1a;  $\beta = .13, p < .05$ ; H1b;  $\beta = .27, p < .05$ ).

Further, we expected that moral reflectiveness would partially mediate the relationships between conscientiousness and VWGB for work group members (Hypothesis 2a) and leaders (Hypothesis 2b). As noted above, we found support for the fully mediated relationships, so we report those results here. For individual members, conscientiousness was positively related to moral reflectiveness (H2a;  $\beta = .20, p < .05$ ). Likewise, leader conscientiousness was positively related to the leader's moral reflectiveness (H2b;  $\beta = .40, p < .05$ ). To ascertain the significance of indirect effects of the fully mediated relationships, a parametric bootstrap procedure was performed with 20,000 Monte Carlo replications (Preacher et al., 2010), using estimates in the entire model including individual and group-level variables with the controls. As viewed in Table 2, the result confirmed the significant positive indirect effect of individual moral reflectiveness on the positive relationship between individual conscientiousness and individual VWGB (H2a; indirect effect = .03,  $p < .05$ , 95 % confidence interval [.003, .058]). In addition, it confirmed the significant positive indirect effect of leader moral reflectiveness on the positive relationship between the leader conscientiousness and leader VWGB (H2b; indirect effect = .11,  $p < .05$ , 95% confidence interval [.003, .262]). While the effect size for the individual-level indirect effect may seem small, it should be recognized that this effect is conditional on two additional cross-level effects that are not present for the leader's indirect effect. In conclusion, Hypotheses 2a and 2b were partially supported.

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 Insert Table 2 about here  
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Hypothesis 3 predicted that the VWGB of work group leaders would be positively associated with the VWGB of their work group members. The significant positive cross-level relationship between both ( $\beta = .35, p < .05$ ) supports Hypothesis 3.<sup>3</sup>

Last, Hypothesis 4 anticipated that work group green advocacy would partially mediate the positive cross-level relationship between leader VWGB and individual member VWGB. As expected, the results showed that leader green behavior was positively related to work group green advocacy ( $\beta = .21, p < .05$ ), which in turn was positively related to the VWGB of individual group members ( $\beta = .32, p < .05$ ). The bootstrapping result confirmed the significant positive indirect effect of work group green advocacy on the positive relationship between leaders' and members' VWGB (H4; indirect effect = .07,  $p < .05$ , 95% confidence interval [.001, .166]). Accordingly, Hypothesis 4 was supported.

#### **Supplemental Analyses (Available Online)**

To further examine our hypothesized model, we conducted several additional analyses, the details of which appear in the Online Appendix for Supplemental Material. The supplemental analyses suggest the following conclusions: First, our finding that group members and leaders with higher conscientiousness are more likely to perceive moral issues and behave environmentally in the workplace is robust; including other personality traits in the analyses does not alter this finding. Second, our conclusion that leaders' or members' moral reflectiveness

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<sup>3</sup> Using group members' self-rated VWGB as a dependent variable, we tested whether leader VWGB is related to group member VWGB. We found no significant relationship between them ( $\beta = .01, n.s.$ ), perhaps because some of the VWGBs are not observable from the leaders.

mediates the relationship between conscientiousness and VWGB is generalizable across group members and leaders. Third, the results modeling a three-level model or controlling organizational or industry controls show that our hypothesized model is generalizable across the three organizations or industries. Finally, we modeled the possibility of reverse causation between leader VWGB and work group green advocacy. This “reverse-causality” model fits similarly to the hypothesized model, which means that we cannot empirically rule out a reverse causal direction (although if nothing else, the results suggest there is a robust relationship between leader VWGB and group green advocacy).

## DISCUSSION

Recognizing that organizational responses to concerns about environmental issues often are not governed by formal institutional policies, programs, and environmental management systems, we developed and tested a multilevel model to explain why some employees voluntarily engage in eco-friendly behaviors at work, which we dubbed voluntary workplace green behaviors. Our findings show that conscientiousness is positively related to employee reflections about the moral implications of environmental degradation at work, which in turn has implications for green work behaviors that are morally valued but not explicitly sanctioned. [m10]

In the companies we studied, where employees were organized into small work groups supervised by a leader, we found that individual motivational dynamics have cumulative and amplifying consequences. Seeing their leader engage in VWGBs, work group members appear to increase their own advocacy of such behavior, perhaps in an effort to realize prosocial value and fulfill relational motive. The leader’s behavioral cues and the work group’s green advocacy together create additional social pressure to engage in VWGB. All in all, our theory and evidence indicated multilevel influences that may stimulate some of individual underlying

motives for achievement in VWGB.

