

Name: Michael G. Weyand

Program: Doctoral Program in Organizational Leadership

Dissertation Title: Theory of Planned Behavior: Public Employee Intentions to Recycle Correctly

Committee Chair: Kathleen Bands, Ph.D.

Program Director: Kathleen Bands, Ph.D.

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Signed:

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[Michael G. Weyand]

Date

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Theory of Planned Behavior: Public Employee Intentions to Recycle Correctly

A DISSERTATION

Submitted to the Faculty of the
Graduate School of Hood College
In partial fulfillment of the requirements
for the degree
Doctor of Organizational Leadership

by

Michael G. Weyand

Frederick, Maryland

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Kathleen C. Bands, Ph.D., Chair Date

Anita Jose, Ph.D., Member Date

Megan D. Shaine, Ph.D., Member Date

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DEDICATION

Thanks a million to everyone out there who helped me complete this dissertation.

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Theory of Planned Behavior: Public Employee Intentions to Recycle Correctly

Michael G. Weyand, DOL

Committee Chair: Kathleen Bands, Ph.D.

ABSTRACT

Environmental performance refers to the impact business operations have on the natural environment. The more employees perform green behaviors, the greater an organization's environmental performance becomes, and the less its business operations damage the natural environment. Yet, there is a general lack of investigation into why employees voluntarily engage in green workplace behaviors. To address limited research in this area, this study took a formative research approach to identify and evaluate the determinants driving public employee intention to recycle correctly. Mixed methods were used first to elicit determinants from employees using semi-structured interviews (n = 22). Then, the saliency of each elicited determinant was validated using a cross-sectional survey administered to the entire workforce (n=105). Data analysis consisted of testing three mediated multiple regression models based on tenets from Ajzen's (1991) theory of planned behavior. Results from the elicitation phase unearthed 32 initial determinants. Of these, nine were identified as salient determinants within the target population, and of those nine salient determinants, seven were found during data analysis to significantly impact public employee correct recycling intention. Behavioral beliefs of employees were the most influential determinant explaining 38% of the model variance. These findings are helpful for designing recycling initiatives within the studied municipality. Research implications are discussed in relation to the theory, practice, and future exploration in the field of pro-environmental workplace behavior. This study also proposes a scholar-practitioner framework for streamlining formative research on green workplace behaviors.

CHAPTER 1 INTRODUCTION

Organizational environmental performance is often determined by the sum of pro-environmental behaviors performed by its employees (Ones & Dilchert, 2012a). Yet, the performance of many green workplace behaviors depends solely on the willingness of employees to participate in greening activities. For instance, behaviors such as turning off the lights, reusing office supplies, and repurposing equipment are voluntary and rarely part of employees' formal work responsibilities (Robertson & Barling, 2013). Therefore, understanding the determinants and motivational factors driving these voluntary pro-environmental workplace behaviors is vital for developing greening initiatives that enhance an organization's overall environmental performance.

There are many types of green workplace behavior and even more possible determinants influencing employee performance of green behaviors (Ones et al., 2017). Despite the direct impact on organizational environmental performance, there is an overall lack of research investigating the determinants of voluntary pro-environmental workplace behaviors (Yuriev, Boiral, & Guillaumie, 2020). For this reason, Ajzen's (1991) theory of planned behavior (TPB) has been used by researchers to fill the gap in the literature and add to the nascent understanding of green workplace behaviors. Thus, I used the TPB to identify and prioritize the determinants most impacting employee intentions to perform a voluntary pro-environmental workplace behavior. The voluntary behavior of interest in this paper was employee intention to recycle correctly while at work. The findings of this research add to the growing academic understanding of pro-environmental workplace behavior.

Problem Statement

Environmental performance refers to the impact business operations have on the natural environment. The more employees perform green behaviors, the greater organizational environmental performance becomes, and the fewer business operations damage the natural environment. In the same way, municipal environmental performance signifies the impact cities can have on the long-term sustainability of urban communities (Newman, 2006). For instance, municipal greening initiatives, such as paper shredding events, solar panel rebates, and the adoption of low-impact development policies affect local urban sustainability.

Yet, environmental performance suffers when employees are unwilling to voluntarily engage in company greening initiatives (Christmann & Taylor, 2006). The literature shows that, in aggregate, the performance of individual green behaviors can dramatically enhance organizational environmental performance (Boiral, 2009; Boiral, Paillé, & Raineri, 2015; Daily et al., 2009). Research also shows that managers are often gatekeepers of environmental performance because they directly influence the individual behaviors of their employees (Zibarras & Coan, 2015). Nevertheless, organizations are struggling to maintain high levels of environmental performance (Inoue & Alfaro-Barrantes, 2015). And now, more than ever, the world is facing an unprecedented environmental catastrophe due to the global climate breakdown (IPPC 2014).

City employees have the potential to impact urban sustainability and municipal environmental performance (Azhar & Yang, 2019); however, there is also an overall lack of research in the field of pro-environmental workplace behaviors (Yuriev, Boiral, & Guillaumie 2020). Therefore, the reasons why public employees engage in green workplace behaviors are not well known. For these reasons, there is a clear gap in the literature and an urgent need to

advance research on the determinants of green workplace behaviors, especially within municipal contexts.

Background

The United States population is roughly 330 million people (U.S. Census Bureau, 2020). Nearly two-thirds of Americans live in incorporated cities across the country (Coheb, 2015). By 2050, the United States population is expected to surpass 400 million people, with over 80% of Americans living in highly urbanized communities (Center for Sustainable Systems, 2019). City populations across the country are growing faster now more than ever, with cities making up over 75% of the global resource demands (Yeh & Huang, 2012). As the population of Americans living in cities continues to climb, the pressure to maintain urban sustainability will increase (Lynch et al., 2019).

Green building codes, watershed protection strategies, and environmentally conscious planning are municipal-driven green initiatives that support urban sustainability (Sorensen et al., 1997). In addition, city employees themselves can influence urban sustainability (Caldatto et al., 2020) because green initiatives protect local natural resources and determine the overall ecological impact of public services (Newman, 2006; Riffat et al., 2016). Likewise, employee pro-environmental workplace behaviors leading to greater recycling, energy conservation, and other pollution-preventing activities can increase organizational environmental performance (Boiral, 2009; Boiral, Paillé, & Raineri, 2015; Daily et al., 2009).

The willingness of city employees to voluntarily perform pro-environmental behaviors may enhance municipally driven green initiatives (Azhar & Yang, 2019). Therefore, voluntary pro-environmental behaviors of city employees can influence municipal environmental performance. Moreover, public employees can perform many types of green workplace

behaviors (Ones et al., 2017) and can play an essential role in the long-term sustainability of urban communities.

Researchers have also coined several different names when referring to green behaviors. For example, organizational citizenship behavior for the environment (OCBE) is an umbrella term describing employees' willingness to engage in pro-environmental behaviors voluntarily (Boiral, 2009). OCBE behaviors are defined as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate, immediately benefit the natural environment, and indirectly through this means, contributes to the organization and benefit specific individuals" (Robertson & Barling, 2017, p. 58).

When employees engage in OCBE behaviors, like green purchasing and waste reduction, these actions enhance an organization's environmental performance (Boiral, 2009; Boiral, Paillé, & Raineri, 2015; Daily et al., 2009). However, according to Inoue & Alfaro-Barrantes (2015), organizations, including municipalities, struggle to foster employee pro-environmental behaviors at work. One reason may be that managers act as gatekeepers to the performance of green behaviors because they directly influence individual employee behaviors at work (Zibarras & Coan, 2015). Another reason could be that employees lack the experience and expertise to perform the behavior (Simpson 2012).

Despite the considerable impact green behaviors have on environmental performance, there is a lack of research on the determinants of green workplace behaviors (Francoeur et al., 2021). As a result, there are limited validated measures scholars trust to accurately capture OCBE behavioral action (Yuriev, Boiral, & Guillaumie, 2020). This lack of understanding about green workplace behaviors raises the following questions: What are the determining factors

influencing municipal employee voluntary green workplace behaviors? and, How important is each determinant in predicting voluntary green workplace behaviors of municipal employees?

In the absence of trustworthy measures, researchers of pro-environmental behaviors have relied on other mechanisms for investigating OCBE behaviors. One such mechanism used to explore OCBE is Ajzen's (1991) theory of planned behavior (TPB) (Greaves et al., 2013; Yuriev, Dahmen, et al., 2020). TPB suggests that a person's intention to perform a behavior best predicts their actual behavior (Ajzen 1991). A significant utility of TPB stems from its framework allowing researchers to identify and subsequently evaluate a person's underlying beliefs leading to behavioral intention (Ajzen, 2015). Furthermore, studies using the TPB framework to research pro-environmental workplace behavior have traditionally used mixed-method designs to evaluate employee behavioral intentions (Greaves et al., 2013; Lam, 1999; Yuriev, Boiral, & Guillaumie, 2020). Using TPB to answer questions about green behaviors and its determinants could help inform the design of behavior change initiatives that foster greater adoptions of municipal OCBE behaviors by targeting the most salient determinants.

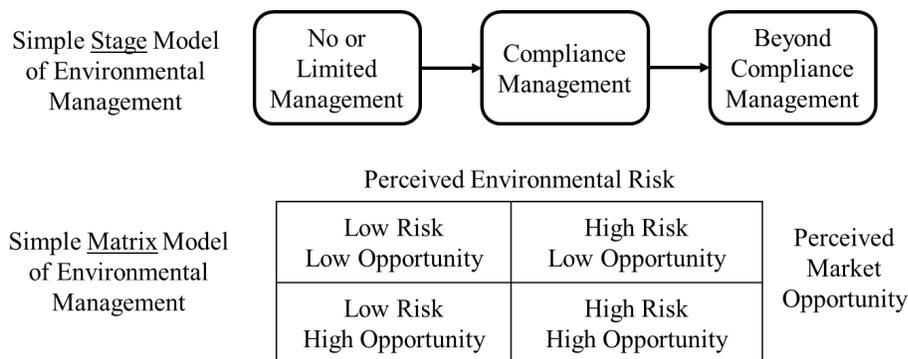
The following two sections provide a brief introduction to the types of green workplace behaviors and the issues that arise when measuring those behaviors. These are followed by the theoretical framework for this study, Ajzen's (1991) TPB, which was used to systematically evaluate the determinants of employee intention to perform the green behavior of interest. I then present my conceptual framework, research questions, and corresponding hypothesis for this study. My conceptual model uses the foundation of TPB constructs and extends TPB to include an additional variable. Finally, I end the chapter with the study purpose, research significance, and chapter summary.

Organizational Greening

Organizational environmental strategies have changed over the years. For example, an organization’s decision to adopt measures to enhance its environmental performance has traditionally been determined by industry pressures and potential market benefits (Kolk, 2000). These two factors drove the development and usage of stage and matrix models for environmental management and corporate greening (see Figure 1). Stage models illustrate the progression of organizations through phases of environmental strategy when responding positively to outside pressures (Worthington, 2013). Furthermore, while stage models explain what organizations can do in response to environmental pressures, matrix models are a set of predetermined dimensions for setting an organization's environmental management agenda (Worthington, 2013). Well-known examples of corporate greening models include the Hunt and Auster (1990) five-stage Environmental Development Continuum and the Streger (1993) Generic Environmental Strategies Matrix Model.

Figure 1

Example Stage and Matrix Management Models of Corporate Greening



However, organizational environmental strategy and management may fit poorly into both models of corporate greening (Hass, 1996). Furthermore, contextual and process-oriented factors, not accounted for by stage and matrix models, can influence employee behaviors and impact the overall effectiveness of greening models (Schaefer & Harvey, 1998). As a result, organizations are beginning to adopt modernized voluntary-based approaches for promoting green employee behaviors as environmental management strategies for promoting corporate greening (Kotchen, 2013).

Within an organization, contextual factors such as industry type, physical infrastructure, products developed, and services provided play a crucial role in determining what kind of green behaviors employees can perform (Steg & Vlek, 2009). In addition, these factors may promote or limit green behaviors and influence employees' overall workplace behaviors (Lockrey et al., 2018). For example, the availability of recycling bins or the purchase of recyclable alternatives can influence an employee's ability to recycle at work.

According to Steg & Velk (2009), contextual factors can influence employees in four ways: a) directly by preventing access to the behavior, example, e.g., the absence of recycling bins from an office; b) by mediating the behavior via motivational factors such as attitudes and beliefs, e.g., placing additional recycling bins may make employees feel recycling at work is convenient; c) moderate the motivational factors influencing the behavior, e.g., employees that feel recycling is responsible might only act on that behavior when recycling bins are conveniently located; and d) moderate the behavior following goal-framing theory, which suggest the most substantial motivational factor impacting the goal will drive the performance of the behavior, e.g., subjective norms of managers may influence an employee's recycling behavior when adequate recycling bins are present.

Beyond the contextual factors influencing green behaviors, other psycho-sociological constructs such as organizational culture, leadership style, management hierarchy, and employee attitudes and beliefs can impact the performance of green behaviors (Tudor & Dutra, 2018). The literature has empirically supported the complex dynamics between psycho-sociological constructs and green workplace behaviors. For example, Norton et al.'s (2014) study of 168 full-time employees found that staff perceptions of workplace climate mediated the role between the company's sustainability policies and employee performance of green behaviors. In addition, Paillé et al.'s (2014) study of 449 respondents from a large Mexican university found that the relationship between perceived organizational support and job attitudes was moderated by job satisfaction and indirectly impacted the performance of green workplace behaviors. Furthermore, Gond et al. (2016) found that behaviors considered unsustainable to external stakeholders were considered reasonable by employees within the oil and gas industry.

The non-linear dynamics of green workplace behaviors, coupled with corporate adoption of more voluntary-based environmental management models, suggest the need to develop adaptive and agile frameworks for investigating and evaluating green workplace behaviors. Moreover, implementing systematic processes that account for contextual and psycho-sociological factors is necessary to create effective environmental management strategies. Such frameworks would yield contextually relevant insights and generate information grounded in applied knowledge to inform organizational greening efforts.

Green Workplace Behaviors

Organizations strive to improve their environmental performance because declining natural resources jeopardizes their access to the materials necessary for their operations (Holme et al., 2000). While the organizational-level assessment of environmental performance is

imperative for understanding regional impacts (Newman, 2006), it is important to recognize that organizational environmental performance is the aggregated effect of individual behaviors performed at the employee level (Alt & Spitzeck, 2016). Employees can engage in many types and categories of pro-environmental behaviors while at work. For example, Ones and Dilchert's (2012a) taxonomy of green workplace behaviors analyzed over 3,000 behaviors from various organizational contexts and industries across the United States and Europe. They categorized employee green workplace behaviors into five major groups: transformative actions, conservation activities, avoiding environmental harm, influencing others, and taking the initiative (see Figure 2).

Figure 2

Ones & Dilchert (2012a) Green Workplace Categories

| | |
|------------------------------------|--|
| Transformative Actions | <ul style="list-style-type: none"> • Choosing sustainable alternatives and changing how work is done by embracing sustainable innovation and creating sustainable products and processes. |
| Conservation Activities | <ul style="list-style-type: none"> • Reducing use, reusing, and repurposing materials as well as recycling and composting. |
| Avoiding Environmental Harm | <ul style="list-style-type: none"> • Preventing pollution to strengthening ecosystems through the monitoring of organizational environmental impacts. |
| Influencing Others | <ul style="list-style-type: none"> • Leading, encouraging, facilitating, and coordinating environmental education and pollution prevention training. |
| Taking Initiative | <ul style="list-style-type: none"> • Initiating programs and policies lobbying and activism putting environmental interests first. |

Note: Adapted from the Green Five Taxonomy (Ones & Dilchert 2012a).

According to Ones and Dilchert (2012a), transformative behaviors change or adapt an individual's workflows and routines to make the process itself more sustainable. For example,

employees choose to carpool to work rather than drive separately. Conserving and avoiding harmful behaviors focus on avoiding wastefulness and mitigation of environmental impacts, respectively (Ones & Dilchert, 2012a). For instance, employees choosing to recycle their lunch is a conservation behavior, and employees following pollution prevention protocols engage in behaviors that avoid environmental harm. Lastly, green behaviors in the group, influencing others, aim to spread sustainability behaviors to others, and employee behaviors that take the initiative may involve leading green projects that impact the organization's sustainability (Ones & Dilchert, 2012a). An example of influencing behavior is encouraging co-workers to recycle, whereas an example of taking initiative behavior is an employee who heads a green team for making recycling easier for the entire organization.

Not all pro-environmental workplace behaviors performed by employees within Ones and Dilchert's (2012a) taxonomy are voluntary. For example, organizations typically mandate employees to follow pollution prevention protocols, whereas recycling waste material and turning off lights is often contingent on employees' goodwill and behavior (Boiral et al., 2014). Mandatory pro-environmental behaviors set by an organization are required as job duties, and failure to perform may result in disciplinary action (Norton et al., 2015).

Green behaviors categorized as OCBE are performed at the discretion of an employee and are neither rewarded nor required by the organization (Daily et al., 2009). OCBEs are performed voluntarily by individual employees. This optional element of the OCBE construct is what distinguishes it from other types of operationalized pro-environmental workplace behaviors (Boiral & Paillé, 2012; Daily et al., 2009; Robertson & Barling, 2017). For example, the unrequired sorting and saving of leftover or excess scrap materials by employees for recycling is an example of OCBE behavior.

Robertson and Barling (2017) defined OCBE as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate, immediately benefit the natural environment, and indirectly through this means, contributes to the organization and benefit specific individuals" (p. 58). They categorized the three OCBE dimensions as self-enacted, co-worker, and organizational. Self-enacted OCBE are workplace pro-environmental behaviors employees enact themselves without any intentional influence on colleagues (Robertson & Barling, 2017). Examples of self-enacted OCBE behaviors include conserving activities such as recycling, reusing, and repurposing workplace materials. Co-worker OCBE behaviors reflect an employee's discretionary efforts to influence and help co-workers be more environmentally friendly (Robertson & Barling, 2017). Examples of co-worker OCBE behaviors center on influencing others, such as encouraging co-workers to adopt green behaviors and promoting environmental initiatives amongst other employees. Lastly, Robertson and Barling (2017) note that organizational OCBE behaviors influence the organization to improve its environmental performance. Examples of organizational OCBE behaviors include employees advocating for an organization to reduce its environmental impact and working with management to improve its environmental performance.

The OCBE construct is one possible option for measuring the general propensity of employees to engage voluntarily in green workplace behaviors (Paillé & Boiral, 2013). However, research in this field is nascent, which raises questions concerning the validity of OCBE. The following section provides a brief introduction on the limitations of OCBE as a measurement tool. Additionally, the literature review presented in Chapter 2 discusses the current research on green workplace behaviors in greater detail.