Our multilevel study of 80 leaders and their 325 followers complements and extends the findings of Robertson and Barling (2013), which showed a positive linkage between green behaviors of leaders and those of followers for 139 leader-follower dyads. Together, these two studies demonstrate the important role supervisors can play in eliciting or discouraging their subordinates' voluntary efforts to green an organization. Going one step forward, our study extends the finding of Robertson and Barling by further investigating the role of work group green advocacy, which is a top-down cross-level social influence process through which leaders' VWGBs affect members' VWGBs in small work groups. In such settings, leader behavior is positively associated with the complex social dynamics that characterize the dyadic relationships between leaders and members as well as the dynamics of the work group as a whole.

Our research contributes to an emerging understanding of environmental sustainability in the context of organizations by shedding light on the role of individual differences in personality characteristics and moral reflectiveness. For nonsupervisory participants in this study, moral reflectiveness may act as a proximal determinant of discretionary green behavior at work. Further, conscientiousness is positively related to moral reflectiveness, suggesting that this intentional process may explain why personality and VWGB are related. To date, individual traits have received very little research attention from organizational scholars interested in environmental sustainability. In studies that have included individual differences as predictors of socially and environmentally responsible work behavior, environment-specific values, concerns, attitudes, and beliefs have received much more attention (Aguinis & Glavas, 2012) than more generic traits that are known to also be associated with a broader array of other workplace outcomes. By identifying generic personality and moral traits that may stimulate employees'

underlying motives for VWGBs, our work added another theoretical route for inducing employee VWGB.

By specifying multilevel processes to explain the emergence of VWGBs, our findings contribute to an improved understanding of OCB, also. Compared to what is known about the multiple foci of citizenship behaviors and their determinants (e.g., Chiaburu et al., 2011; Lee & Allen, 2002; McNeely & Meglino, 1994), much less is known about the specific processes that give rise to specific types of citizenship behavior (Ilies et al., 2009; Organ & Ryan, 1995). And despite the prevalence of team-based organizational structures, few studies have shed light on the combined influences of multilevel and cross-level social dynamics that shape individual citizenship behavior at work. Our multilevel model begins to illuminate these dynamics.

### **Managerial Implications**

Increasingly, organizations are being pressured to improve their environmental performance. In the business media, green and not-so-green companies are named and ranked (e.g., see *Newsweek*, 2012a/b). Financial institutions have created green indices such as FTSE4Good to guide investment decisions. Consumers are signaling their desires for more environmentally-friendly products (*GlobeScan*, 2012). An understanding of individual predispositions associated with VWGB may provide useful guidance for recruiting, identifying, and selecting employees who are likely to perform well in such positions (Bauer, Erdogan, & Taylor, 2012). Evidence from our research suggests that including conscientiousness and moral reflectiveness (along with other predictors) may contribute to the successful performance of new green, or greener, jobs, because both individual factors are conceived as human capital for green volunteers. For organizations that address environmental concerns by relying exclusively on voluntary behavioral changes, recruiting and selecting new hires, and promoting leaders for all

jobs using information about conscientiousness and moral reflectiveness may be a way to improve the organization's environmental performance (cf., Van Velsor & Quinn, 2012). We offer these ideas cautiously, however, as more direct intervention also are needed to significantly improve environmental performance. When such major interventions are implemented, our results suggest that having a strong cadre of conscientious and morally reflective leaders and non-leaders is likely to improve the efficacy of such interventions.

### **Limitations and Future Research Directions**

Of course, this study is only one step forward in the search for knowledge about how to encourage environmentally-friendly behavior. Given the increasing and diverse forms of environmental degradation, additional research is sorely needed. First among our suggestions for future research is to test the generalizability of the model and findings shown in Figure 1. In addition to differences in the cultural, regulatory, and physical environments that differentially affect companies in different countries, research indicates that environmental beliefs, knowledge, and attitudes also vary around the world (e.g., see Aoyagi-Usui, Vinken, & Kuribayashi, 2012). Such differences may enhance or constrain the interpersonal influences shown in Figure 1. For example, in locations where environmental knowledge is deep and widespread, personality and moral traits may be less powerful predictors of environmental behavior than found in our sample. Widely-held knowledge and beliefs would create greater consensus around environmental norms that form within work groups, thereby reducing opportunities for personal characteristics (rather than situational demands) to drive behavior; where such knowledge and beliefs are weak or more variable, the influence of leader VWGB and work group green advocacy may be strengthened.

Second, research also is needed to improve our understanding of how contextual differences at the macro-level influence voluntary workplace green behavior. South Korea has

relied immensely on imported resources for its economic prosperity after the Korean War, due to a shortage of natural resources buried in the country. Therefore, the South Korean government has been carrying on a multitude of campaigns for conserving resources. For instance, the South Korean ministry of environment has implemented the “Green Growth” campaign since 2009, which aims to not only drive an economic growth in a way that preserves the natural environment but also harness the natural environment as a growth driver.<sup>4</sup> This unique context may explain why our qualitative and quantitative analysis of green behavior items yielded mostly items referring to resource-conservation. Future research in other institutional contexts may yield different results.

Third, we encourage future research that tests the robustness of our findings by using alternative measures. For example, we acknowledge that our measures of VWGB and green advocacy are somewhat limited in scope. Recently, Ones and Dilchert (2012, 2013) proposed the “Green Five” taxonomy for describing employee green behaviors (although they had not yet published a corresponding measure at the time when this article was written). Our measure of voluntary green behavior and advocacy in the workplace tapped several elements of their taxonomy (e.g., conserving, working sustainably, and influencing others), but not all of the elements. More comprehensive measures of green behavior are needed to further improve the insights possible through future research.

Fourth, applying alternative data collection methods (e.g., objective indices of environmental performance metrics) would allow for stronger conclusions to be drawn about our model’s robustness. Particularly useful would be qualitative research that examines more deeply

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<sup>4</sup> For more information, see <http://www.oecd.org/korea/greengrowthinactionkorea.htm> and <http://www.greengrowth.go.kr/english/>.

how individuals can effectively use their own behaviors and words to initiate and sustain improved environmental behavior. For example, investigations of the moral roots of environmental attitudes within the U.S. reveal that political liberals and conservatives both respond to messages that link environmental behavior to morality, but the effectiveness of messages grounded in moral reasoning depends on the specific framing of the issues (Feinberg & Willer, 2013). By understanding such differences, organizations could improve their ability to leverage the natural tendencies of their most conscientious employees. A somewhat related line for future inquiry concerns the approaches employees take when attempting to create change. We focused on socially acceptable VWGBs, but more aggressive and potentially destructive behaviors that are harmful to the organization are also possible.

Fifth, research that tracks voluntary green behavior and advocacy over time is needed to verify the proposed causal relationships. Additional evidence should test our assumption that leader VWGB drives work group green advocacy. The importance of top management support for effecting organizational change is well documented (Rodgers, Hunter, & Rogers, 1993; Van Velsor & Quinn, 2012), but additional research is needed to establish that group leaders' VWGB influences followers' voluntary green advocacy. It is intriguing to consider the reverse causal path, also—that is, does the green advocacy of followers influence the VWGB of leaders? When business leaders describe the circumstances that engendered their commitment to environmental sustainability, they often implicate the attitudes and actions of lower-level employees, family, and friends. Such influences are poorly understood, but may be quite powerful. Ultimately, employee engagement in and commitment to environmental sustainability may prove to be the spark that ignites leaders' passion for creating environmentally sustainable organizations (cf., Aguiler et al., 2007; Aguinis & Glavas, 2012; Jackson, 2012).

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Table 1  
Descriptive Statistics and Correlations

Variable	M	Individual-level S.D.	Group-level S.D.	1	2	3	4	5	6	7	8	9	10
1. Group member organizational tenure	9.16	6.25		-									
2. Group member conscientiousness	3.79	.58		.03	(.73)								
3. Group member moral reflectiveness	3.50	.66		.11*	.21*	(.88)							
4. Group member VWGB	3.62	.90		.10	.20*	.30*	(.79)						
5. Work group size	7.00		2.88					-					
6. Leader organizational tenure	18.05		4.92					-.17	-				
7. Leader conscientiousness	3.92		.53					-.07	.07	(.70)			
8. Leader moral reflectiveness	3.57		.63					-.12	.03	.34*	(.86)		
9. Leader VWGB	3.54		.76					.13	.02	.24*	.22*	(.79)	
10. Work group green advocacy	3.22		.66					-.06	.12	.23*	-.01	.23*	(.84)

Note: N = 325 employees in 80 work groups.  
\*p < .05.