Measuring Green Workplace Behaviors

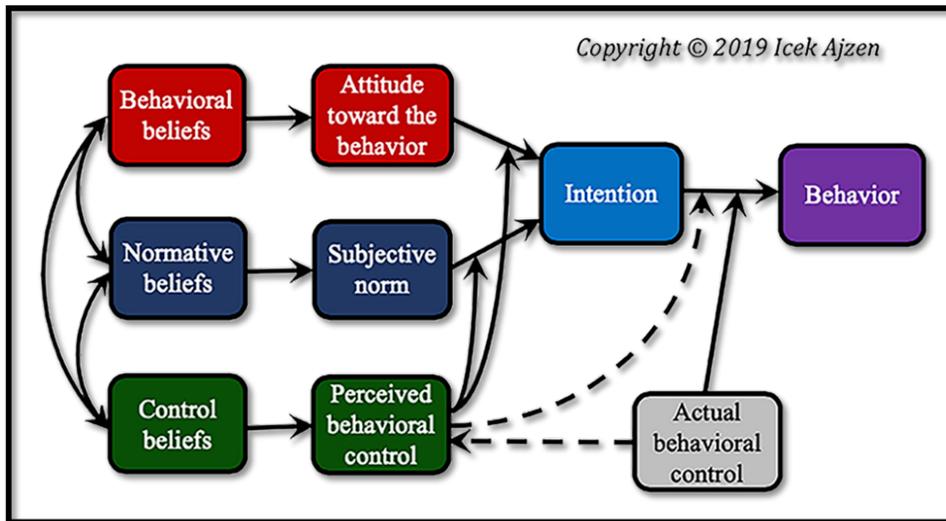
Environmental behavioral psychologists have sought to develop better methods for measuring green workplace behaviors (Bamberg & Möser, 2007; Kollmuss & Agyeman, 2002; Steg & Vlek, 2009). However, there is an overall lack of research investigating the determinants of green workplace behavior (Francoeur et al., 2021). As a result, few validated measures comprehensively capture discretionary behaviors inherent to the OCBE phenomenon (Yuriev, Dahmen, et al., 2020). While OCBE is a promising construct for capturing employee voluntary pro-environmental behaviors (Paillé & Boiral, 2013), several investigators have shown the need to investigate further the determinants of employee OCBE behaviors. For example, Robertson and Barling (2017) noted that self-efficacy is an under-investigated determinant influencing employee OCBE behaviors. Mi et al. (2019) suggested that research should examine the "psychological empowerment," otherwise known as one's sense of self-control over OCBE behavior (p. 9). Yuriev, Dahmen, et al. (2020) noted that future research on OCBE behaviors have not investigated behavioral determinants of OCBE behavior in detail. The dynamic nature of OCBE raises methodological concerns for measuring the OCBE phenomenon. Moreover, because OCBE behavior is optional and not mandated, employees can participate in OCBE behavior in a variety of subtle non-salient ways that are difficult to measure. For example, employees can choose to waste less by reusing paper or avoiding printing. Employees can also decide to reduce their energy consumption by turning off lights after leaving a room. In addition, some employees may have the ability to use video conferencing over traditional in-person meetings. The lack of measures for capturing OCBE behaviors, paired with the larger need to understand the determinants of green workplace behaviors, suggests the need for a flexible theoretical framework for studying the determinants of OCBE and green workplace behaviors.

Theoretical Framework

This study used Ajzen's (1991) theoretical model, the theory of planned behavior (TPB). This theory suggests that an individual's actual behavior is best predicted by the person's intention to perform the behavior (Ajzen, 1985). Scholars in pro-environmental workplace behavior have used TPB to focus on explaining the factors that influence green intention versus the factors influencing actual green behavior (Lam, 1999; Laudenslager et al., 2004; Li et al., 2018). The TPB model consists of three direct predictors and three ancillary indirect predictors of intentions. These predictors include (a) attitude toward the behavior and its indirect predictor, behavioral beliefs; (b) subjective norm and its indirect predictor, normative beliefs; and (c) perceived behavioral control and its indirect predictor, control beliefs (see Figure 3).

Figure 3

Theory of Planned Behavior



Note. Ajzen's official website: <http://people.umass.edu/aizen/tpb.diag.html> (May 8, 2020)

Ajzen (1991) defines attitude toward the behavior as the extent individuals favor or disfavor the behavior of interest. Subjective norms gauge whether the individual perceives most people approve or disapprove of the behavior of interest, and perceived behavioral control captures an individual's perceived self-efficacy toward the behavior of interest. Perceived behavior control is a proxy to actual behavioral control because measuring actual behavioral control is difficult in formative research (Ajzen, 2002). Table 1 includes the definitions of the TPB constructs.

Table 1

Theory of Planned Behavior Constructs

| TPB Constructs | Definition |
|------------------------------|--|
| Behavior | An individual's observable response is based on a given situation regarding a given topic. |
| Intention | Considered an immediate determinant of behavior and represents an individual's readiness to engage in a given behavior. |
| Attitude toward the behavior | An individual's overall positive or negative evaluation of the behavior. |
| Subjective norm | An individual's perceptions regarding the presence of social pressure influence their intention to perform or not perform the behavior. |
| Perceived behavioral control | The extent an individual is confident they can perform the behavior. |
| Behavioral beliefs | An individual's beliefs about the consequences of the behavior and subsequent positive or negative opinions about those beliefs. |
| Normative beliefs | An individual's beliefs about the expectations of others concerning how they should act and subsequent positive or negative judgments concerning those beliefs. |
| Control beliefs | An individual's beliefs regarding the existence of factors that either help or prevent them from performing a behavior and their perception of how powerful those factors are. |
| Actual behavioral control | The actual extent to which a person has the necessary skills and resources to perform the behavior. |

Note: Definitions paraphrased from Ajzen (1991).

The three direct predictors merge to create an individual's overall intention to engage in the behavior of interest. Each direct predictor connects to an indirect predictor called antecedent beliefs. According to Ajzen (1991), behavioral belief is an individual's perceived likelihood that performing a behavior will lead to a given outcome or experience, normative beliefs concern an individual's perceived behavioral expectations of others, and control beliefs refer to factors and individual recognition of factors that facilitate or impede their engagement in a given behavior. Each antecedent belief directly influences the prevailing core TPB predictor and indirectly influences TPB behavioral intention. Existing research in pro-environmental workplace behavior indicates that the TPB model is an adequate theoretical basis for this study. For example, Greaves et al. (2013) surveyed 449 public employees and found the TPB constructs together explained 68% of the variance in switching off computer intentions, 56% of the variance in recycling intentions, and 55% of the variance in video conferencing intentions. Yuriev, Boiral, & Guillaumie (2020) reported TPB constructs predict 79% of the variance in nonacademic employee intention to use alternative transportation to travel to work. Together, both Greaves et al. (2013) and Yuriev, Boiral, & Guillaumie (2020) explained between 55% and 79% of the variance of employee behavioral intention to perform green behaviors at work.

In addition, the literature review conducted by Yuriev, Dahmen, et al. (2020) found 126 publications using the TPB theoretical framework to study pro-environmental behavior. Furthermore, Yuriev, Dahmen, et al. (2020) reported that only 18 of the 126 studies investigated green behaviors at work. Of these 18 TPB-based studies, the top three pro-environmental workplace behaviors studied were recycling (29%), transportation (19%), and energy-saving (14%) (Yuriev, Dahmen, et al., 2020).

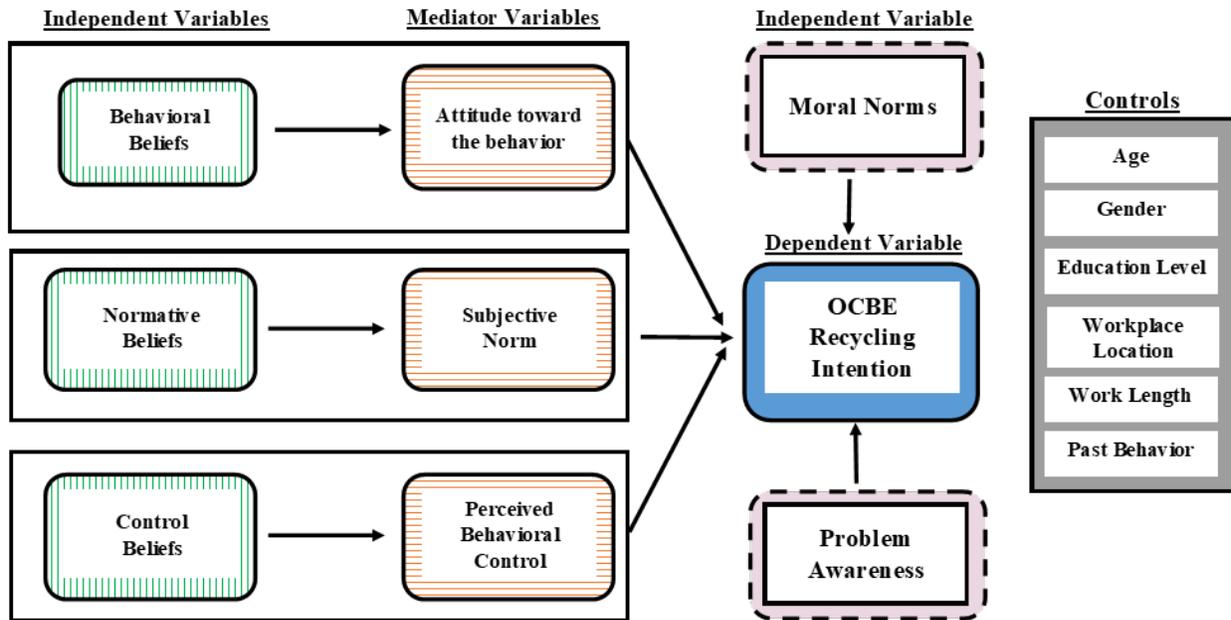
The TPB model explains a significant proportion of variance in green workplace behavioral intention; however, one limitation of the TBP model is its inability to account for other variables that factor into employee behavioral action. For instance, the model does not account for factors such as awareness of environmental problems or an individual's moral norms (i.e., values) towards a given behavior. For instance, Yuriev, Dahmen, et al. (2020) found, on average, that the explained variance in TPB models improved by 12.1% when researchers augmented additional variables that influence pro-environmental behaviors.

Conceptual Framework

The literature lacks validated methods for measuring green workplace behaviors (Francoeur et al., 2021). For this reason, my conceptual model focused on explaining the determinants of green workplace behavioral intention rather than green workplace behavioral action. Thus, the green workplace behavior of interest for this research study was employee correct recycling intention. Figure 4 presents the TPB-based conceptual model for this research study.

Figure 4

Study Conceptual Framework



The conceptual framework shown in Figure 4 uses Ajzen's (1991) three TPB core constructs: attitude toward the behavior, subjective norm, and perceived behavioral control (i.e., self-efficacy). Prior research on OCBE indicated attitude (Bissing-Olson et al., 2013; Blok et al., 2015), social norms (Greaves et al., 2013; Paillé et al., 2013), and self-efficacy (Boiral & Paillé, 2012; Boiral, Talbot, & Paillé, 2015) are determinants of OCBE behavior.

Antecedent beliefs, known as indirect determinants, are subconstructs that further define the prevailing direct predictors (attitude, subjective norms, and perceived behavioral control). The evaluation of these indirect determinants is critical for designing intervention programs for a municipal population. Previous research on pro-environmental behavior suggested problem awareness impacts green behaviors (Echegaray & Hansstein, 2017; Tosti-Kharas et al., 2016; Wan et al., 2017). However, Ajzen's (1991) TPB model does not account for problem awareness; thus, my conceptual framework extends TPB to include problem awareness as a primary predictor of OCBE behavioral intention. My conceptual model also controls for past behavior,

age, and gender because these factors have also been shown to influence pro-environmental behavior.

Ajzen's (2002) theoretical model is slightly different, with moderating arrows going right before attitude and norms. I decided to use a more additive approach because my research focuses on understanding the importance of determinants on OCBE intention and not necessarily the influence of the determinants on each other. This approach is consistent with the existing research (Greaves et al., 2013; Lam, 1999; Yuriev, Boiral, & Guillaumie, 2020). Additionally, my study aimed to identify and quantitatively assess the importance of behavioral determinants impacting municipal employees' intentions to engage in a single OCBE behavior. For this reason, I choose a specific OCBE behavior relevant to the population of interest that also provides educational value. More on the choice of OCBE behavior is in Chapter 3.

Research Questions

Literature investigating the dynamics of pro-environmental workplace behaviors is nascent. The current literature suggests the field lacks the intellectual maturity to succinctly isolate and comprehensively report on the factors most important for determining employee voluntary green workplace behaviors (Boiral, 2009; Boiral, Paillé, & Raineri, 2015; Francoeur et al., 2021; Inoue & Alfaro-Barrantes, 2015; Ones & Dilchert, 2012a; Yuriev, Dahmen, et al., 2020).

Nonetheless, public managers need answers to help promote pro-environmental workplace behaviors. Moreover, such insights on public employee green workplace behaviors will help enhance municipal environmental performance for providing greater long-term urban sustainability. Therefore, this study sought to answer the following research questions:

Research Question 1 (R1): *What are the salient determinants predicting public employees' intentions to engage in green workplace behavior voluntarily?*

Research Question 2 (R2): *How much explained variance does each determinant capture when predicting employee behavioral intention?*

Formative Research

I used a formative research approach to answer the research questions in this study. Formative research involves using mixed-method research techniques that collect and analyze data helpful in informing the development of academic theories and systemic change programs (Gittelsohn et al., 2006). Formative research is used widely across several different industries, such as health-behavior (Vastine et al., 2005), environmental management (Maibach, 1993), and education (Wiley, 2000). Formative research methods focus on designing studies that are systematic in development and contextually appropriate. Formative research generates results grounded in applied knowledge to inform practitioners how to improve or alter behavioral intervention programs (Reigeluth & Frick, 1999). Interpreting complexity is the mark of formative research, which offers a scientist a guiding framework for triangulating methodologies that strengthen answers to research questions (Barab & Squire, 2004).

Research on voluntary green workplace behavior is nascent. Therefore, determinants of green workplace behaviors are not well known. Formative methodology is well suited for investigating OCBE behaviors because it provides a systematic framework for building a knowledge foundation on voluntary pro-environmental behaviors. For these reasons, I designed this study based on best practices in the field of formative research in the areas of recruiting participants (Francis et al., 2004), determining the acceptability of measurement procedures

(Ajzen, 2015), and extending existing research on OCBE behaviors (Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020; Yuriev, Dahmen, et al., 2020).

Methodology

I conducted this study using formative methods to explore and evaluate the salient determinants of one green workplace behavior. Public employees who are a part of a municipal workforce were the population of interest for this research. I used a mixed-method research design that was based on the theoretical tenets of the TPB model. The study was completed in two phases: qualitative exploration to elicit employee determinants of green workplace behavioral intention and a quantitative evaluation to assess the significance of each determinant predicting behavioral intention. Throughout this study, I adhered to TPB guidelines from Ajzen (1991, 2002, 2011, 2012a, 2015, 2020) and remained consistent with best practices from the field (e.g., Francis et al., 2004; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020; Yuriev, Dahmen, et al., 2020).

Phase 1 of this study consisted of 22 semi-structured interviews to elicit underlying determinants influencing behavioral intention. I then operationalized the salient determinants from each interview transcript and constructed a TPB questionnaire. Phase 2 of this study involved administering the resultant TPB questionnaire to the target population. I then tested three mediation models to verify the impact determinants have on behavioral intention.

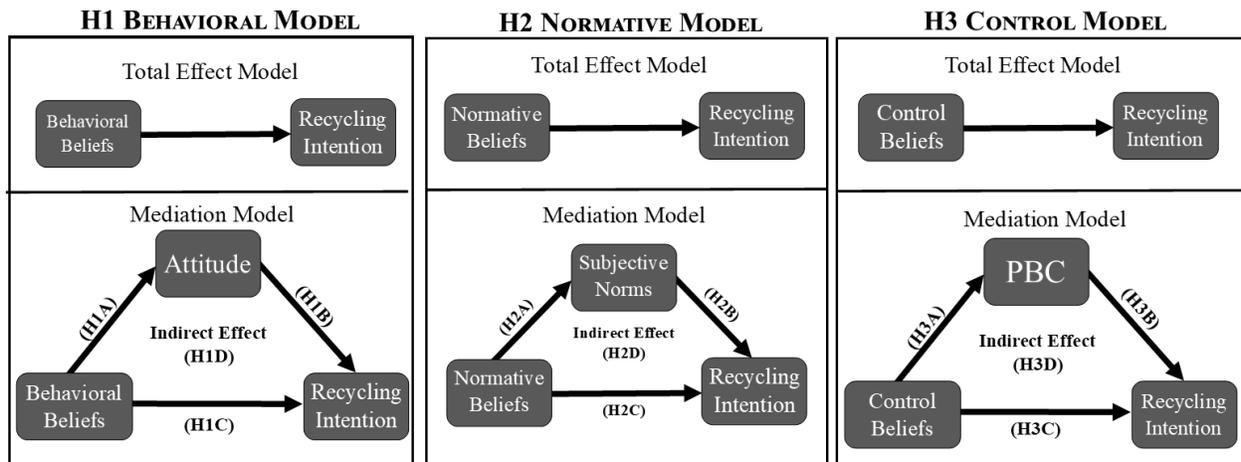
Hypotheses

The theory of planned behavior (TPB) model (Ajzen, 1991) suggests a person's antecedent beliefs are indirect determinants of behavioral intentions. For example, the TPB model proposes that behavioral beliefs influence attitudes, and then attitudes influence the prevailing construct intention. Thus, the direct TPB constructs (attitude, subjective norms, and

perceived behavioral control) function as mediator variables to the indirect TPB antecedent behavioral, normative, and control beliefs. Accordingly, I developed three mediated multiple regression models to test whether direct TPB constructs mediate the relationship between indirect TPB determinants and behavioral intention (see Figure 5). The total effect model within each of the three hypothesis models was not assigned a specific hypothesis in this study.

Figure 5

Three Hypothesis Models: Attitude, Subjective Norms, and PBC as Mediator Variables



The first hypothesis model (H1 Behavioral Model) consists of four separate hypotheses. The first hypothesis (H1A) in the H1 Behavioral Model evaluates the relationship between the independent variable, behavioral beliefs, and the mediator variable, attitude. The second hypothesis (H1B) evaluates the relationship between the mediator variable, attitude, and the dependent variable, recycling intention. Next, the third hypothesis (H1C) tests the relationship between the independent variable, behavioral beliefs, and the dependent variable, recycling intention. Finally, the last hypothesis (H1D) sought to find an indirect effect for establishing mediation on the relationship between the independent variable, behavioral beliefs, and the

dependent variable, recycling intention. Thus, the four-hypothesis making up the H1 Behavioral model are as follows:

H1A: *Behavioral beliefs will have a direct effect on attitude*

H1B: *Attitude will have a direct effect on correct recycling intention*

H1C: *Behavioral beliefs will have a direct effect on correct recycling intention*

H1D: *Attitude will mediate the relationship between behavioral beliefs and correct recycling intention.*

The second hypothesis model (H2 Normative Model) also consists of four separate hypotheses. The first hypothesis (H2A) in the H2 Normative Model evaluated the relationship between the independent variable, normative beliefs, and the mediator variable, subjective norms. The second hypothesis (H2B) evaluates the relationship between the mediator variable, subjective norms, and the dependent variable, recycling intention. The third hypothesis (H2C) tests the relationship between the independent variable, normative beliefs, and the dependent variable, recycling intention. Finally, the last hypothesis (H2D) sought to find an indirect effect for establishing mediation on the relationship between the independent variable, normative beliefs, and the dependent variable, recycling intention. The four-hypothesis making up the H2 Normative Model are as follows:

H2A: *Normative beliefs will have a direct effect on subjective norms*

H2B: *Subjective norms will have a direct effect on recycling intention*

H2C: *Normative beliefs will have a direct effect on correct recycling intention*

H2D: *Subjective norms will mediate the relationship between normative beliefs and correct recycling intention*

The last hypothesis model (H3 Control Model) also consists of four separate hypotheses. The first hypothesis (H3A) in the H3 Control Model evaluated the relationship between the independent variable, control beliefs, and the mediator variable, perceived behavioral control (PBC). The second hypothesis (H3B) evaluates the relationship between the mediator variable, PBC, and the dependent variable, recycling intention. The third hypothesis (H3C) tests the relationship between the independent variable, control beliefs, and the dependent variable, recycling intention. Finally, the last hypothesis (H3D) sought to find an indirect effect for establishing mediation on the relationship between the independent variable, control beliefs, and the dependent variable, recycling intention. The four-hypothesis making up the H3 Control Model are as follows:

H3A: *Control beliefs will have a direct effect on Perceived Behavioral Control*

H3B: *Perceived Behavioral Control will have a direct effect on correct recycling intention*

H3C: *Control beliefs will have a direct effect on correct recycling intention*

H3D: *Perceived Behavioral Control will mediate the relationship between control beliefs and correct recycling intention*

The last two hypotheses (H4 & H5) were used to test the relationships of the two independent variables, problem awareness and moral norms, on the dependent variable, recycling intention. The intended goal of these two independent variables was to extend the TPB theoretical framework to capture additional model variance. The two hypotheses for problem awareness and moral norms are:

H4: *Problem awareness will positively relate to correct recycling intention*

H5: *Moral Norms will positively relate to correct recycling intention*

Study Purpose

This study systematically identified and evaluated the determinants influencing public employees' intentions to engage in green workplace behavior voluntarily. This study took on a formative research design and was implemented systematically via a two-phased mixed-methods approach. When designing this study, I sought to achieve the following objectives: (a) qualitatively identify and subsequently operationalize the salient determinants of a municipal green behavior of interest; (b) quantitatively evaluate and assess the importance each determinant has on influencing employees' intentions to engage in the municipal green behavior of interest; and (c) design a post-study research framework to promote future research on municipal green behaviors. The overall goal was to advance research in the field of pro-environmental workplace behaviors and provide a scalable framework appropriate for both scholars and practitioners. In addition, I hoped to help all managers increase the pace at which public employees adopt green workplace behaviors that ultimately result in greater urban sustainability.

Research Significance

This study took a formative research approach to identify and evaluate the determinants driving public employee intention to recycle correctly. To my knowledge, this is the first TPB-based research study on green workplace behaviors to report a detailed protocol and analysis of findings from the elicitation phase. This is also likely the first study on employee green behaviors to explore employee intentions to recycle correctly versus employees' generalized recycling intentions to recycle as much as possible.

As a result, the findings presented in this study offer insight into the determining factors influencing municipal employee adoption of correct recycling behaviors at the studied organization. Additionally, the proposed post-study framework provides practitioners a blueprint

for learning more about the drivers of voluntary pro-environmental behaviors for improving municipal environmental performance. Furthermore, the study findings contribute to the research field in the following ways: (a) providing researchers a model for operationalizing municipal OCBE behaviors; (b) expanding the current academic understanding of the determinants of municipal OCBE behaviors, and (c) offering public managers a systematic process for creating change interventions for fostering municipal OCBE behaviors.

Summary

Employees can increase the environmental performance of organizations by voluntarily engaging in green workplace behaviors like recycling, energy conservation, and other pollution-prevention activities (Boiral, 2009; Boiral, Paillé, & Raineri, 2015; Daily et al., 2009). Performed directly by employees, these green workplace behaviors function as individual actions that protect the natural environment. Yet, there is an apparent lack of research on pro-environmental workplace behaviors and its determinants. Researchers also lack access to validated measures for comprehensively gauging an employee's overall propensity to engage or not engage in green behaviors.

Public employees' performance of green workplace behaviors can impact the environmental performance of cities. Municipal environmental performance refers to the aggregate effect of public greening initiatives for offsetting the impact of city operations on the local natural environment. Thus, public employees' greater performance of green workplace behaviors can help address the sustainability issues facing urbanized environments. For these reasons, I designed a study to address a gap in the literature on the determinants of a voluntary green workplace behavior within a municipal workforce.

The theoretical model in this study is based on tenets from Ajzen's (1991) theory of planned behavior (TPB). I focused my study on investigating correct recycling intention rather than correct recycling behavior because measures for assessing the behavior at an individual level are challenging to obtain. The conceptual model suggests that determinants are mediated via three direct TPB variables, and the hypotheses unpack the relationship between determinants and public employee correct recycling intention. Findings from this study aid in the decision-making for developing behavioral change interventions and promoting employee green workplace behaviors at the study organization. Findings from this study also further the academic understanding of the drivers of municipal green workplace behaviors and provide researchers with an additional framework for evaluating pro-environmental workplace behaviors.

Chapter 2 will offer a detailed literature review regarding the various types of pro-environmental behaviors, followed by a comprehensive review of theoretical frameworks used to evaluate pro-environmental behaviors and why the TPB is the most appropriate framework for this study.

CHAPTER 2 LITERATURE REVIEW

The voluntary commitment of employees to engage (or not to engage) in pro-environmental behaviors has substantial implications for the environmental performance of organizations (Boiral 2009; Boiral, Paillé, & Raineri, 2015; Daily et al., 2009). In the same way, the long-term sustainability of urban communities largely depends on the environmental performance of municipalities (Azhar & Yang, 2019; Theaker & Cole, 2001). Organizations, including municipalities, struggle to promote discretionary pro-environmental behaviors, such as recycling, energy conservation, and other pollution-preventing activities, among employees (Inoue & Alfaro-Barrantes, 2015).

Promoting these green workplace behaviors raises the following fundamental question: What are the determining factors influencing municipal employee adoption of voluntary pro-environmental behaviors? Moreover, which of these determinants are most influential to predicting green behavioral performance?

The literature review presented in this chapter summarizes the existing research on pro-environmental workplace behaviors. Furthermore, I have separated this chapter into two main parts: employee green behaviors and green behavior theories.

The first section begins with an overview of green employee behavior and the differences between required and voluntary green behaviors at work. More information is then given about the many types of voluntary green behaviors and how the voluntary performance of these green behaviors is advantageous to the natural environment, coworkers, and organizations at large. This first part of Chapter 2 ends with a comprehensive review of the existing literature regarding the determinants of green behaviors. The literature review suggests a flexible theoretical framework is needed to evaluate green workplace behaviors.

Therefore, in the second part of this chapter, I assess three flexible theoretical frameworks that prior research studies have used to evaluate green workplace behaviors. I demonstrate that there is no single dominant theory for evaluating green workplace behaviors. I then close the second part of the chapter by explaining why Ajzen's (1991) theory of planned behavior (TPB) was the most appropriate and widely accepted theoretical model for this study. I end this literature review by discussing the selected green behavior of interest for this study and summarizing the key information presented in this chapter. Again, the purpose of this study was to systematically identify and evaluate the determinants influencing employees' intentions to voluntarily take part in municipal green behavior. This study aimed to answer the two research questions and develop a framework for facilitating the systematic investigation of green workplace behaviors and its determinants. The first research question (R1) asked what are the salient determinants predicting public employees' intentions to engage in green workplace behavior voluntarily? The follow-up question, R2, asked how much explained variance does each determinant capture when predicting employee behavioral intention?

Employee Green Behavior

Distinguishing between required (in-role) and voluntary (extra-role) behavior makes it possible to group pro-environmental behaviors and contextualize their determinants (Norton et al., 2015). Therefore, the following section briefly introduces employee green behaviors by highlighting the difference between mandatory and voluntary green workplace behavior. The various types of voluntary green workplace behaviors of employees and the existing literature on the determinants of green behaviors are also discussed. The purpose of the following sections is to outline the current state of affairs regarding research in the field of green workplace behavior. These sections also highlight the disorganized accounting of green behavior determinants due to

an apparent lack of trustworthy measures for comprehensively evaluating green workplace behaviors.

Voluntary Green Workplace Behaviors

Ones and Dilchert (2012a) defined green behaviors as "actions and behaviors that employees engage in that are linked with and contribute to or detract from environmental sustainability" (p. 87). However, not all green behaviors performed by employees at work are voluntary. Distinguishing between mandatory and voluntary pro-environmental workplace behavior is essential for studying the phenomenon.

The literature on pro-environmental workplace behavior largely separates green behaviors into two groups: in-role and extra-role green behaviors (Francoeur et al., 2021; Norton et al., 2015; Ones & Dilchert, 2012a). In-role behavior refers to activities employees do as a function of their regular job duty (Ramus & Killmer, 2007). Extra-role green behaviors are performed freely and are not mandated by employers.

Not performing in-role green behaviors can have consequences or penalties. For example, public works employees must follow state environmental laws when applying pesticide applications to city parks. Employees not following green policies set by an organization are subject to reprimands (i.e., a verbal warning or disciplinary action).

Unlike mandatory in-role behaviors, extra-role behaviors are "discretionary behaviors that are neither required nor formally rewarded" by organizations (Van Dyne et al., 1995 as cited in Ramus & Killmer, 2007, p. 557). Voluntary workplace pro-environmental behaviors such as recycling office paper, repurposing materials, and reducing waste are examples of extra-role behavior (Francoeur et al., 2021).

Furthermore, voluntary pro-environmental behavior is an umbrella concept describing the various actions employees may perform while at work (Boiral, Paillé, & Raineri, 2015). Yet, researchers have described and operationalized these voluntary workplace pro-environmental behaviors differently. Yuriev et al.'s (2018) systematic literature review of barriers to green workplace behaviors reports on 11 terms referring to the phenomenon; some notable phrases included employee green behaviors (Ones & Dilchert, 2012), green practices of employees (Chan et al., 2014), sustainable work styles (Greene et al., 2014), and workplace environmentally friendly behaviors (Saifulina & Carballo-Penela, 2017). Referring to the rise in pro-environmental behavior terminology, Boiral et al. (2015) stated, "the proliferation of concepts certainly illustrates the dynamic nature of research in this area, but also the absence of a clearly established definition of what a pro-environmental behavior within organizational settings is or should be" (p. 6).

Organizational citizenship behavior for the environment (OCBE) is a promising concept for creating consensus for defining environmental behaviors within organizations. OCBE is an extra-role conceptualization of voluntary workplace pro-environmental behavior. Extending from Organ's (1988) concept of organizational citizenship behavior, OCBE suggests a person's voluntary commitment within an organization can affect the organization's overall performance (Boiral, 2009). Daily et al. (2009) introduced one of the first OCBE conceptual models and defined OCBE as "discretionary acts by employees within the organization not rewarded or required that are directed toward environmental improvement" (p. 252). In recent years, research interest in OCBE behaviors has increased considerably (Boiral, 2009, Lamm et al., 2013; Robertson & Barling, 2017), which led to the development of similar definitions conceptualizing OCBE behavior:

- Boiral (2009) defined OCBE as “individual and discretionary social behaviors not explicitly recognized by the formal reward system and contributing to improve the effectiveness of environmental management of organizations” (p. 223).
- Lamm et al. (2013) defined OCBE as “voluntary behavior not specified in official job descriptions that, through the combined efforts of individual employees, help to make the organization and/or society more sustainable” (p. 165).
- Robertson and Barling (2017) defined OCBE as “individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate, immediately benefit the natural environment, and indirectly through this means, contributes to the organization and benefit specific individuals” (p. 58).

Organ’s 1988 original concept of organizational citizenship behavior was criticized for being too broad to capture specific behaviors within a given organizational context (Bettencourt et al., 2001). In part, this need for higher specificity led to the development of the OCBE model presented in Daily et al. (2009). Furthermore, Boiral (2009) went on and expanded the OCBE definition to emphasize the singular nature of voluntary employee commitment and the impact individuals can have on the efficiency of environmental management. In contrast, Lamm et al.’s (2013) definition of OCBE sought to illustrate the cumulative impact discretionary behaviors have on an organization. Lastly, Robertson and Barling’s (2017) target-based definition of OCBE describes how voluntary pro-environmental workplace behaviors help the environment, individuals, and entire organization. The specificity of scholarly OCBE definitions appears to be increasing over time. For this reason, I used the increased specificity of Robertson and Barling’s

(2017) target-based definition as the basis for remaining consistent with the literature when selecting the green behavior of interest for this study.

Types of Voluntary Green Workplace Behaviors

The first step in understanding the role of green workplace behaviors in organizations is creating a taxonomy inventorying the many forms of these behaviors. Ones and Dilchert’s (2012a) taxonomy of green workplace behaviors analyzed over 3,000 behaviors from various organizational contexts and industries across the United States and Europe. Table 2 displays categories of pro-environmental inventories, their behavioral subcategories, and examples of behaviors.

Table 2

Categories of Pro-Environmental Behaviors

| Categories | Behavioral subcategories | Municipal Example of Behaviors |
|--------------------|---|---|
| Conserving | Recycling | Recycling cans, bottles, paper. |
| | Reusing | Reusing cardboard boxes, binders, office supplies. |
| | Reducing use | Turning off lights, printing double-sided. |
| | Repurposing | Repurposing barrels for storage. Using PVC pipes as trash can dispensers. |
| Avoiding Harm | Pollution | Preventing and reducing pollution. |
| | Monitoring environmental impact | Monitoring emissions from operations. |
| | Strengthening ecosystems | Maintaining wildlife areas around work facilities. |
| Transforming | Choosing responsible alternatives. | Purchasing non-disposable equipment or supplies, using eco-friendly products. |
| | Changing how work is done | Optimizing shipping programs to reduce air shipments. |
| | Creating sustainable products and processes | Designing new products, developing new manufacturing processes. |
| | Embracing innovation for sustainability | Choosing virtual meetings instead of travel, purchasing company hybrid cars. |
| Influencing Others | Educating and training for sustainability | Hiring a sustainability education coordinator, sharing suggestions on workplace pollution with group members. |
| | Encouraging and supporting others | Encouraging others to protect nature. |
| Taking Initiative | Initiating programs and policies | Starting a new environmental program, taking initiative to act in environmentally friendly ways. |

| Categories | Behavioral subcategories | Municipal Example of Behaviors |
|------------|---------------------------------------|--|
| | Lobbying and activism | Campaigning, lobbying, and arguing for environmental issues. |
| | Putting environmental interests first | Not using air conditioning, turning down heat. |

Note: Behaviors are taken from Ones and Dilcher (2012a).

A significant advantage of Ones and Dilchert’s (2012a) taxonomy is its capacity for capturing both required (in-role) and voluntary (extra-role) employee green behaviors (i.e., OCBE) (Norton et al., 2015). While the taxonomy has confirmation and cross-cultural generalizability limitations, two separate meta-analyses (Hertel et al., 2013; Wiernik et al., 2016) offered empirical validation to support Ones and Dilchert’s (2012a) taxonomy of green workplace behaviors. For this reason, the comprehensiveness of Ones and Dilchert’s (2012a) taxonomic grouping of green workplace behaviors offers a legitimate starting point to evaluate OCBE behaviors.

Ones and Dilchert (2012b) found that 13% to 29% of green employee behaviors are job requirements (in-role), which suggests that 71% to 87% of workplace pro-environmental behavior may be voluntary and performed at the employees’ discretion. Norton et al.’s (2015) definition of required employee green behavior, “behavior performed within the context of employees’ required job duties,” highlights the importance of accounting for contextual factors when determining the discretionary degree of pro-environmental behaviors (p. 105). Yuriev et al.’s (2018) study on workplace barriers of pro-environmental behaviors adds to the elastic nature of OCBEs, claiming an employee’s effort to recycle at home is not equivalent to their recycling efforts at work. Furthermore, Yuriev et al. (2018) argued that OCBE behavior is not directly tied to an organizational system. For example, organizations can encourage staff to attend green team meetings by permitting time away from their required job duties. In contrast, organizations may

not offer any incentives to staff for turning off lights when exiting a room. Thus, considering organization-related aspects is necessary when selecting a method for evaluating an OCBE behavior of interest.

Advantages of Voluntary Green Workplace Behaviors

Employee green behaviors refer to "actions and behaviors that employees engage in that are linked with and contribute to or detract from environmental sustainability" (Ones & Dilchert, 2012a, p. 87). The categories of green employee behavior vary in that they have many forms of pro-environmental workplace behaviors (Ones & Dilchert, 2012a). Yet, not all green behaviors performed by employees at work are voluntary. A growing field of research concentrates on the discretionary nature of pro-environmental workplace behaviors (Boiral 2009, Lamm et al., 2013; Norton et al., 2015; Robertson & Barling, 2017). Scholars often refer to voluntary pro-environmental workplace behaviors as organizational citizenship behaviors for the environment (OCBEs) (Daily et al., 2009). OCBE behavior extends Organ's (1988) theoretical concept of organizational citizenship behavior, which suggests that employee organizational voluntary commitment can affect an organization's overall performance. Along the same lines, OCBE suggests that employees' voluntary commitment to pro-environmental behaviors can improve an organization's overall environmental performance (Daily et al., 2009).

OCBE behaviors performed at the employees' discretion are different from the required pro-environmental behaviors mandated by an organization. Boiral and Paillé (2012) offered four ways employee voluntary pro-environmental behaviors influence an organization's environmental performance. First, employees can exchange existing practices for new environmental initiatives. Second, employees can advocate for more sustainable and greener organizational policies. Third, workers can suggest new eco-innovations and resource-saving

ideas to management. Fourth, employees can influence the effectiveness of environmental management systems. In support of Boiral and Paillé's concept, several studies offer empirical backing demonstrating the impact of employees' environmental behaviors on an organization's environmental performance (Boiral, Talbot, & Paillé, 2015; Paillé, Chen, et al., 2014; Robertson & Barling, 2015).

Organizations with higher environmental performance exhibit greater economic efficiency than organizations with low environmental performance (Claver et al., 2007). OCBE behaviors at work can help reduce material usage, promote recycling, and contribute to lower energy consumption (Daily et al., 2009). Moreover, OCBE behaviors are inseparable from organizational greening initiatives because green initiatives rely on the employee's goodwill and participation for success (Boiral, Paillé, & Raineri, 2015). The effectiveness of a green initiative to reduce material consumption and promote recycling depends heavily on an employee's commitment to engage in resource-saving behaviors (Homburg & Stolberg, 2006). Even the implementation of organizational policies, such as the commonly used ISO 14001 environmental management system, requires active employee participation for success (Yin & Schmeidler, 2009).

Municipal environmental performance refers to the impact green initiatives have on offsetting the environmental impact of municipal urbanization. Municipalities can implement a variety of green policies and programs to improve their environmental performance (Brilhante & Klaas, 2018). For example, municipal green initiatives could include the adoption of environmentally conscious building codes, community composting, green purchasing practices, and energy conservation techniques. However, the effectiveness of a municipality's

environmental performance depends not just on policy and available funding but also on the willingness of municipal employees to engage in OCBE behaviors (Azhar & Yang, 2019).