Table 2  
 Bootstrapping Tests for Mediation

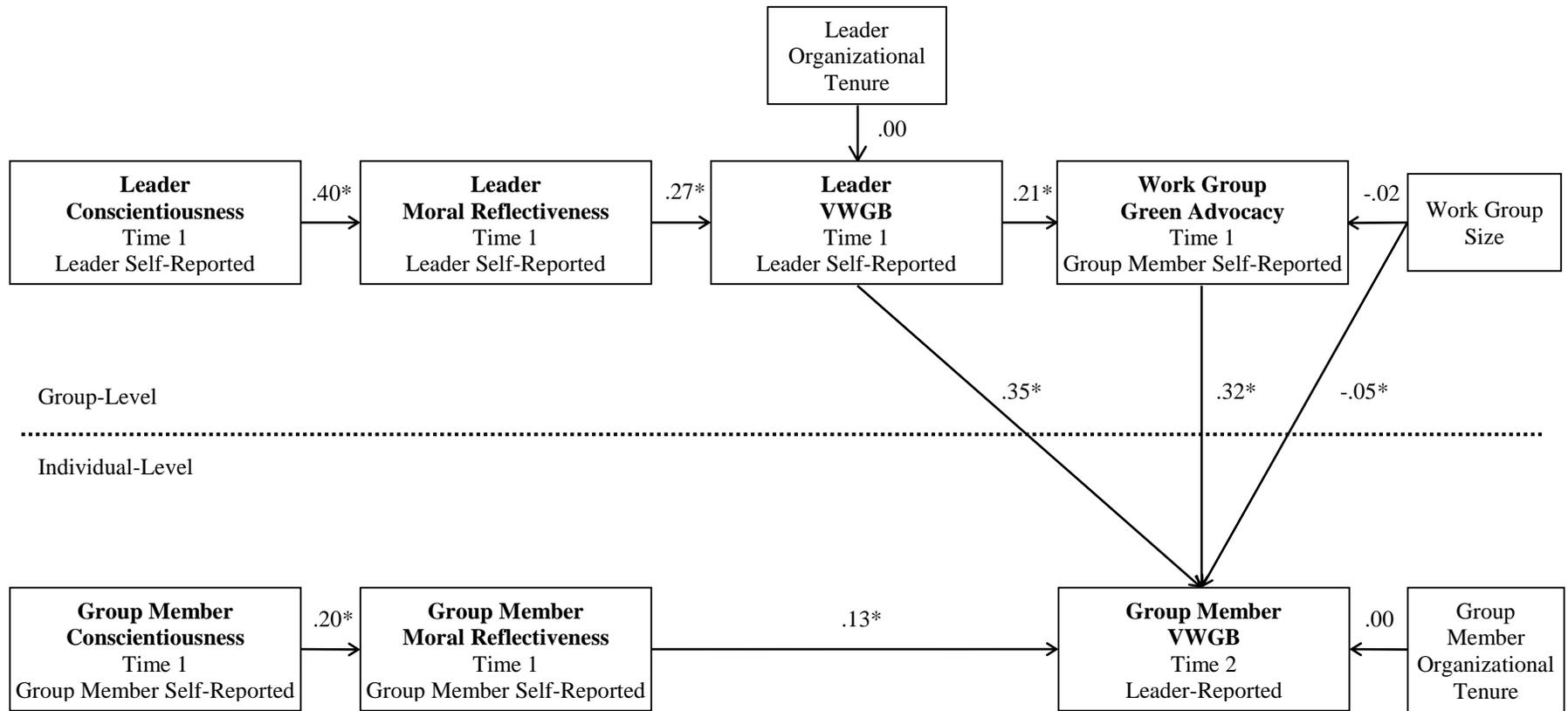
Paths	Bootstrapping	
	Indirect Effect	95 % Confidence Interval
<b>Indirect Paths</b>		
<i>Individual-Level Mediation Paths</i>		
Group member conscientiousness → Group member moral reflectiveness → Group member VWGB	.03*	[.003, .058]
<i>Group-Level Mediation Paths</i>		
Leader conscientiousness → Leader moral reflectiveness → Leader VWGB	.11*	[.003, .262]
Leader moral reflectiveness → Leader VWGB → Work group green advocacy	.06*	[.001, .142]
<i>Cross-Level Mediation Paths</i>		
Leader VWGB → Work group green advocacy → Group member VWGB	.07*	[.001, .166]
Leader moral reflectiveness → Leader VWGB → Group member VWGB	.09*	[.006, .223]