Employees who are unwilling to engage in pro-environmental behaviors make formal and organizational-level green actions merely "symbolic, ceremonial, and unsubstantial activities" (Christmann & Taylor, 2006, p. 6). OCBE behaviors drive organizational environmental performance, and organizational environmental performance contributes to an organization's overall performance (Boiral, Talbot, & Paillé, 2015). Effective organizational environmental performance is necessary for business in today's marketplace (Welford, 2016, p. 12). For instance, Robertson and Barling (2017) found evidence suggesting employee OCBE can significantly reduce expenditures and contribute to an organization's financial performance. Thus, the effectiveness of municipal greening efforts for long-term urban sustainability may depend on a manager's ability to foster employee voluntary pro-environmental behaviors at work.

Corporate Environmental Responsibility

Corporate environmental responsibility (CER) is an organization's obligation to avoid negatively impacting natural environments (Dashlsrud, 2008). CER is a component of corporate social responsibility (CSR) which refers to an organization's overall well-doing toward making positive change in the community through employee engagement, financial support, and volunteerism (Dashlsrud, 2008). While normally environmental sustainability is part of CSR, not all CSR strategies prioritize the activities of CER within an organization's business model (Chandler, 2014). For example, the Patagonia clothing company is an organization embracing its CER model with sustainability-driven innovations and the circularity of resources (Rattalino, 2018)

The overall mission of an organization and its focus on CER impacts the green behaviors of employees (Ruepert et al., 2017). Moreover, employee perceptions and acceptance of CER can shape sustainable norms of companies and determine the extent of green behaviors performed (Ruepert & Steg, 2018). However, individuals may not act on green behaviors when the social norm costs are too high. For example, employees may avoid green behaviors when they perceive that the behavioral costs of time, money and effort are not advantageous toward achieving manager goals (Lindenberg & Steg, 2007). Employees may also not act on green behaviors for personal reasons, such as their negative attitudes and held beliefs toward the behavior (Nordlund & Garvill, 2002). Therefore, organizational-related factors, such as perceived organizational support, and individual-related factors, such as attitudes towards green workplace behaviors, can impact the performance of green workplace behaviors and the overall environmental performance of an organization. Organizational- and individual-related determinants of green behavior exist within the framework of CSR and CER. Furthermore, the fundamental distinctions between the mission of private and public sector organizations may also suggest there are different reasons for why employees engage in green behaviors within public institutions.

Organizational-Related Determinants of Green Workplace Behavior

Yuriev, Boiral, & Guillaumie (2020) argued that determinants of OCBE behaviors stem from a combination of organizational and psychosocial factors. Organizational-related determinants are variables influencing OCBE behaviors within the context of organizational systems. McFreely (1983) described an organizational system as "a series of components so interfaced and interrelated that they work together towards the achievement of the worthy and legitimate objectives of the enterprise" (p. 38). For instance, perceived organizational support is

an OCBE determinant derived from an organizational system. Perceived organizational support refers to employees' perception that an organization values their contribution and well-being (Lo et al., 2012).

Studies investigating employee green behaviors find perceived organizational support has a significant impact on employee performance and well-being. For example, Cantor et al. (2012) demonstrated that employee participation in green organizational initiatives was positively correlated with perceived organizational support. Expanding on that concept, Paillé and Mejía-Morelos (2014) demonstrated how perceived organizational support indirectly affects employee green behaviors via job satisfaction and commitment. Motivational determinants such as convenience can also impact an employee's willingness to perform green behaviors at work. For example, in a study evaluating recycling activities, investigators Brothers et al. (1994) found that the proximity of recycling bins to employee office space significantly increased the amount of office paper recycled.

Individual-Related Determinants of Green Workplace Behaviors

Individual-related determinants, such as an individual's behavioral beliefs, attitude toward a behavior, normative beliefs, subjective norms, control beliefs, and perceived behavioral controls, also impact employees' willingness to engage in green workplace behaviors. Employee behavioral beliefs and attitudes refer to an individual's overall perception that a green behavior is favorable or unfavorable. The importance of employee-level determinants was demonstrated when postal workers' attitudes significantly affected employees' use of energy-saving driving techniques (Siero et al., 1989). Normative beliefs and subjective norms refer to the social pressure one feels when performing or not performing a specific green behavior. Cordano et al. (2010) illustrated the power of social pressure in their study of 369 managers in U.S. wineries which

found subjective norms positively affected managerial intention to implement environmental management programs.

Jones (1989) found that self-efficacy improves employee recycling intention and is strongly correlated with self-reporting paper recycling. Control beliefs and perceived behavioral controls are essential drivers of green workplace behavior because employee control beliefs determine their perceived behavioral controls and self-efficacy over performing a specific behavior (Glanz et al., 2008). Additional research by Davis et al. (2009) demonstrated that perceived behavioral control could positively affect pro-environmental behaviors. They found that perceived behavioral control can significantly affect green workplace behavior when employees control beliefs centered on recycling consequences. Other key determinants of green workplace behavior include an employee's existing environmental awareness and green workplace policies.

Employee behavioral intention is a primary determinant of workplace pro-environmental behaviors. Ajzen's (1985) theory of planned behavior (TPB) asserts that an individual's behavior is determined primarily by their intention to perform that behavior. TPB has become a widely used theoretical model for studying individual behaviors. Its use as a framework for predicting environmental behavior is becoming common (Norton et al., 2015). Investigations into the organizational level determinants of green workplace behavior are limited (Francoeur et al., 2021). Investigators have noted that integrated research combining both employee and organizational level determinants is lacking (Yuriev, Dahmen, et al., 2020).

Although the environmental literature clearly distinguishes between voluntary and required OCBE behaviors (Boiral, Paillé, & Raineri, 2015; Norton et al., 2015; Ones & Dilchert, 2012a), the literature is unclear as to how organizational and psychosocial (i.e., individual)

background factors affect the emergence of OCBE behaviors (Norton et al., 2015; Yuriev et al., 2018; Yuriev, Dahmen, et al., 2020). For instance, Yuriev, Dahmen, et al. argued that recycling at work requires a separate set of efforts than recycling at home. Organizations often supply recycling bins around an office, while homeowners must obtain bins and find locations in their homes to recycle.

Furthermore, Yuriev, Dahmen, et al. (2020) claimed the degree of OCBE inclusion within organizational contexts could change OCBE determinants which changes a determinant's importance for OCBE emergence. For example, some organizations may encourage recycling by placing multiple large recycling bins around an office, while other organizations may use no recycling bins in an office. Thus, recycling inclusion (OCBE) in an organization can shift an individual's efforts resulting in different behavioral determinants. Therefore, behavior type, level of influence, and degree of inclusion within organizations influence the determinants of OCBE behaviors (Francoeur et al., 2021).

The diversity of determinants influencing green workplace behaviors in the literature is evident. As a result, researchers attempting to investigate the determinants of green behavior should use a flexible yet systematic research design. Such a research design would allow researchers to capture the emergence of determinants specific to a given context and evaluate the power each determinant has on fostering the green behavior of interest.

Key Determinants of Green Behaviors

Determinants are constructs that group the reasons why someone does or does not do a behavior. The literature suggests that employee attitudes, subjective norms, and self-efficacy are determinants of OCBE behavior. Table 3 displays determinants of voluntary green workplace behavior along with supporting literature.

Table 3*Determinants of Voluntary Green Workplace Behavior*

| Variable | Definition | Sample | Supporting Literature |
|------------------------------|---|--|---|
| Attitudes | Individual assessment of whether a behavior is beneficial or unfavorable (Ajzen, 1991). | Small businesses workers (n=56) University faculty | Bissing-Olson et al. 2013 Blok et al. 2015 |
| Subjective norms | An individual's perception of whether their peers approve or disapprove of engaging in a behavior (Ajzen, 1991). | Employees of publicly funded organization (n=499) MBA students with full-time jobs (n=407) | Greaves et al. 2013 Paillé et al. 2013 |
| Perceived Behavioral Control | "people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183) | MBA students with full-time jobs (n=651) Nonacademic employees of a large Canadian university (n=318) | Boiral & Paillé 2012 Yuriev, Boiral, & Guillaumie (2020) |
| Problem Awareness | An individual's recognition of environmental consequences for performing the behavior of interest (Stern et al., 1999). | Brazilian households (n=806) Hong Kong street sample (n=246) | Echegaray & Hansstein 2017 Wan et al. (2017) |
| Past Behavior | Habitual actions individuals perform on a regular basis (Bagozzi 1981) | Households in Ireland (n=1500) Students from an Italian university (n=104) | Lavelle et al. (2015) Richetin et al. (2012) |
| Age/Gender | Demographic variables are commonly reported when investigating pro-environmental behaviors. | Greek households (n=258) | Botetzagias et al. (2014) |

Employee attitudes toward pro-environmental behavior are typically defined as an individual's assessment of whether performing a behavior is beneficial or unfavorable (Ajzen, 1991). Bissing-Olson et al. (2012) found that a pro-environmental attitude positively predicted pro-environmental behavior ($\beta=0.37$; $p=0.43$) among employees working in small businesses. Likewise, a study by Blok et al. (2015) of university faculty reported a strong positive effect

($B=0.286$; $p < 0.015$) between attitudes toward pro-environmental behavior and intention to engage in pro-environmental behaviors at work.

Subjective norms are an individual's perception of whether their peers approve or disapprove of engaging in a behavior (Ajzen, 1991). Greaves et al. (2013) found subjective norms positively predicted ($B=0.10$; $p < .001$) public employee recycling intentions, and Paillé et al. (2013) reported positive correlations between perceived superior support ($B=0.166$; $p=0.002$) and perceived organizational support ($B=0.148$; $p=0.00$) on environmental management practices.

Perceived behavioral control is defined as an individual's "perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183). Boiral and Paillé (2012) found that eco-civic engagement (i.e., self-development) was critical for achieving an organization's environmental goals. In a recent study, Yuriev, Boiral, & Guillaumie (2020) reported that perceived behavioral control significantly predicted (9.6%; $p<0.001$) employees' intention to use alternative forms of transportation.

Problem awareness and past behavior are additional determinants of pro-environmental behavior. While I was unable to find empirical research for the variable, problem awareness, in an organizational context, the variable likely impacts voluntary employee behaviors. Problem awareness is defined as an individual's recognition of environmental consequences for performing the behavior of interest (Stern et al., 1999). Echegaray and Hansstein (2017) found that awareness towards e-waste recycling significantly predicted recycling intention ($B=0.20$; $p < 0.001$). Likewise, Wan et al. (2017) reported that awareness of consequences also significantly predicted recycling intentions ($B=0.101$; $p<0.05$).

Past behaviors are the habitual actions individuals regularly perform (Bagozzi 1981). Richetin et al. (2012) found a significant relationship ($B=0.37$; $p < 0.05$) between past behavior and reducing resource consumption. Furthermore, Lavelle et al. (2015) surveyed 1,500 households in Ireland and found that 52% ($n=781$) of respondents habitually engaged in the pro-environmental behavior of purchasing reusable products instead of disposable ones. Research in the field of pro-environmental workplace behavior also captures the demographic variables age and gender because these variables have traditionally been shown to influence pro-environmental behaviors (Blok et al., 2015; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020). For instance, Botetzagias, Malesios, and Poulou (2014) found that perceived behavioral control significantly predicted recycling intention in Greek households ($n=258$). Botetzagias, Dima, and Malesios's study also found age and gender were not statistically significant predictors for recycling intention.

Researchers also agree that an individual's pro-environmental behavioral determinants at home differ from those at work (Blok et al., 2015; Greaves et al., 2013; Yuriev et al., 2018). For instance, Greaves et al. suggest that people have a different motivation for low energy usage at home than at work because they are less liable to incur energy consumption costs as a homeowner. For this reason, I focused this study on identifying determinants that impact pro-environmental behaviors within an organizational context because the determinants at work are different from those at home.

In this research study, determinants involve employees' feelings, attitudes, and beliefs that support or prevent the selected OCBE behavior of interest. Ones and Dilchert's (2012a) taxonomy of green workplace behaviors consists of voluntary and mandatory employee behaviors. In contrast, Robertson and Barling's (2017) taxonomy comprises only pro-

environmental workplace behaviors that are voluntary and neither required nor rewarded, but when performed, they can benefit the natural environment. Both Ones and Dilchert (2012a) and Robertson and Barling's (2017) grouping of pro-environmental workplace behaviors illustrate the large variety of pro-environmental workplace behaviors in different contexts. Thus, there is a vast number of determinants influencing each overarching category in both taxonomies. To focus this study and reduce the number of studied determinants, I selected a specific OCBE behavior of interest from Robertson and Barling's self-enacted grouping. Further justification and reasoning for choosing the OCBE behavior of interest are discussed later on in Chapter 2.

Green Behavior Theories

Ajzen's (1991) theory of planned behavior claims that a person's intention to perform a behavior best predicts their actual behavior. Thus, this study identifies and evaluates the importance of behavioral determinants of employees' intentions to perform voluntary workplace pro-environmental behaviors. Inoue and Alfaro-Barrantes's (2015) meta-analysis found that the environmental psychology literature uses three main theoretical frameworks to explore why individuals in the workplace make decisions to perform pro-environmental behaviors: the value-belief-norm (VBN) theory (Stern et al., 1999), the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980), and the theory of planned behavior (TPB) (Ajzen, 1991). These three theories seek to explain the underlying constructs motivating individuals to engage in voluntary behaviors (Montano & Kasprzyk, 2015). The motivational factors influencing the nature or outcome of a person's behavior are known as behavioral determinants. The theoretical frameworks offered by VBN, TRA, and TPB make it possible to conceptualize the complexity of behavioral determinants of workplace pro-environmental behaviors.

Value-Belief-Norm Theory (VBN)

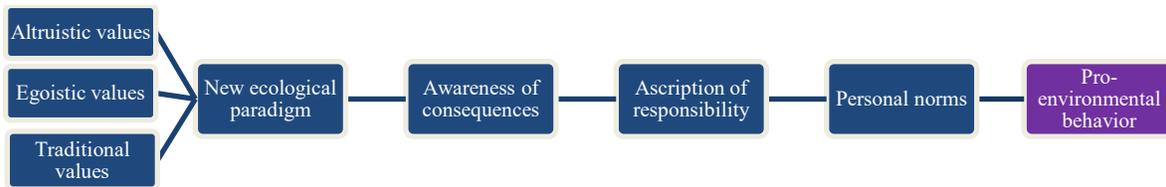
In value-belief-norm theory (see Figure 6), pro-environmental behavior is the product of an individual's values, beliefs, and norms (Stern et al., 1999). The value-belief-norm (VBN) theory suggests the direct cause of pro-environmental behaviors stems from personal norms or an individual's sense of obligation to engage in pro-environmental behavior (Stern, 2000a).

VBN theory uses a series of meditations to construct personal norms, ascription to responsibility, awareness of consequences, and an ecological paradigm. For example, Stern et al. (1999) defined ascription to responsibility as an individual's view over whether their actions have contributed to or alleviated a given outcome. Additionally, awareness of consequences relates to a person's recognition of possible consequences, and a new ecological paradigm refers to "a view that human actions have substantial adverse effects on a fragile biosphere" (Stern et al., 1999, p. 85).

Furthermore, the VBN theory ascribes three personal values that influence an individual's new ecological paradigm: altruistic, egoistic, and other traditional values. Stern et al. (1999) define altruistic values as an individual's willingness or practice of concern for others' happiness; egoistic values concern the costs or benefits one's choice has on others; other traditional values divulge one's sense of duty and family obligations. Figure 6 presents the constructs of the VBN theory.

Figure 6

Value-Belief-Norm Theory



Note: Adapted from Stern et al. (1999).

Theory of Reasoned Action (TRA)

The theory of reasoned action (TRA) assumes behavioral intention is the best predictor of an individual's behavioral action (Ajzen & Fishbein, 1980). Thus, TRA argues that a person's decision to perform a behavior is determined by the intention to perform a given behavior (Ajzen 2012b). Behavioral intention is defined as "indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen, 1991, p. 181).

As a first-degree construct in TRA, the behavioral intention has two direct predictors: attitude and subjective norm (Ajzen & Fishbein 1980). Attitude refers to a person's assessment of whether a behavior is beneficial or unfavorable; the subjective norm is an individual's perception of whether their peers approve or disapprove of engaging in a behavior (Ajzen, 1991). Thus, while TRA explains a substantial part of the variance of behavioral intention, the model is not suitable for explaining behavior in contexts where a person's volitional control is limited (Glanz, Rimer, & Viswanath, 2008). Figure 7 displays the elements of TRA adapted from Stern et al. (1999, p.84).

Figure 7

Theory of Reasoned Action



Note: Adapted from Ajzen & Fishbein, 1980.

Theory of Planned Behavior (TPB)

The theory of planned behavior (TPB) is an extension of TRA and suggests that voluntary behavior is the product of behavioral intention plus perceived behavioral control (Ajzen, 1985). Unlike TRA, the TPB maintains that an individual's decision to perform a behavior is determined by both their intention and their actual control over performing the behavior (Ajzen, 1991). In most contexts, obtaining a person's actual behavioral control is difficult or infeasible; thus, TPB uses an individual's perceived behavioral control as a proxy for actual control. Furthermore, the stronger someone's intention is, the more likely the individual is to perform the behavior (Ajzen 2012a). Figure 8 displays the elements of Ajzen's TPB.

The TPB extends TRA's premises and has three direct predictors to determine behavioral intention: attitude, subjective norm, and perceived behavioral control. Attitude towards the behavior refers to an individual's overall positive or negative assessment of the behavior (e.g., good or bad). Subjective norm is an individual's perception of social pressure influencing their intention to perform or not perform the behavior (e.g., managers encouraging or approving the behavior). Lastly, perceived behavioral control refers to "people's perception of the ease or difficulty of performing the behavior of interest" (Ajzen, 1991, p. 183). According to Ajzen

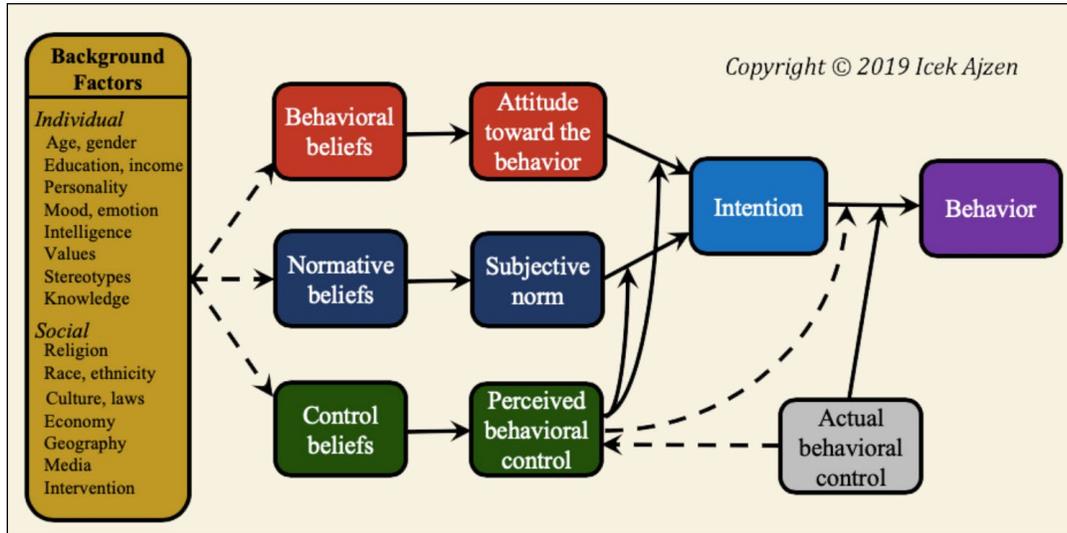
(2020), motivation to perform the behavior is established by a favorable attitude and a supportive subjective norm paired with a confident perceived behavioral control.

The TPB includes three indirect predictors that influence each of the three determinants of intention: behavioral, normative, and control beliefs. According to Ajzen (1991), behavioral belief refers to the extent a person expects or anticipates a given outcome or experience by engaging in a behavior. Normative beliefs are a person's feelings about whether people approve or disapprove of a given behavior, and control beliefs refer to the degree a person recognizes factors that may facilitate or prevent the performance of a behavior.

The TPB also pairs each indirect predictor with an accompanying minor construct: subjective value, motivation to comply, and perceived power. Ajzen (1991) defines subjective value as one's ascribed worth to the expected outcomes and experiences that stem from a behavior. Motivation to comply considers a person's enthusiasm to meet the expectations of these people, and perceived power is a person's gauge of how influential a controlling factor is in facilitating or preventing the performance of a behavior. Other determinants such as personality traits and demographic characteristics are considered background factors in the TPB. Lastly, explained variance is the principal indicator of TPB predictive power (Ajzen 1991). Figure 8 displays the construct in the TPB model and their relation to each other.

Figure 8

Theory of Planned Behavior.



Note. Taken from Ajzen’s official website: <http://people.umass.edu/aizen/tpb.diag.html> (accessed on May 8, 2020)

Strengths – Theory of Planned Behavior

The TPB model offers researchers several substantial advantages for evaluating pro-environmental workplace behaviors. First, the TPB model can uncover hidden behavioral beliefs within the population of interest and then subsequently evaluate their importance within a given context (Yuriev, Dahmen, et al. 2020). The model assumes that the more a belief accounts for explained variance, the more critical the belief is for determining an individual's behavioral action. For example, a strong belief that annual physicals help prevent long-term illnesses can be portrayed by an individual’s high intention to schedule a yearly check-up with their doctor’s office.

Indirect beliefs in the TPB model allow researchers to explain why study participants have either positive or negative intentions towards a behavior. Thus, the TPB framework's

second advantage stems from targeting important beliefs when developing behavioral interventions (Riebl et al., 2015). For example, Timm and Deal (2016) targeted energy-saving beliefs on several college campuses in Illinois by implementing information dashboards and found that the behavioral change initiative reported up to 50% energy savings.

The third advantage of the TPB is model flexibility, which allows researchers to add more variables to improve predictive power (Mannetti et al., 2004; Montaña & Kasprzyk, 2015). While the core determinants (i.e., attitude, subjective norms, and perceived behavior control) of TPB are appropriate for meeting the assumption of sufficiency (Ajzen 2020), the addition of context-appropriate variables can improve the predictive power of TPB. Yuriev, Dahmen, et al. (2020) found, on average, TPB explained variance improved by 12.1% when researchers added additional variables that influence pro-environmental behaviors. Thus, the TPB model can be adapted by researchers to study the behavior of interest

Limitations – Theory of Planned Behavior

The theory of planned behavior (TPB) also has several assumptions and limitations despite its extensive research application. First, the TPB model assumes that people have the opportunity and resources necessary for engaging in the desired behavior (Ajzen, 2002). For example, workplace recycling is not possible when recycling bins and services are unavailable to employees. Factors such as time, money, and resources, as well as the lack of necessary skills, are activation barriers to behavioral performance (Ajzen, 2020). Therefore, researchers need to be cognizant of these limiting factors when analyzing TPB study results.

Second, the theory does not account for other variables factoring into pro-environmental intention such as habitual behaviors, self-identity, connectedness to nature, and moral obligations (Gkargkavouzi et al., 2019). However, the TPB model is adaptable to additional variables, and

the core determinants (attitude, subjective norms, and perceived behavior control) are considered appropriate for meeting the sufficiency assumption (Ajzen, 2020). Therefore, researchers must be mindful of outside variables influencing the studied behavior.

Lastly, the TPB assumes a linear decision-making process and does not account for behavior changes over time or during the period between behavioral intention and behavioral action (Sniehotta et al., 2014). Ajzen (2020) calls this the feedback effect and suggests measuring behavioral action along with periodic reassessments to account for this limitation. As a result, researchers must recognize that TPB may create a fallacy between actual behavioral control and perceived behavioral control because a person's control belief may not accurately reflect their actual ability to perform the desired behavior (Weinstein, 2007). Therefore, the predictive power of TPB changes as the behavioral determinants of TPB differs from one context to another (Andersson et al., 2005).

Integrated Theoretical Framework – VBN, TRA, & TPB

Overall, the theory of planned behavior (TPB) improves the predictive power of the theory of reasoned action (TRA) by adding “perceived behavioral control” as an additional primary construct (Ajzen, 2002; Madden et al., 1992). As a result, the TPB theoretical framework is a superior approach for studying individual behavior. Ajzen’s (1991) seminal article on TPB emphasizes its superiority over TRA, with over 95,000 citations on Google Scholar as of 2021.

The TPB model applies to multiple industries, including healthcare (Godin & Kok, 1996), information technology (Venkatesh & Davis, 2000), and consumerism (Oliver, 2014). Likewise, the environmental psychology literature also uses TPB to assess the pro-environmental intentions of conservation managers (Cordano & Frieze, 2000), the hospitality industry (Han et

al., 2010), and high school students (De Leeuw et al., 2015). The systematic literature review conducted by Yuriev, Dahmen, et al. (2020) found that TPB was the theoretical basis of 126 publications investigating pro-environmental behaviors since 1995. Furthermore, Yuriev Dahmen, et al. (2020) noted that 81% of publications were conducted within households, and only 18 studies looked at employee pro-environmental behaviors within an organizational context.

VBN theory is a more recent theoretical framework suggesting that moral and other personal values are the primary determinants of pro-environmental behavior (Stern et al., 1999). VBN has shown significant predictive power by explaining 19-35% of the variance in pro-environmental behavior (Stern et al., 1999). However, the VBN theory is also limited to situations where individuals can act freely on their norms and sense of self-obligation (Kaiser et al., 2005). For example, organizational factors may overrule an employee's sense of obligation to make an environmentally beneficial suggestion. As a result, the VBN theory is unsuitable for situations where solid contextual forces are at play. Thus, the VBN alone is not appropriate for investigating pro-environmental behaviors in the workplace.

The VBN theory also argues that knowledge and habits significantly influence green behaviors (Stern, 2000b). However, the TPB framework does not directly account for an individual's knowledge and habits. Evidence suggests that the moral values of VBN theory are affiliated with the TPB construct attitude (Kaiser & Gutscher, 2003). Given these points, coupled with the knowledge of TPB's flexibility, it is reasonable to suggest TPB models investigating pro-environmental behaviors could include additional direct predictors to capture an individual's knowledge and habits.

Public employee recycling is the target behavior for this study. Correct recycling intention refers to employees avoiding the placement of non-recyclable items in recycling bins. I refer to this behavior as “correct recycling” and have carefully chosen to study public employee intentions to engage in this behavior for the following reasons:

- The behavior meets the required specificity needed for creating trustworthy TPB questionnaires (Ajzen, 1991).
- Existing literature recommends further systematic investigation into the determinants of workplace recycling (Yuriev, Dahmen, et al., 2020).
- There is a distinction between the determinants of recycling while at work as opposed to at home (Yuriev et al., 2018).
- The selected behavior aligns with current environmental initiatives and the goals of the target populations.
- The act of recycling applies to all employees within the target population.
- Prior research using TPB focuses on the employee intentions to recycle as much as possible versus employees’ intention to recycle as correctly as possible to avoid recycling contamination (Greaves et al., 2013).
- The improper sorting or incorrect disposal of non-recyclable material causes recycling bin contamination and decreases an organization’s environmental performance (Simpson 2012).

The TPB questionnaires require a definable and exact behavior of interest because overarching behaviors encompass multiple themes that hide behavioral nuances in complexity; thus, broad behaviors lack the required specificity for accurately eliciting underlying beliefs (Ajzen n.d.-a). Yuriev, Dahmen, et al. (2020) also noted that TPB surveys are ill-suited for

exploring multiple OCBE behaviors. For example, the construct municipal environmental performance may include influences from the entire workforces' performance of many OCBE and non-OCBE behaviors.

As a result, municipal environmental performance may comprise an array of dynamic relationships stemming from an excessive number of determinants whose analysis is not suitable for a single TPB study. By focusing this study on employees' intentions to recycle correctly while at work, I not only meet Ajzen's (n.d.-b) requirements for administering a trustworthy TPB survey, but my research findings will be relevant to both scholars in the field of pro-environmental workplace behavior as well as the target municipality.

Summary

Environmental psychology literature outlines many types of green workplace behaviors. However, the exact nature of voluntary green workplace behavior and its elastic role within organizational systems are still unclear to scholars. Thus, future research investigating the determinants of green behaviors at work should utilize research designs that can account for the emergence of employee determinants.

The literature uses three main theories to study voluntary green behaviors: TRA, TPB, and VBN theory. Based on this literature review, Ajzen's (1991) TPB is an appropriate theoretical model for investigating green workplace behaviors because the model captures emerging determinants specific to a target population. However, researchers using TPB without a qualitative exploration in the field of pro-environmental workplace behavior are less effective at developing tailored intervention plans (Yuriev, Dahmen, et al., 2020). For that reason, I used an extension of the TPB model in a mix-methods format to capture additional salient determinants for this study. Lastly, I studied the voluntary green workplace behavior "correct recycling" for

this study because existing literature suggests the behavior is well suited for the TPB model and warrants further exploration.

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CHAPTER 3 RESEARCH METHODOLOGY

Organizational citizenship behavior for the environment (OCBE) is an umbrella term describing employees' willingness to engage in pro-environmental behaviors voluntarily. OCBE behavior is defined as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate, immediately benefit the natural environment, and indirectly through this means, contributes to the organization and benefit specific individuals" (Robertson & Barling, 2017, p. 58).

Employees engaging in OCBE behaviors like recycling, energy conservation, and other pollution prevention activities can increase organizations' environmental performance (Boiral 2009, Boiral et al., 2015; Daily et al., 2009). Likewise, the OCBE behavior of city employees can alter a municipality's environmental performance (Azhar & Yang, 2019). Furthermore, municipal environmental performance can influence the long-term sustainability of urban communities (Riffat et al., 2016).

However, despite the importance of OCBE's influence on environmental performance, there is a general lack of research on the determinants of green workplace behaviors (Francoeur et al., 2021). As a result, scholars trust a limited number of validated measures to accurately capture OCBE behavioral action (Yuriev, Boiral, & Guillaumie, 2020). Due to a lack of trustworthy measures, researchers in the field of pro-environmental behaviors have relied on other mechanisms for investigating voluntary green workplace behaviors. One such mechanism used to explore green behaviors is Ajzen's (1991) theory of planned behavior (TPB) (Greaves et al., 2013; Yuriev, Dahmen, et al., 2020). In the Chapter 2 literature review, I presented several reasons why TPB is a suitable theoretical model for studying municipal OCBE behaviors. First,

TPB can identify beliefs and subsequently determine the significance of a belief relative to the behavior of interest. Second, TPB is a useful tool for developing green behavioral interventions. Third, TPB's flexible structure allows researchers to add variables for capturing greater explained variance for a given behavior.

TPB suggests a person's intention to perform a behavior best predicts their actual behavior (Ajzen 1991), and studies using the TPB framework to investigate pro-environmental workplace behavior have traditionally used mixed-method designs for evaluating employee behavioral intentions (Lam 1999; Greaves et al., 2013 Yuriev, Boiral, & Guillaumie, 2020). Therefore, I used a research design that focuses on behavioral intention and uses an exploratory sequential, mixed-method design because a major utility of TPB stems from its framework that allows researchers to identify and, subsequently, evaluate a person's underlying beliefs leading to behavioral intention (Ajzen, 2015).

I focused this study on "correct recycling behavior" due to the lack of measures that comprehensively capture employees' willingness to engage in other green workplace behaviors. Furthermore, I extended TPB to include elements of value-belief-norm (VBN) theory. Additional VBN variables were used to improve the TPB conceptual framework by increasing the amount of explained variance captured by behavioral intention.

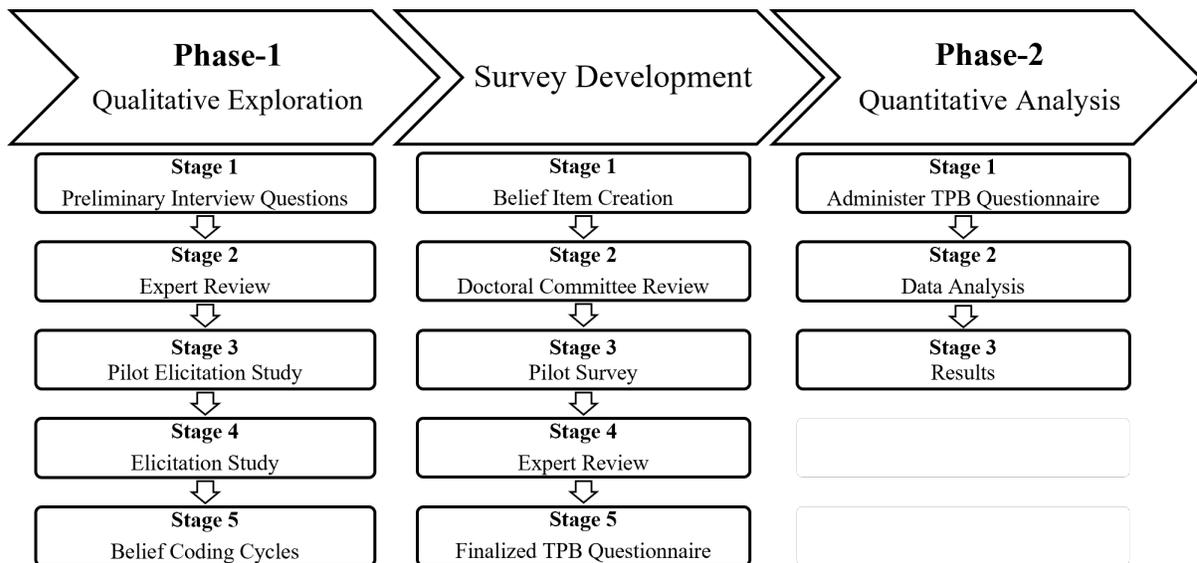
In this chapter, I summarize the research design and two-phase approach for systematically evaluating employee correct recycling behavior determinants. Following this, I restate my research questions and hypotheses. The following sections outline the research design, the population of interest, and the research variables. Chapter 3 ends with a summary of the methodology used in research Phase 1 and 2, and a discussion of study limitations and research validity.

Research Design

I used a two-phase mixed method design for this study. Phase 1 involved a qualitative exploration grounded in TPB elicitation techniques, and Phase 2 included the sequential evaluation of elicited determinants using a cross-sectional survey. Survey development was performed during the transition between Phase 1 and 2 of this study. Thus, I identified salient determinants in Phase 1, subsequently developed a cross-sectional survey, and then assessed each determinant's influence on municipal employees' intentions to engage in correct recycling behavior in Phase 2 (see Figure 9).

Figure 9

Two-Phase Mixed-Method Research Design



This study aimed to systematically identify and evaluate the determinants influencing employees' intentions to participate in municipal voluntary green workplace behavior. Thus, I collected data in both research phases. First, I collected data via semi-structured interviews followed by coding to identify determinants of the behavior of interest. Then I develop a TPB

questionnaire and then administer the resultant questionnaire to the municipal workforce. Therefore, Phase 2 was the quantitative assessment of determinants detected in the Phase 1 elicitation study.

The Phase 2 quantitative assessment used a cross-sectional survey to collect data. The analysis reviewed data using internal consistency indices, verified data via eligibility assessment, and then tested data with three mediation models. Findings from this analysis provided information for assessing the degree of importance each indirect belief had on employees' intentions to take part in correct recycling behavior.

Furthermore, my study is formative because collecting and analyzing research data rendered helpful information for planning and executing behavioral intervention programs. Accordingly, my two-phase research design is consistent with other formative research systematically using TPB to study pro-environmental workplace behaviors (Greaves et al., 2013; Lam, 1999; Yuriev, Boiral, & Guillaumie, 2020;).

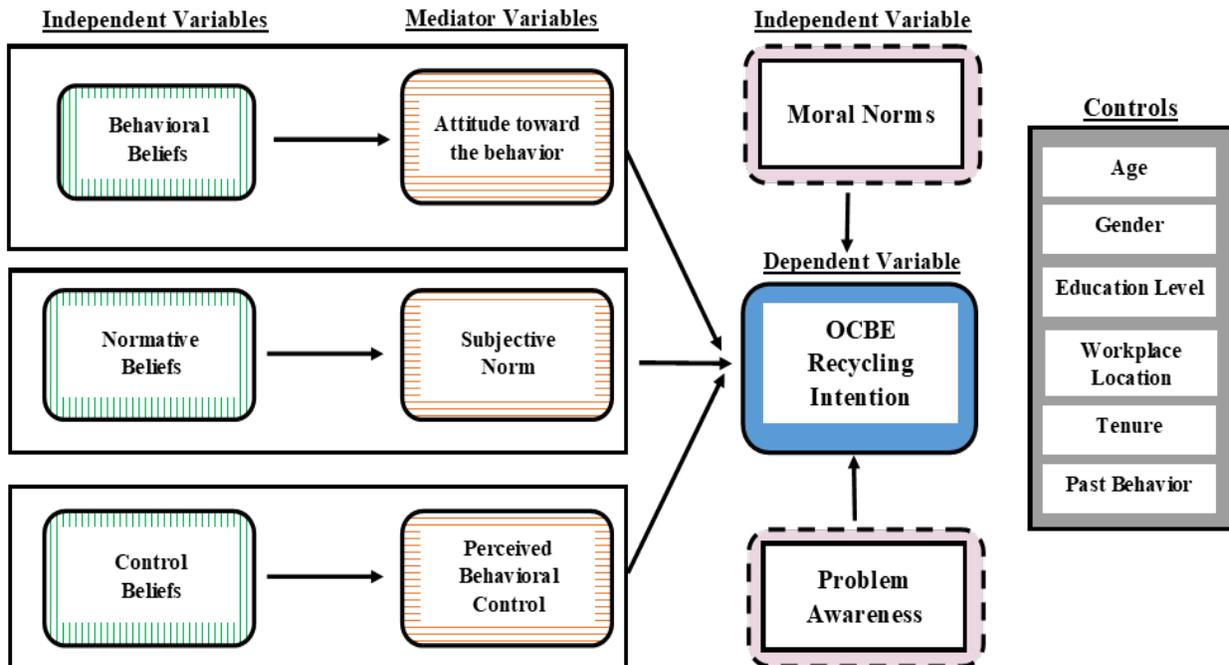
There are, however, three noteworthy caveats for using TPB in my research. First, TPB research models are contingent on the pre-elicitation of belief surrounding the behavior of interest (Ajzen, 2002). Thus, I systematically designed this study using a two-phase formative research approach for qualitative exploration followed by a quantitative evaluation. A second caveat of using TPB stems from the model's inability to explore more than one green behavior (Yuriev, Dahmen, et al., 2020). Therefore, I focused my research efforts on evaluating the determinants of a specific municipal green behavior. The third caveat lies in the fact that TPB study findings are rarely generalizable to outside populations because research must tailor each TPB survey to fit a given population (Ajzen, 2011). Thus, I have selected a green behavior

whose further investigation will yield both practical implications for the target populations as well as scholarly insight on pro-environmental workplace behaviors.