*Note:* Bootstrapping is conducted based on Monte Carlo Method with 20,000 repetitions. Note that all terms in the hypothesized model are used when generating these estimates.

\* $p < .05$ .

Figure 1

Standardized Path Relationships of the Final Model



\* $p < .05$ .

Model fit:  $\chi^2 (df = 16) = 18.99$ ; CFI = .94; RMSEA = .02; SRMR = .01 (within), .07 (between).

### ONLINE APPENDIX FOR SUPPLEMENTAL MATERIAL

In addition to the analyses reported in the main body of our article, we conducted four sets of supplemental analyses to assess (a) potential influences of other personality variables (e.g., agreeableness, openness), (b) generalizability of individual-level phenomenon, (c) organizational- or industry-level effects on VWGB, and (d) causality concerns between leader VWGB and work group advocacy.

First, we tested whether other personality measures in the Five Factor Model (FFM) are related to moral reflectiveness and VWGB in order to rule out potential influences of other personality traits. Using the measures from the Mini-IPIP (Donnellan et al., 2006) and ordinary least squares regression, the findings showed that only conscientiousness is strongly and significantly related to VWGB of group members ( $\beta = .16, p < .05$ ) and leaders ( $\beta = .18, p < .05$ ). However, these analyses did reveal that both conscientiousness (group members:  $\beta = .11, p < .05$ ; leaders:  $\beta = .15, p < .05$ ) and agreeableness (group members:  $\beta = .11, p < .05$ ; leaders:  $\beta = .16, p < .05$ ) are positively and significantly related to moral reflectiveness (see Appendix Table A1 for specific relationships between FFM, VWGB, and moral reflectiveness). Thus, this supplemental analysis confirmed that group members and leaders with higher conscientiousness are more likely to perceive moral issues and behave environmentally in the workplace, and including the other personality traits did not eliminate this finding<sup>[AK13].<sup>[m14]</sup></sup>

Second, we investigated whether the process models (i.e., conscientiousness  $\rightarrow$  moral reflectiveness  $\rightarrow$  VWGB) are generalizable across all employees including group members and leaders. Using the total sample ( $n = 405$  employees; 325 members and 80 leaders), we tested individual-level relationships between conscientiousness, moral reflectiveness, and VWGB. The results of path analysis (using self-rated VWGB from members and leaders) showed that the

conscientiousness of all employees is positively and significantly related to their moral reflectiveness ( $\beta = .24, p < .05$ ), which in turn is significantly related to their VWGB ( $\beta = .15, p < .05$ ). The model yielded an acceptable model fit ( $\chi^2 = 3.10, df = 1, p < .05$ ; CFI = .94; RMSEA = .07; SRMR = .03). Because the direct relationship between conscientiousness and individual VWGB was not significant ( $\beta = .12, n.s.$ ) when controlling moral reflectiveness, these results indicated a full-mediation model. Also, a parametric bootstrap result confirmed the significant indirect effect between conscientiousness and VWGB for all employees via moral reflectiveness (indirect effect = .04,  $p < .05$ , 95 % confidence interval [.011, .065]). Further, using only the leader sample ( $n = 80$  leaders), we found that the conscientiousness-moral reflectiveness relationship ( $\beta = .34, p < .05$ ) and the moral reflectiveness-VWGB relationship ( $\beta = .22, p < .05$ ) were all significant, showing the full mediation and significant indirect effect (indirect effect = .07,  $p < .05$ , 95 % confidence interval [.004, .173]). Consequently, these results did not change any prior conclusion that leaders' or members' moral reflectiveness fully mediates the relationship between conscientiousness and VWGB, suggesting that the relationships are generalizable across group members and leaders.