Research Questions

The alignment of research questions and hypotheses to their corresponding research phase highlights the systematic approach to evaluating green behavior determinants. The two-phase research approach (qualitative exploration followed by a quantitative evaluation) avoids the confirmation fallacy created by skipping methodological steps that undermine TPB's principal utility. In this section, I offer a brief introduction to each research question's methodological placement and hypothesis. Figure 10 presents the TPB-based conceptual model for this research study.

Figure 10
Conceptual Framework



Phase 1 Research Question

R1: *What are the salient determinants predicting public employees' intentions to engage in a green workplace behavior voluntarily?*

Ajzen (1991) argues that an individual's underlying antecedent beliefs (indirect determinants) shape their attitudes, subjective norms, and perception of control (direct determinants). However, antecedent beliefs (behavioral, normative, and control beliefs) are often unique to each population of interest (Ajzen, 2002). A principal utility of the theory of planned behavior is its capacity to inform behavioral interventions by first identifying then subsequently targeting underlying beliefs that promote a given behavior. Thus, the TPB model is suitable for producing target-based results appropriate for my research population of interest. Ajzen (2015) recommends using TPB elicitation techniques to establish the cognitive and contextual foundation of a population's salient beliefs. Therefore, during Phase 1, the qualitative exploration, I conducted semi-structured interviews as part of an elicitation study to unearth determinants and answer R1.

Phase 2 Research Question

R2: *How much explained variance does each determinant capture when predicting employee behavioral intention?*

Calculating to what extent each determinant predicts behavioral intention helps understand why particular change interventions work and others do not. This, in turn, provides critical information on what causes some interventions to be more successful than others. I answer R2 by performing the statistical analysis during the Phase 2 quantitative assessment. These study findings will inform program planning for practitioners within the target population and research designs for fostering public employee green workplace behaviors.

Context and Participant Interactions

All participants in both Phase 1 and Phase 2 are volunteers. All data collected remains confidential and poses minimal risks to participants. This study took place using a Mid-Atlantic state municipal workforce, and the unit of analysis is individual full-time employees. I received approval from the municipal organization granting permission to conduct this research (see Appendix A). I also received the Hood College Institutional Review Board (IRB) approval for conducting this research study (see Appendix B).

The research population of interest was approximately 300 municipal employees. Most employees work at one of four locations: city hall, public works, parks and recreation, and the police department. The studied municipality was also an environmentally progressive organization in a highly urbanized area of Maryland. This municipality had recently implemented three noteworthy environmentally oriented initiatives directed toward employees: centralized waste collection program, teleworking policy, and carpooling of fleet vehicles.

I recruited 22 interview participants during Phase 1 by sending an email to the entire workforce. In the email, I asked for volunteers to participate in a 45-minute interview (see Appendix C). There were at least two volunteers for the elicitation study from each workplace location. This helped capture a broad range of commonly held beliefs because contextual factors specific to each workplace location may influence employees differently. During Phase 2, I emailed an electronic survey to the entire workforce to assess the strength of commonly held beliefs obtained from the elicitation study conducted in Phase 1. The survey was completed by employees anonymously using online survey software.

Study Variables

The following sections discuss how I operationalize and measure the variables in my conceptual model. First, I reviewed the types of scales for each dependent, mediator, and independent variable, as well as the differences between direct and indirect TPB measurements. Additionally, I operationalized all prominent variables using a validated methodology for scale creation and measured all predictors of green behavioral intention using interval-level scales.

Table 4 summarizes the study variables.

Table 4

Study Variable Matrix

| Variable | Construct | Level of Measurement | Data Collection | Data Analysis |
|-------------|------------------------------|----------------------|--------------------------------|------------------|
| Dependent | Correct Recycling Intention | Interval | TPB Questionnaire | Process |
| Mediator | Attitude | Interval | TPB Questionnaire | Process |
| Mediator | Subjective Norm | Interval | TPB Questionnaire | Process |
| Mediator | Perceived Behavioral Control | Interval | TPB Questionnaire | Process |
| Independent | Behavioral Beliefs | Interval | Interviews & TPB Questionnaire | Coding & Process |
| Independent | Normative Beliefs | Interval | Interviews & TPB Questionnaire | Coding & Process |
| Independent | Control Beliefs | Interval | Interviews & TPB Questionnaire | Coding & Process |
| Independent | Moral Norm | Interval | TPB Questionnaire | Process |
| Independent | Problem Awareness | Interval | TPB Questionnaire | Process |
| Control | Age | Ratio | TPB Questionnaire | Process |
| Control | Gender | Nominal | TPB Questionnaire | Process |
| Control | Education | Ordinal | TPB Questionnaire | Process |
| Control | Workplace Location | Nominal | TPB Questionnaire | Process |
| Control | Work Length | Interval | TPB Questionnaire | Process |
| Control | Past Behavior | Ordinal | TPB Questionnaire | Process |

Operationalizing Variables

Ajzen's (1991) theory of planned behavior includes seven variables: four direct predictors (intention, attitude, subjective norm, and PBC) and three indirect antecedents (behavioral, normative, and control beliefs). Prevailing direct predictors were operationalized using pre-defined and already-validated statements (Ajzen, 2002). Indirect antecedents were operationalized by conducting qualitative exploration to uncover commonly held beliefs within the population of interest (Ajzen, 2015).

Measures of internal consistency are not appropriate for assessing the reliability of indirect antecedent beliefs because an individual may hold both positive and negative opinions about the same behavior (Francis et al., 2004). For example, an individual may believe recycling correctly at work is rewarding, and that not understanding what items can be recycled is discouraging. Likewise, an individual may be highly motivated to recycle correctly to meet colleagues' expectations but not be motivated to meet the expectations of managers. As a result, Francis et al. (2004) argued that low or negative correlations are inadequate justification for removing survey items about antecedent belief. Instead, Ajzen (2015) suggested test-retest or temporal stability to test the reliability of TPB antecedent beliefs.

Direct TPB Variables

I operationalized direct TPB predictors (intention, attitude, subjective norm, and PBC) by using a set of pre-defined statements with 7-point bipolar adjective scales (Ajzen n.d.-c). I used the guidelines presented by Ajzen and Francis et al. (2004) to create a preliminary TPB questionnaire. For example, Ajzen's pre-defined statement, "I want to perform X behavior," was a survey item measuring the construct of correct recycling intention.

These pre-defined statements for operationalizing direct predictors have demonstrated adequate internal consistency and reliability in pro-environmental workplace behaviors. Greaves et al. (2013) reported reliable Cronbach's alpha scores for employees' intention (0.87), attitudes (0.88), subjective norms (0.77), and perceived behavioral control (0.81) for turning off work computers. Likewise, following the same steps for creating a TPB questionnaire as Greaves et al. (2013), Yuriev, Boiral, & Guillaumie (2020) evaluated the determinants of employees' pro-environmental behavioral intentions to use alternative forms of transportation and reported the Cronbach's alpha scores for intention (0.97), attitudes (0.82), subjective norms (0.83), and perceived behavioral control (0.85). Thus, I replicated the steps of Yuriev, Boiral, and Guillaumie (2020) and Greaves et al. (2013).

Intention

I operationalized correct recycling intention as a direct TPB predictor using three pre-defined statements based on Francis et al. (2004). Each survey item used a 5-point scale with a *strongly disagree* to *strongly agree* response format. Intention scores were calculated using the mean sum of the three intention items. The following three survey items were used to capture correct recycling intention.

I try to recycle correctly at work.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : *Strongly agree*

I want to recycle correctly at work.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : *Strongly agree*

I have every intention to recycle correctly at work.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : *Strongly agree*

Attitude

I used four bipolar adjectives 5-point scale items to operationalize employee attitudes toward correct recycling behavior. Items evaluating (i.e., *good/bad*) attitudes stem from a single statement that defines the behavior of interest. Based on TPB guidelines by Francis et al. (2004), I also included instrumental items (i.e., *not useful/worthwhile*) and experiential items (i.e., *unprofessional/professional*) arranged in a mix of positive and negative endpoints. According to (Glanz et al. (2008), the mixture of positive and negative endpoints is a widespread practice in TPB research for minimizing respondents' tendency to answer related items the same way. Scoring the attitude construct involved recoding negatively worded endpoints to show positive attitudes and calculating the mean sums to generate an overall attitude score. The following four survey items capture employee attitudes toward the correct recycling behavior.

Recycling correctly at work is:

Good: __1__ : __2__ : __3__ : __4__ : __5__ : *Bad*

Harmful: __1__ : __2__ : __3__ : __4__ : __5__ : *Beneficial*

Unprofessional: __1__ : __2__ : __3__ : __4__ : __5__ : *Professional*

Not Useful: __1__ : __2__ : __3__ : __4__ : __5__ : *Worthwhile*

Subjective Norm

I measured subjective norm using four bipolar 5-point scale items referring to survey participants' perceptions about the opinions held by the people or groups most important to them. Using Glanz et al. (2008) guidelines, I included two items that are incomplete sentences with accompanying responses to complete the sentence and two items that are complete sentences with responses of *strongly disagree* to *strongly agree*. Based on Francis et al.'s (2004) recommendations, the two incomplete sentences items should have mixed positive and negative

endpoints, while the endpoints for the two complete sentence items should not be mixed. I scored subjective norms by recoding negative endpoints and then calculating each mean item score to get an overall score for the variable. The following items were included in the survey:

At work, most people who are important to me think I should try to recycle correctly.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : Strongly agree

At work, most people whose opinions I value approve of me trying to recycle correctly.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : Strongly agree

At work, most people want me to recycle correctly.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : Strongly agree

At work, I feel under social pressure to recycle correctly.

Strongly disagree: __1__ : __2__ : __3__ : __4__ : __5__ : Strongly agree

Perceived Behavioral Control

Perceived behavioral control was measured with two pairs of predefined statements assessing respondents' perceived self-efficacy or controllability over the behavior. According to Glanz et al. (2008), self-efficacy speaks to how difficult and how confident an individual is at performing the behavior, while controllability addresses whether respondents have the power to control the behavior. Based on the recommendations of Francis et al. (2004), incomplete sentence items will have a mix of positive and negative endpoints, whereas the endpoints for the complete sentence will remain consistent. Scoring was done by recoding negative endpoints and calculating each item's mean to give an overall perceived behavioral control score. The following 5-point scale items were included in the survey:

Self-efficacy

If I wanted to, I could recycle correctly at work.

Strongly disagree: __1__: __2__: __3__: __4__: __5__: Strongly agree

I feel recycling correctly at work is:

Easy: __1__: __2__: __3__: __4__: __5__: Difficult

Controllability

At work, I cannot control whether items are recycled correctly.

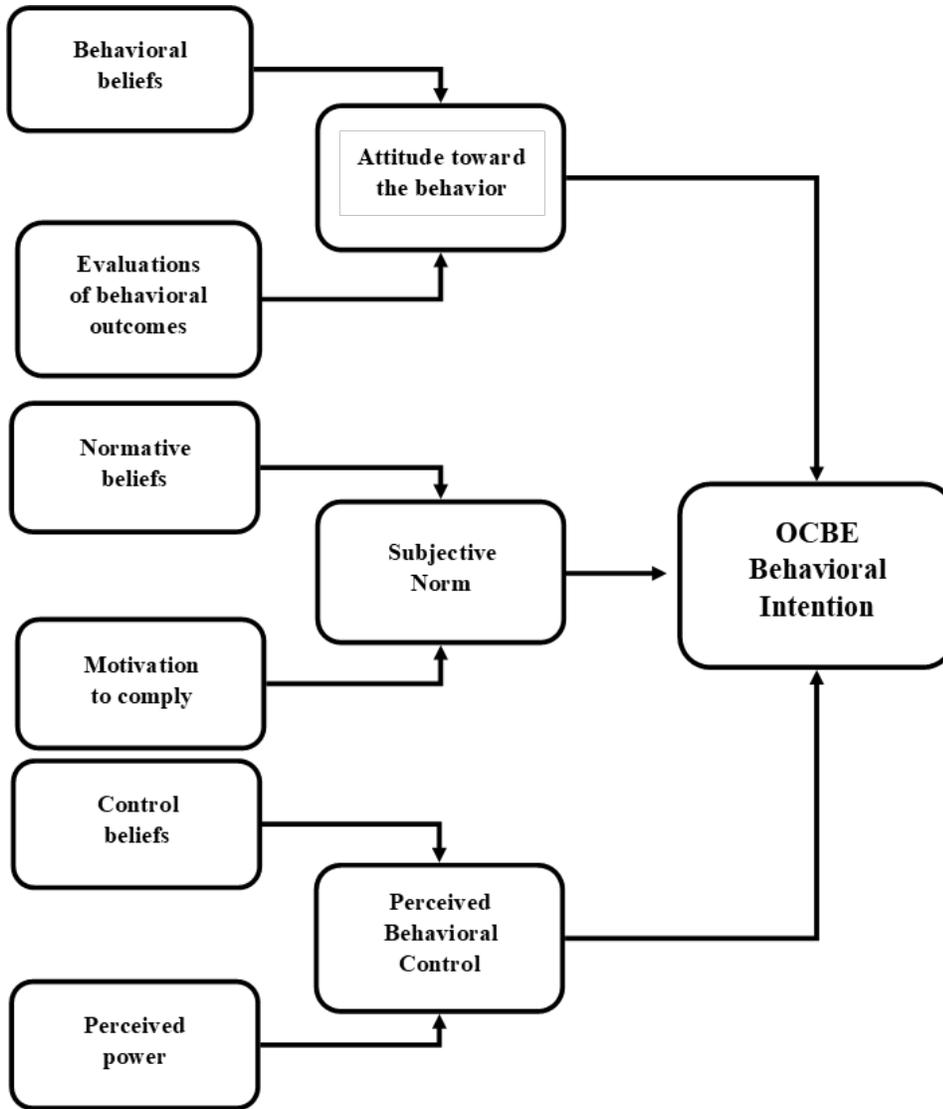
Strongly disagree: __1__: __2__: __3__: __4__: __5__: Strongly agree

Indirect TPB Variables (Behavioral, Normative, & Control Beliefs)

Belief variables were operationalized by conducting an elicitation study. According to Ajzen (n.d.-b), creating measures for antecedent beliefs (behavioral, normative, and control) requires three stages of development: (a) elicitation study to uncover commonly held antecedent belief within the target population, (b) creation of questionnaire items to assess the strength of antecedent beliefs, and (c) the creation of affirmation pairs to assess outcome evaluations for each antecedent belief (see Figure 11). Thus, each identified belief from the elicitation study has two survey items. Affirmation pairs are corresponding survey items created to verify a respondent's evaluation of a belief statement, their motivation to comply with social pressures from each reference group, and their perceived power over influencing the control factors that impact the behavior of interest (Francis et al., 2004). Following the guidelines of Ajzen (n.d.-b), I conducted a qualitative elicitation study using semi-structured interview questions to elicit antecedent beliefs during this research phase. I discuss the development of preliminary elicitation questions here; the final set of interview questions are discussed in Chapter 4.

Figure 11

Belief Variable Affirmation Pairs



Preliminary elicitation study questions targeted TPB beliefs and included:

- "While at work, are there any advantages or benefits to you personally for recycling correctly" (behavioral beliefs).
- "Please tell me about the groups of people that disapprove or consider it unimportant to recycle correctly" (normative beliefs). and

- "Tell me about any factors or circumstances that make it difficult or would prevent you from recycling correctly while at work" (control beliefs).

After identifying and retaining antecedent beliefs via the elicitation study, I converted the antecedent beliefs into a set of statements based on a protocol from Francis et al. (2004). Each statement reflects the prevailing TPB core construct as well as the behavior of interest. For example, the interview question, "While at work, are there any advantages or benefits to you personally for recycling correctly," elicited the behavioral belief that recycling correctly makes respondents feel they are doing something positive for the environment. I then converted this behavioral belief into the following survey item "If I recycle correctly while at work, I will feel that I am doing something positive for the environment," followed by a 5-point response format of *unlikely/likely*.

After converting the elicited beliefs into a survey item for assessing the strength of that behavioral belief, I created an affirmation item pairing the behavioral belief to verify a respondent's favorable or unfavorable evaluation of a belief statement. Francis et al. (2004) recommended using incomplete sentences with endpoints of *extremely undesirable* and *extremely desirable* because the directional terminology allows respondents to understand which items are positive and which are negative (p. 15). Using Francis et al. (2004) recommendation, I then created a 5-point affirmation pair item, "doing something positive for the environment is," with a response ranging from *extremely undesirable* to *extremely desirable*.

This sub-process of converting antecedent behavioral beliefs into a survey item and subsequently creating an affirmation item to pair it with is both consistent with the methodology used in similar research in the field of pro-environmental workplace behaviors (Greaves et al.,

2013; Yuriev, Boiral, & Guillaumie, 2020) and applicable to normative and control beliefs (Glanz et al., 2008).

Control Variables

This study collected data on six control variables: age, gender, education level, workplace location, work length, and past behavior. The age and gender variables were initially entered into the statistical analysis but removed to improve model clarity, given that both controls were found to be non-significant. Demographic factors such as education, work length, and workplace location were not directly entered into the TPB model, but these controls did help to describe the target population. For example, latent cultures present at each workplace location (i.e., Public Works, City Hall, Police Department, and Parks and Recreation) may have different contextual factors influencing employee green workplace behavior. Therefore, the workplace location survey item asked the respondent to identify which municipal location they work at to help control the difference between departments. The last control variable, past behavior, was removed from the study analysis due to complications with data collection.

Phase 1 Methodology

The first phase of this research study involved conducting an elicitation study to uncover the underlying determinants of public employee intentions to recycle correctly. At the end of Phase 1, there was a transition to Phase 2, which included developing a TPB questionnaire that incorporated the elicited beliefs. The elicitation study is necessary because no standardized TPB questionnaire exists. In addition, contextual factors, time-period, and existing culture within a target population give rise to commonly held beliefs unique to each situation (Ajzen, n.d.-c). Therefore, researchers must create a TPB questionnaire that can research a given behavior in a specific sample. Thus, TPB studies consist of an elicitation component to uncover these

commonly held beliefs that aid in developing a questionnaire appropriate for investigating the behavior of interest (Ajzen n.d.-a).

In the following sections, I describe the steps for eliciting employees' antecedent beliefs using semi-structured interviews. I then discuss details about the qualitative data collection process and describe the coding methodology used to construct sets of salient modal beliefs. I end the section by reviewing survey item creation and administration protocols for this study.

Employee Interviews

I conducted 22 semi-structured interviews to elicit salient beliefs (behavioral, normative, and control) for each core TPB predictor (attitude, subjective norm, and PBC). I decided to collect data using semi-structured interviews because it is the preferred TPB elicitation technique recommended by Ajzen (2020). Permission to conduct interviews was granted during IRB approval (see Appendix B).

Recruiting interview participants from the target population is consistent with Francis et al.'s (2004) TPB elicitation study guidelines. Thus, all employees participating in the semi-structured interviews were volunteers. Each interview participant was assigned a random research number to protect their identity during coding. Likewise, interview participants for this study were recruited via an email sent to the entire workforce. The email to prospective participants included a proposed time for the interview, a brief outline explaining the purpose of my research, interview questions, and the study Consent Form (see Appendix D).

Municipal employees' commonly held beliefs about recycling may change slightly based on workplace location. For instance, the milieu at Public Works may elicit recycling beliefs that differ slightly from that of employees working at City Hall. Furthermore, it is possible that employees' recycling beliefs may change based on their working environment. For instance,

employees working in an office environment may have different experiences impacting their recycling behaviors versus employees working outside. Thus, the sample used for the elicitation component of this study was reviewed to ensure employees were representative of the workforce populations. More on the characteristics of participants in the elicitation study is presented in Chapter 4.

The final number of interview participants was determined by the criterion of saturation (Weiss 1995; Saunders et al. 2018). The criterion of saturation suggests a researcher becomes "empirically confident" when a topic is thoroughly explored, and interviews no longer yield new information (Glaser & Strauss, 2017, p. 61). I determined that the elicitation study criterion of saturation was met during belief coding cycles. More on the coding cycles are presented in Chapter 4. In addition, 22 employees participated in the elicitation study, which was similar to the sample sizes of prior TPB research in the field of pro-environmental workplace behaviors for meeting the criterion of saturation (Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020).

I conducted interviews individually and spent at least 30 minutes at each interview using a free-response format. Each interview was recorded to transcribe responses, and interviews took place using the virtual meeting platform, Go-To-Meeting. Interviews were originally meant to take place in person, but the institution's IRB required virtual data collection due to the COVID-19 pandemic. More information on how the initial study protocols were changed to adapt to pandemic protocols is discussed in Chapter 4. At the end of the interview, the Go-To-Meeting software generated a transcript. However, in some instances, the auto-generated transcript had misinterpreted interviewee responses; therefore, I reverted to the audio recordings to transcribe interviews manually.

At the beginning of the interview, I reminded participants that the study was voluntary, completely confidential and that there were no right or wrong responses. I then used the interview protocol (see Appendix E) to ask a series of questions to elicit participants' salient beliefs. I kept one copy of each interview transcript on Hood's Microsoft OneDrive using a password-protected folder. Following the completion of a coding process, all transcripts and interview notes were deleted permanently from the Go-To-Meeting and my audio recording.

The interview protocol was modeled after Ajzen's (n.d.-b) and Francis et al. (2004) recommendations for conducting an elicitation study for developing a TPB questionnaire. The interview protocol used in this study was also consistent with Greaves et al. (2013) and Yuriev, Boiral, & Guillaumie's (2020) TPB research on pro-environmental workplace behavior.

Ajzen (n.d.-a) suggested that interview questions must focus on eliciting responses specific to each of the TPB antecedent beliefs (behavioral, subjective norm, and control). Both Ajzen and Francis et al. (2004) suggested using open-ended questions. Accordingly, the interview protocol for this study targeted the positive and negative behavioral beliefs stemming from a participant's experiences when attempting to recycle correctly while at work.

Coding Transcripts

According to Ajzen (2015), compiling transcripts and sorting responses allows the research to identify commonly held beliefs among the target population. Therefore, following Ajzen's recommendation, transcripts were converted to Microsoft Word. After each interview, I sorted and completed a preliminary coding of respondent transcripts using an excel coding matrix. The coding process involved three steps: (a) compiling and sorting responses, (b) identifying and labeling themes, and (c) rearranging and retaining themes most frequently mentioned.

After assembling all the responses, I identified and labeled themes. I intentionally designed the interview questions to elicit responses for each corresponding construct. Once all transcripts were assigned theme prints, I tallied each theme's recurrence to calculate response rates for each belief. Francis et al. (2004) advised researchers to list commonly held beliefs from the most frequently to the least frequently mentioned. These researchers also recommended that an inclusion rate of 75% is sufficient for determining whether a belief represents the target populations. Yuriev, Boiral, & Guillaumie's (2020) noted that holding a 75% retention rate for indirect TPB belief focuses the study on the essential beliefs while also reducing the number of items in the questionnaire. For these reasons, I listed themes in order of most frequently to least frequently mentioned and then removed themes expressed less than 75% of the time. In addition, Ajzen (n.d.-a) suggests that researchers need to review elicited beliefs to ensure each belief can affect the behavior of interest within the target population. Thus, I also removed any additional themes that did not legitimately appear to impact the behavior of interest. The three-cycle coding approach used in this study is consistent with the TPB coding methodology presented in a similar study performed by Greaves et al. (2013).

Questionnaire Development

After coding and retaining salient beliefs, I converted salient beliefs into item statements appropriate for a 5-point Likert response scale. For example, the elicitation study identified the control belief, recycling bin proximity, which refers to employees feeling that the recycling bin located far away affects their ability to recycle correctly. Therefore, I transformed the control belief, recycling bin proximity, into the following question: "At work, how often do feel recycling bins are located too far away?" with the response ranging from *never* to *always*. This

approach to questionnaire item creation is consistent with the TPB literature (Conner et al., 2002; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020).

After converting beliefs into item statements, I created a matching affirmation item to pair with each belief statement. The purpose of affirmation items is to verify the elicited belief and gauge how an individual holds that belief (Ajzen, 1991). For instance, the affirmation item for the control belief, recycling bin proximity, was “If work placed recycling bins too far away, it would make it more difficult for me to recycle correctly.” This process for creating affirmation pairs is based on Francis et al.'s (2004) recommendations to use affirmation questions to help identify whether a belief makes it more or less likely the participant will engage in the target behavior.

The final questionnaire contained a total of 51 questions (see Appendix F). All questions used in the questionnaire follow guidelines from Ajzen (n.d.-c) and Francis et al. (2004) and best TPB practices from the field (Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020; Yuriev, Dahmen, et al., 2020). In addition, the questionnaire included seven demographic questions on the characteristics of the sample. The direct TPB measures (i.e., intention, attitude, subjective norm, and PBC) had 15 items. The indirect TPB measures for assessing antecedent beliefs had a total of 18 items. An additional six items related to problem awareness, moral norms, past behavior, and COVID-19.

Phase 2 Methodology

This section outlines the research procedures for completing Phase 2 of this study. First, I administered the final questionnaire to the target population. I then scored survey responses and performed data eligibility testing. Finally, after data prepping was finished, I performed a

statistical analysis using three mediation models using Hayes' (2018) PROCESS. More information outlining the survey development procedures is discussed in Chapter 4.

Survey Data Collection

I administered the questionnaire to the entire municipal workforce population (N=300). Permission to administer a survey was granted during IRB approval (see Appendix B). The survey questionnaire was delivered to employees using an online Qualtrics survey circulated through the municipality's internal email system. The Qualtrics survey software anonymized responses by removing respondents' personal information such as IP address and location data from their survey results. As a result, all data collected by the survey were anonymous.

Respondents were invited to participate voluntarily via an email containing the following information: (a) a link to the survey questionnaire, (b) a brief outline explaining the purpose of my research, and (c) the approximate time for completing the survey. Appendix G presents the email that the city manager forwarded to the entire workforce. To complete the survey, respondents selected the email link and then were required to provide consent before answering survey questions. In addition, the following strategies were used to facilitate a higher response rate: (a) I issued email and survey reminders (see Appendix H); (b) I prepped department heads for the upcoming survey (see Appendix I); and (c) I leveraged the city manager's agency for distributing the initial survey.

Questionnaire Scoring

I scored survey data for analysis using the guidelines from Francis et al. (2004) and Glanz et al. (2008) for interpreting TPB questionnaires. First, I recoded items with negatively worded endpoints so that higher numbers reflected more positive attitudes toward the behavior of interest. Next, for each of the direct TPB predictors (intention, attitudes, subjective norms, and

perceived behavioral control), scores were calculated using the total mean of all survey items for each construct. Finally, scores for indirect TPB predictors (behavioral, normative, control beliefs) were calculated using the following formula recommended by Francis et al. (2004):

Formula: $B = (a \times e) + (b \times f) + (c \times g) + (d \times h)$

Where: B = total behavioral belief score

a, b, c and d are scores for each of four behavioral beliefs

e, f, g, and h are scores for affirmation questions relating to each behavioral belief

Data Analysis

I initially intended to run a structural equation model (SEM) in SPSS using the AMOS package. However, using an effect size of .03, SEM requires a minimum of 200 responses (Preacher & Hayes, 2004). The preference for using SEM over traditional step-by-step regression analysis stems from the technique's comprehensiveness. Baron and Kenny (1986) noted that path analysis could calculate multiple mediation paths, assess indirect and direct effects of various variables, and evaluate a model. Furthermore, path analysis is the most frequently used statistical technique in TPB-based formative research (Yuriev, Dahmen, et al., 2020).

Because the data sample for this study was insufficient to run SEM, I replaced it with PROCESS Macro methodology, which lowered the required response rates to approximately 70 respondents (Hayes, 2018). Furthermore, based on Green's (1991) formula, the minimum sample size for research was 98 cases. This study had 119 survey responses and retained 105 for statistical analysis and, therefore, met the requirements of PROCESS Macro methodology.

Cronbach's alpha scores for internal consistency were calculated to search for internal consistency issues and to check the overall reliability of summated scales. As recommended by

Maruyama & Ryan (2014), I completed data eligibility for meeting the assumptions of mediated multiple regression for this study using residual independence, linearity, homoscedasticity, multicollinearity, normality, and review of data for significant outliers.

Hypothesis testing was done with three mediated multiple regression models using Hayes' (2018) PROCESS add-on for SPSS. Researchers have traditionally established mediation effects by using a four-step approach of Baron and Kenny (1986) by testing: a) the relationship between the independent variables and the dependent variables; b) the relationship between the independent variables and the mediating variables; c) the relationship between the mediating variables and the dependent variables while controlling for the independent variables; and d) the relationship between the independent and dependent variables while controlling for the mediating variables.

Researchers have recently started opting to use Hayes's (2009) more refined approach over Baron and Kenny's (1986) four-step method for establishing mediation effects (Hayes et al., 2017; Mascha et al., 2013; Zhao et al., 2010). Hayes (2009) argued that a significant indirect effect, which is the difference between the total effect of the independent variable on the dependent variable while controlling for the mediating variables, is appropriate for establishing a mediating relationship between the independent and dependent variables. Accordingly, a sizeable indirect effect suggests there is a robust mediating relationship (Hayes, 2018).

This study remains consistent with the latest literature and uses Hayes (2009) analytic method to demonstrate a significant indirect effect between model variables. Furthermore, Hayes' PROCESS incorporates bootstrapping as a statistical procedure for resampling datasets to generate large, replicated samples. The bootstrapping process helps correct issues of normality found in smaller datasets. Hayes recommended bootstrapping data 5,000 times or more when

using PROCESS. Thus, I used bootstrapping at Hayes's suggested rate and heteroscedasticity-consistent standard errors for testing hypothesis models.

Limitations

There are some methodological limitations to this study. First, due to an absence of validated measures for researching the studied behavior, I explore the constructs that go into employee intentions, not behavioral action. Therefore, I do not explore the intention-behavior gap. The TPB literature supports the need to evaluate the antecedents of correct recycling intention at work (Greaves et al., 2013; Yuriev et al., 2018; Yuriev, Dahmen, et al., 2020). Ajzen (2011) also notes that establishing whether a target population intends to perform the behavior of interest is a critical first step in developing a successful behavioral change intervention.

A second limitation of this research comes from identifying beliefs specific to the target population (Sniehotta et al., 2014). Even if it belongs to a neighboring municipality, each workforce population may hold a separate set of underlying beliefs (Ajzen, 2020). As a result, findings presented in this study have limited generalizability, and future researchers need to be cautious when applying results to other contexts. Despite this limitation, the use of TPB to investigate municipal green workplace behavior is both appropriate and justifiable. Yuriev, Boiral, & Guillaumie (2020) suggest that an inventory of salient determinants of pro-environmental workplace behaviors is necessary for future research to confirm or deny determinants of green behaviors.

Social desirability bias is another limitation of this research because data collection relies solely on self-reported measures. Social desirability, a type of response bias, occurs when respondents answer questions based on how they perceive others will view their answers, rather than answering questions truthfully or openly (Fisher, 1993). To avoid social desirability issues, I

designed this research approach and questionnaire strictly based on the main guidelines and recommendations of TPB (Ajzen, n.d.-c). I also performed data collection using anonymous surveys, which can help reduce issues of social desirability bias. Nevertheless, social desirability may still be an issue, and researchers reviewing findings from this study should keep this in mind.

Research Validity

Threats to my research validity stem from issues of generalizability, correlational research design, and scale development. The formative nature of my research makes generalizing its results problematic; thus, my external research validity was initially weak. However, the findings presented in this study are helpful for planning interventions within the target population. Therefore, viewed within the context of the studied organization, the external validity for this study is strong because response rates drew from approximately one-third of the target population.

Furthermore, this study is cross-sectional and non-experimental; therefore, I do not address the temporal sequence nor account for all influencers affecting the data in this study. As a result, findings do not meet the necessary criteria for making statements of causality. Being unable to make statements of causality implies low internal validity within the study design.

Conclusion validity in this study is sufficient because the survey captures approximately one-third of the target population. Findings from this study also only draw inferences about employees within the studied municipality. Construct validity for this research is strengthened because I created my measures based on the work of Ajzen (n.d.-c). Ajzen (2015) claims that even “carefully constructed” measures in TPB may not exceed 0.80 Cronbach Alpha’s (p. 2).

Summary

The overall purpose of this study was to systematically identify and evaluate the determinants influencing employees' intentions to engage in correct recycling behavior. The methodology outlined in this chapter is systematic by application. Phase 1 and Phase 2 of this study sought to answer the two research questions, R1 and R2, respectively. Study variables were operationalized based on tenants from Ajzen's (1991) theory of planned behavior.

This study was completed using a two-phase, mixed-method approach to discover and then evaluate the determinants of municipal employees' intentions to engage in the behavior of interest. Phase 1 was the qualitative exploration that identified commonly held beliefs impacting the behavior of interest. Phase 1 involved the following steps: (a) conducting an elicitation study using semi-structured interviews within the target population, (b) identifying commonly held beliefs by coding transcripts rendered from the elicitation study, (c) converting commonly held beliefs into statements and then survey items that assess the strength of each belief, (d) creating affirmation pairs to verify and clarify each elicited belief influence on the behavior of interest, and (e) piloting and finalizing the final questionnaire.

Phase 2 included the quantitative assessment in determining how important each determinant was when predicting municipal employee intentions to perform the behavior of interest. Phase 2 involved the following steps: (a) administration of the resultant questionnaire developed during Phase 1, (b) scoring and prepping data responses from the questionnaire, and (c) performing three mediated multiple regression models using Hayes' (2018) PROCESS add-on for SPSS.

The elicitation study and survey questionnaire for this study required the Hood College Institutional Review Board (IRB) approval. On October 27, 2020, I received approval to proceed

with both Phase 1 and Phase 2 of this research. Appendix A includes the research permission from the studied municipality, and Appendix B includes a copy of the IRB application. Study implications of the COVID-19 pandemic are discussed in Chapter 4.

CHAPTER 4 QUALITATIVE AND QUANTITATIVE ANALYSIS

This study identified and evaluated the determinants influencing municipal employees' intentions to recycle correctly at work. The field of pro-environmental workplace behaviors is nascent, and its literature suggests that further investigation into the determinants of specific voluntary green workplace behaviors is needed to create more trustworthy measures (Yuriev, Dahmen, et al., 2020). Ajzen's (1991) theory of planned behavior (TPB) proposes that a person's intention to perform a behavior is the best predictor of their actual behavior. Using a mixed-method research design based on Ajzen's TPB framework, this research conducted an elicitation study to identify the main determinants of employees' intentions to recycle correctly at work. The identified determinants from the elicitation study were used to create a survey that evaluated the degree to which each determinant influenced the target behavioral intention. This study took both a systematic and formative approach to answer the following research questions:

Research Question 1 (R1): *What are the salient determinants predicting public employees' intentions to engage in green workplace behavior voluntarily?*

Research Question 2 (R2): *How much explained variance does each determinant capture when predicting employee behavioral intention?*

This chapter presents the analysis and results for both the qualitative and quantitative phases of this study. I begin this section by framing the research significance, summarizing the study methodology, and then listing participants' characteristics. The following sections outline the elicitation study results, the subsequent survey creation, and data collection and preparation for analysis. The chapter ends with a review of the statistical analysis, study findings, and a summary of the research findings.

Significance of the Research

Environmental performance refers to the impacts organizational activities have on the natural environment (Gallego-Álvarez et al., 2014). Employees performing voluntary green behaviors can determine the overall environmental performance of an organization (Daily et al., 2009). There are many different types of voluntary green workplace behaviors. For instance, most organizations do not formally require employees to reuse office supplies, turn off lights, or mandate green purchasing policies. The more employees perform green behaviors at work, the better an organization's environmental performance becomes (Boiral, Talbot, & Paillé, 2015). However, there is a general lack of research and understanding about the behavioral determinants driving employees to voluntarily perform green workplace behaviors (Yuriev, Dahmen, et al., 2020).

Furthermore, the growing number of people living within cities is putting extraordinary environmental pressures on urban communities. As a result, the environmental performance of cities is becoming increasingly more critical for maintaining the long-term sustainability of surrounding communities (Newman, 2006). Therefore, there is a practical need to understand better why employees choose to engage in green workplace behaviors. There is an even greater need to foster green behaviors of city workers to boost the environmental performance of municipal operations. For this reason, this study sought to uncover and evaluate the determinants of voluntary green workplace behavior within a municipal workforce. This study answers Yuriev, Dahmen, et al.'s (2020) call for more research on the topic and proposes a systematic and scalable research framework for the future assessment of voluntary pro-environmental workplace behaviors within municipal workforces.

Summary of Methodology

The research design for this study was correlational and used a two-phase mixed methods approach for data collection and analysis. During Phase 1 of this study, an elicitation study was conducted to qualitatively explore and identify the salient beliefs within the target population. In addition, an initial small-scale pilot of the elicitation study was carried out to investigate the appropriateness of interview questions. The elicitation study involved 22 semi-structured interviews that included 13 open-ended questions followed by eight sentence completion questions.

During Phase 2, a cross-sectional survey was administered to measure how employee beliefs are augmented by TPB variables and impact the target behavioral intention. Salient beliefs identified via the elicitation study were converted to 18 survey questions based on guidelines in the literature. Initial survey questions were reviewed by members of an expert panel both before and after piloting survey questions. The pilot survey was sent to a group of employed adults for the purpose of testing the measurement instruments, overall survey design, and question clarity.

The final survey contained 51 questions and was administered to the entire municipal workforce population. Survey responses were collected anonymously via an email with a link to an anonymous survey. Survey findings were used to test H1, H2, and H3 hypotheses models using Hayes' (2018) PROCESS add-on for SPSS. Testing of H4 and H5 was not possible due to survey items measuring each construct being either tossed out or merged during the survey development or scale reliability testing phases. Appendix E displays the list of semi-structured interviews questions used in the elicitation study. Appendix F presents a copy of the survey questionnaire.