Third, because we collected data from three different organizations or industries (IT, construction, and finance), we checked for potential organizational- or industry-level effects by (a) including two effect-coded control variables (effect-coded variable 1 = [IT = 1; construction = 0; finance = -1], effect-coded variable 2 = [IT = 0; construction = 1; finance = -1]) and (b) modeling organizational- or industry-level effects through three-level analysis when testing the predicted relationships. First, as shown in Appendix Table A2, we found that all hypothesized path coefficients were significant when the two effect-coded control variables were included. We did not find any meaningful differences in the path coefficients for the two models, but the

fit statistics for the model with two effect-coded controls included ( $\chi^2 [df = 25] = 94.13$ ; CFI = .44; RMSEA = .09; SRMR = .01 [within], .12 [between]) were worse than the fit statistics for the model without these controls ( $\chi^2 [df = 16] = 18.99$ ; CFI = .94; RMSEA = .02; SRMR = .01 [within], .07 [between]). Second, we also tested a three-level model where level one is individual employees, level two is leaders, and level three is organization or industry. The results of the three-level model provided almost identical magnitudes and significances of path coefficients (see Appendix Table A3<sub>[r18]</sub>). However, the fit statistics for the three-level model ( $\chi^2 [df = 16] = 24.63$ ; CFI = .89; RMSEA = .04; SRMR = .01 [within], .07 [between]) were slightly worse than the fit statistics for our hypothesized two-level model. Based on the cumulative evidence, we concluded that there were no meaningful organizational or industry differences in VWGB and green advocacy for our sample.

Finally, we tested the reverse causality model to confirm whether work group green advocacy influences leader VWGB. The model fit of reverse causality model (work group green advocacy  $\rightarrow$  leader VWGB  $\rightarrow$  group member VWGB) fits similarly ( $\chi^2 = 18.85$ ,  $df = 16$ ,  $p < .05$ ; CFI = .94; RMSEA = .02; SRMR = .01 [within], .07 [between]) to the data, as compared to our final model ( $\chi^2 = 18.99$ ,  $df = 16$ ,  $p < .05$ ; CFI = .94; RMSEA = .02; SRMR = .01 [within], .07 [between]). This result demonstrates the possibility that group members' green advocacy can result in individual employees' VWGB as well as leaders' VWGB, suggesting that future research further needs to theoretically and empirically examine the causal direction of this relationship.

Appendix A

Table A1

The Relationships Between FFM, VWGB, and Moral Reflectiveness of Group Members and Leaders

Five factors	VWGB	Moral reflectiveness
1. Group member conscientiousness	.16*	.11*
2. Group member agreeableness	.04	.11*
3. Group member extraversion	-.03	.07
4. Group member openness	.05	-.01
5. Group member neuroticism	-.02	.01
6. Leader conscientiousness	.18*	.15*
7. Leader agreeableness	.04	.16*
8. Leader extraversion	-.05	.05
9. Leader openness	-.12	.00
10. Leader neuroticism	-.02	.02

\* $p < .05$ .

## Appendix A

Table A2

Differences of Path Coefficients Before and After Controlling for Organization or Industry

Paths	Coefficients (Before controlling)	Coefficients (After controlling)
1. Group member conscientiousness → Group member moral reflectiveness	.20*	.20*
2. Group member moral reflectiveness → Group member VWGB	.13*	.13*
3. Leader conscientiousness → Leader moral reflectiveness	.40*	.40*
4. Leader moral reflectiveness → Leader VWGB	.27*	.28*
5. Leader VWGB → Work group green advocacy	.21*	.21*
6. Work group green advocacy → Group member VWGB	.32*	.38*
7. Leader VWGB → Group member VWGB	.35*	.33*

\* $p < .05$ .

Appendix A

Table A3

Comparison of Path Coefficients Between Two-Level and Three-Level Models [m19][s120]

Paths	Coefficients (Two-Level)	Coefficients (Three-Level)
1. Group member conscientiousness → Group member moral reflectiveness	.20*	.20*
2. Group member moral reflectiveness → Group member VWGB	.13*	.13*
3. Leader conscientiousness → Leader moral reflectiveness	.40*	.40*
4. Leader moral reflectiveness → Leader VWGB	.27*	.27*
5. Leader VWGB → Work group green advocacy	.21*	.21*
6. Work group green advocacy → Group member VWGB	.32*	.32*
7. Leader VWGB → Group member VWGB	.35*	.35*

\* $p < .05$ .