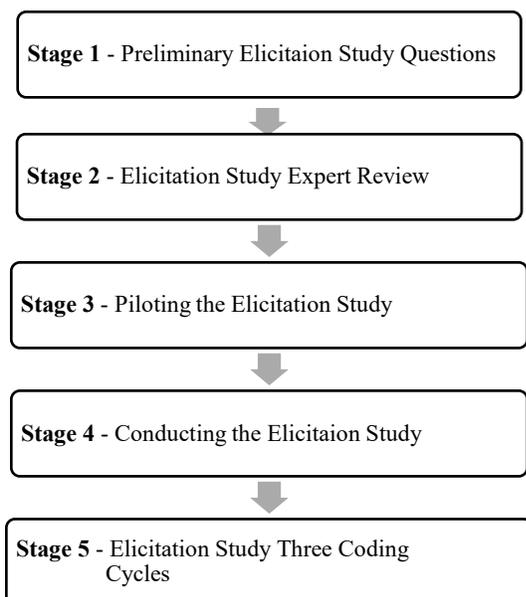
Phase 1 Elicitation Study

Researchers using the theory of planned behavior (TPB) cannot develop trustworthy questionnaires without first doing an elicitation study (Ajzen, n.d.-c). The reason is that employees' beliefs are not universally held and are subject to change based on the characteristics of the studied organization (Ajzen, 2015). Therefore, I conducted an elicitation study before developing the Phase 2 survey using the best TPB research practices.

The elicitation study consisted of five stages during which data from 22 semi-structured employee interviews were collected. During Stage 1, I formed an initial set of interview questions using the guidelines set by Ajzen (n.d.-b) and Francis et al. (2004). These initial set of questions were reviewed and refined by a seasoned qualitative researcher. A pilot study was then completed to check question clarity and suitability. The final elicitation study resulted in 13 open-ended questions and eight sentence completion questions. Figure 12 describes the five stages of the elicitation study.

Figure 12

Stages of the Elicitation Study



Stage 1 - Preliminary Elicitation Study Questions

The elicitation study for this research followed Ajzen (n.d.-b) and Francis et al. (2004) guidelines for developing open-ended interview questions on salient beliefs. A person is thought to only have cognitive access to a small number of beliefs at any given moment (Miller 1956). Therefore, the goal of interview questions was to elicit the salient beliefs an employee holds that most influence their intention to recycle correctly at work. The initial elicitation study conducted for this research included eight questions targeting behavioral, normative, and control beliefs. Chapter 3 provided more detailed information on the development of initial elicitation questions. Table 5 presents the initial eight elicitation questions written by the researcher.

Table 5

Alignment of Initial Elicitation Study Question with Targeted Beliefs

| Order | Question | Research Alignment |
|-------|--|--------------------|
| EQ1 | Why do you try to recycle correctly at work? | Behavioral Beliefs |
| EQ2 | Would you say recycling at work personally benefits you? | Behavioral Beliefs |
| EQ3 | Are there any personal disadvantages or negative impacts to you personally for not recycling correctly at work? | Behavioral Beliefs |
| EQ4 | Think about the last time you were deciding whether to place an item in the recycling bin -- could you try to explain -- or describe the reasons why you might have decided to recycle or not recycle that item? | Behavioral Beliefs |
| EQ5 | Would you describe your coworkers as recycling advocates? | Normative Beliefs |
| EQ6 | Do you ever feel social pressure to recycle at work? | Normative Beliefs |
| EQ7 | What makes recycling at work hard? | Control Beliefs |
| EQ8 | What would make recycling correctly easier for you at work? | Control Beliefs |

Stage 2 - Elicitation Study Expert Review

An experienced qualitative researcher reviewed my initial elicitation questions. The expert review of initial elicitation questions prompted the following changes: a) rewording and repositioning harder to answer questions, b) adding questions for anchoring and eliciting

respondents generalized recycling experiences, c) adding one interview question to ensure participants know what the phrase “recycling correctly” implies, and d) supplementing open-ended interview questions with eight sentence completion questions for triangulation purposes. Appendix J presents the modifications made to the initial interview questions based on the results of the expert review.

Stage 3 - Piloting the Elicitation Study

Five volunteers completed the pilot elicitation study. Two participants were municipal employees from the target population, and three were doctoral students employed full-time. Pilot interviews took approximately 15 minutes to complete. Issues observed among participants in the pilot elicitation study included: a) lengthy interview questions that appeared to confuse respondents, b) elicited short one-word “yes” or “no” responses, c) technology issues with online meetings, and d) off-topic responses for one question. Appendix K presents the elicitation questions and the revisions made based on issues identified during the pilot study.

Stage 4 - Conducting the Elicitation Study

The goal of the elicitation study was to identify employees' most commonly held behavioral, normative, and control beliefs about correct recycling. Using an interview protocol for interviewer consistency (see Appendix E), I conducted semi-structured interviews to elicit correct recycling beliefs. A total of 22 full-time municipal employees volunteered to complete elicitation interviews. Participants for the elicitation study were recruited via an organization-wide email (see Appendix C). The email included information describing the study purpose, instructions for scheduling interviews, and the research Phase 1 Consent Form (see Appendix D). Participants were asked 13 open-ended interview questions followed by eight sentence completion questions displayed in Table 6. The final set of elicitation interview questions

included: a) four questions targeting behavioral beliefs, b) two questions each for normative and control beliefs, c) three questions informing generalized employee recycling experience, d) three self-anchoring questions, e) one question to clarify terminology used in this research, and f) eight sentence completion questions aligned with each belief.

Table 6

Elicitation Study Interview Questions

| Type | Elicitation Interview Question |
|-------------------------------|---|
| Open-ended Questions | 1. What experiences did you have with recycling while growing up? |
| | 2. Do you feel there is a difference between your recycling habits at home vs. at work? |
| | 3. What are the main reasons why you recycle correctly at work? |
| | 4. What does “recycling correctly” mean to you? |
| | 5. What happens when someone places a non-recyclable item in the recycling bin? |
| | 6. What do you do when you are not sure if something is recyclable? |
| | 7. Does trying to recycle items correctly at work personally benefit you? |
| | 8. Are there any disadvantages to trying recycling items properly at work? |
| | 9. Who or what influences your workplace recycling habits the most? |
| | 10. What do you think are the main reasons why coworkers recycle? |
| | 11. What are the main reasons why coworkers do not recycle at work? |
| | 12. What would stop you from recycling at work? |
| | 13. What would help you recycle more at work? |
| Sentence Completion Questions | 1. I could recycle correctly more often at work if... |
| | 2. The most important reason to recycle correctly at work is... |
| | 3. The hardest part about recycling correctly at work is... |
| | 4. Always knowing what items can be recycled would... |
| | 5. Recycling correctly at work is... |
| | 6. Recycling correctly at work is not... |
| | 7. Recycling correctly at work could be... |
| | 8. Everyone would recycle more correctly at work if... |

COVID-19 Adjustments

Interviews for the elicitation study were initially intended to be completed as in-person interviews. However, COVID-19 safety protocols at the studied municipality prohibited face-to-face meetings. The IRB for this research also restricted all face-to-face data collection for this study due to COVID-19 precautions. Therefore, elicitation interviews were converted from an in-person format to a virtual web meeting format.

Elicitation Study Data Collection

Municipal employees were invited to participate in a recycling interview via email. The email included directions for coordinating interview times and submitting voluntary consent forms. Interviews took place online and were recorded using GoToMeeting phone conferencing software. Participants completed the interview over the phone by using the call-in meeting number. Interviews lasted an average of 22 minutes, and participants were given time at the end of each interview to talk openly about their workplace recycling experiences.

Characteristics of Elicitation Study Participants

All participants in the elicitation study were volunteers. Twenty-two municipal employees were involved in the Stage 4 interviews; 13 were female, 9 were males, and female and male participants represented a wide range of ages. Two participants were senior managers, four were middle managers, and 16 were non-management personnel. All participants were either full-time or part-time employees. Participant length of employment ranged from less than one year to over ten plus years as an employee of the municipality.

Participants in the elicitation study came from several different workplace locations and accounted for diverse job functions across the municipality, which ensured that participants represented a broad range of experiences and beliefs toward the target behavior. For example,

one employee worked at the Parks and Recreation building, eight employees worked at City Hall, five employees came from the Police Department, seven employees worked at Public Works, and one employee worked at an off-site city-owned facility. Table 7 presents the breakdown of participants based on gender and municipal department.

Table 7

Elicitation Study Volunteers: Department, Number and Gender

| Municipal Department | Male | Female |
|----------------------|------|--------|
| City Hall | 3 | 5 |
| Parks and Recreation | 0 | 2 |
| Police Department | 3 | 2 |
| Public Works | 3 | 4 |
| Total | 9 | 13 |

Stage 5 - Elicitation Study Coding Cycles

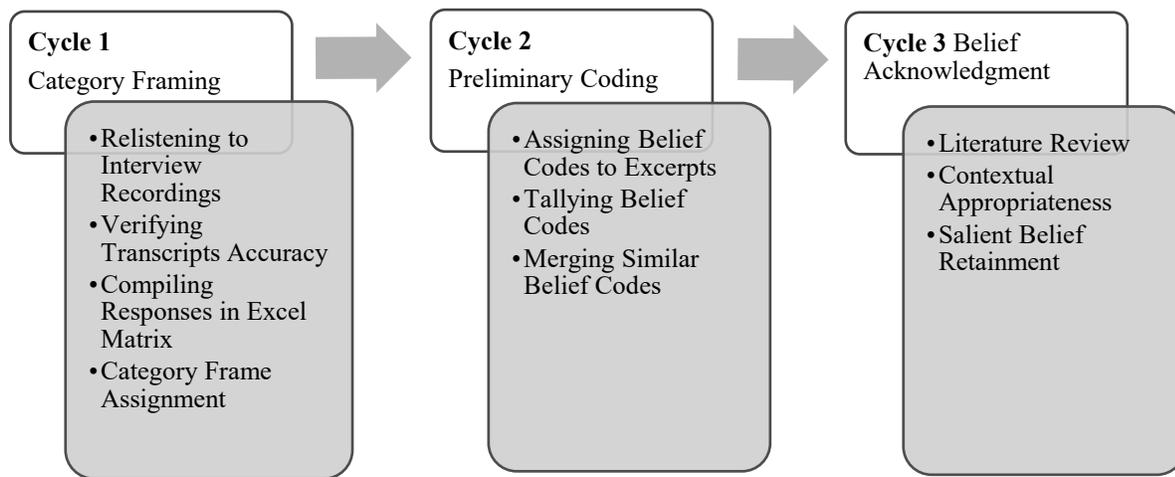
This stage included the coding protocol used to determine which employee-held beliefs were carried over and tested during the Phase 2 quantitative analysis. The protocol I used involved three major components: a) the initial categorization and framing of beliefs, b) the preliminary assignment of belief themes, and c) identification of belief themes for survey item development.

During the first coding cycle, interview transcripts were autogenerated by the GoToMeeting software. The autogenerated transcripts were downloaded as a word document, and responses were sorted into an Excel matrix. Responses were sorted based on their alignment to behavioral, normative, and control beliefs. The second coding cycle was performed in three steps: (a) verifying the accuracy of interview transcripts using audio recordings, (b) transferring interview responses to an excel matrix, and (c) assigning initial category frames to interview responses.

For the third coding cycle, belief themes were retained when expressed in at least 16 out of the 22 interviews, were consistent with recommendations set by Francis et al. (2004). Each retained belief theme was then compared to literature and then converted into survey questions. Figure 13 depicts the three coding cycles and the steps used to identify salient employee beliefs about correct recycling at work.

Figure 13

Identification of Salient Beliefs: Three Coding Cycles



Cycle 1 - Category Framing.

The GoToMeeting software automatically transcribed participant responses and generated transcripts after each interview. Unfortunately, in some instances, the auto-generated transcript incorrectly transcribed participant responses. Therefore, the first part of this coding cycle involved relistening to auto-recording for each interview while simultaneously reading along with the transcript. Next, participant responses were pulled from the word document and compiled within an Excel matrix under an initial category frame after correcting transcript inaccuracies. Finally, the category frames used in this study were established using the following

key roots from within the eight interview questions eliciting beliefs: 1) reasons why, 2) personal benefit, 3) disadvantages, 4) who or what, 5) coworker recycling correctly, 6) coworker not recycling correctly, 7) stop you, and 8) help you. Table 8 summarizes belief questions showing the bolded initial categories used for identifying patterns while compiling excerpts into the Excel matrix.

Table 8

Initial Belief Categories Assigned During Pattern Recognition Coding Cycle

| ID | Elicitation Questions with Bolded Category Frame | TPB Belief |
|------|---|------------|
| EQ3 | What are the main reasons why you recycle at work? | Behavioral |
| EQ7 | Does trying to recycle items correctly at work personally benefit you? | Behavioral |
| EQ8 | Are there any disadvantages to trying recycling items properly at work? | Behavioral |
| EQ9 | Who or what influences your workplace recycling habits the most? | Normative |
| EQ10 | What do you think are the main reasons why coworkers recycle correctly ? | Normative |
| EQ11 | What are the main reasons coworkers do not recycle correctly ? | Normative |
| EQ12 | What would stop you from recycling correctly at work? | Control |
| EQ13 | What would help you recycle more correctly at work? | Control |

Cycle 2 - Preliminary Coding.

The second coding cycle involved the preliminary assignment of beliefs to each of the three category frames: (a) behavioral, (b) normative, and (c) control. These three category frames represented the belief constructs from the theory of planned behavior. The following subsections list all elicited beliefs resulting from analysis of employee interviews sorted by the three category frames. Data on the number of special mentions per belief and examples of an excerpt from participant interviews are also presented.

Behavioral – Category Frames. Table 9 presents the preliminary beliefs assigned to the behavioral category frames. Category frames eliciting a participant’s behavioral beliefs assess

the underlying factors making up an individual's overall evaluation toward performing the behavior. Belief codes within behavioral category frames reflect employee beliefs about the anticipated outcome and the positive and negative consequences of performing the behavior (e.g., recycling correctly). The category frames in this study that elicited employee behavioral beliefs were labeled (a) reasons why, (b) personal benefit, and (c) disadvantages, as shown in Table 9.

Table 9

Behavioral Belief Category Frame

| Category Frame | Total Beliefs | Belief Code | Interview Excerpt |
|-------------------------------|---------------|-------------------------------|---|
| Reasons Why (Behavioral) | 17 | Environmental benefit | <ul style="list-style-type: none"> • <i>It's the whole protection of the planet kind of thing.</i> |
| | 10 | Increase reuse | <ul style="list-style-type: none"> • <i>To re-use something or give something another life, so that it's not just a one-use thing, that's always the best plan.</i> |
| | 7 | Feeling of doing what's right | <ul style="list-style-type: none"> • <i>I recycle at work because I like recycling in general. I just think that's the right thing to do.</i> |
| | 7 | Reduce landfill waste | <ul style="list-style-type: none"> • <i>I think the landfill capacity needs to be lower. So, we need to keep as many items out of the landfill as possible.</i> |
| | 6 | Conserve natural resources | <ul style="list-style-type: none"> • <i>I can't speak for everybody, but I would say if you did a survey of enough people, I'm sure conservation of natural resources would be a reason.</i> |
| Personal Benefit (Behavioral) | 12 | Sense of personal benefit | <ul style="list-style-type: none"> • <i>It's the right thing to do and it helps the planet, then that helps me.</i> |
| | 11 | No personal benefit | <ul style="list-style-type: none"> • <i>I mean, we don't get a bonus or anything...</i> |
| | 8 | Improved Environment Benefit | <ul style="list-style-type: none"> • <i>I benefit from a better environment, less carbon emits, less carbon footprint, those kind of things.</i> |
| | 4 | Reduce landfill waste benefit | <ul style="list-style-type: none"> • <i>It could have a personal benefit other than just feeling better, like not contributing to the waste that goes in the landfill.</i> |
| | 2 | Saving money benefit | <ul style="list-style-type: none"> • <i>If recycling reduces the amount of trash the City has to pay to have hauled away it means that there might be a little more money for other City Programs.</i> |

| Category Frame | Total Beliefs | Belief Code | Interview Excerpt |
|----------------------------|---------------|------------------------------------|---|
| Disadvantages (Behavioral) | 2 | Conserve natural resources benefit | <ul style="list-style-type: none"> • <i>Because what I feel like the whole reason to recycle is to try to reduce waste and preserve natural resources.</i> |
| | 2 | Increase reuse benefit | <ul style="list-style-type: none"> • <i>Giving items another life is important...</i> |
| | 17 | No perceived disadvantages | <ul style="list-style-type: none"> • <i>No. Not at all. I think it seems like it's always good thing, so I would think we should (recycle correctly).</i> |
| | 4 | Separating waste time | <ul style="list-style-type: none"> • <i>It's just time consuming, You know. So, that's all</i> |
| | 3 | Visiting bin time | <ul style="list-style-type: none"> • <i>There is a recycling dumpster in the parking lot, but that's only for paper. So, to do mixed stream recycling, we have to take our recycling into the building.</i> |
| | 1 | Messy and unsightly | <ul style="list-style-type: none"> • <i>Possibly an attraction to insects(drink cans and bottles) before they get rinsed</i> |
| | | Time taken to lookup item | <ul style="list-style-type: none"> • <i>I think the primary disadvantage I can see is that if there isn't a clear policy and the instructions to employees on what is recyclable and how to recycle it, they might spend time trying to figure out what they should do with it</i> |
| | 1 | Recyclability | |

The “reasons why” behavioral category frame targeted what participants perceived as the overall outcome from recycling correctly at work. The “reasons why” frame elicited five beliefs mentioned a total of 47 times by participants during interviews. Ranked from most to least frequently mentioned, the behavioral belief codes assigned to “reasons why” included: 1) environment benefit, 2) increase reuse, 3) feeling of doing what’s right, 4) reduce landfill waste, and 5) conserve natural resources.

The “personal benefit” behavioral category frame focused on the perceived positive advantages employees felt they would gain from recycling correctly at work. The “personal benefit” frame elicited seven beliefs that were mentioned 40 times collectively. Behavioral belief codes for “personal benefit” ranked from most to least mentioned included: 1) sense of personal

benefit, 2) no benefit, 3) improved environment benefit, 4) reduced landfill waste benefit, 5) saving money benefit, 6) conserve natural resources benefit, and 7) increase reuse benefit.

The “disadvantages” behavioral category frame centered on uncovering negative employee consequences toward recycling correctly. The “disadvantages” frame elicited five beliefs mentioned a total of 26 times. Over 75% of participants reported no perceived disadvantages for making an effort to recycle correctly at work. The ranked behavioral codes for “disadvantages” included: 1) no perceived disadvantage, 2) separating waste time, 3) visiting bin time, 4) messy and unsightly, and 5) time taken to lookup item recyclability.

Normative – Category Frames. Table 10 presents the preliminary beliefs assigned to the normative category frames. Category frames eliciting a participant’s normative beliefs gauge one’s perception of existing social pressure to perform or not perform the target behavior. Therefore, belief codes in the normative category frame reflect an employee’s perception of whether people in the municipality care if they recycle correctly. The normative category frames aimed to identify salient groups of people within the municipal workforce influencing employee correct recycling behavior; however, some themes identified in the normative frames represent behavioral or control beliefs. Mixed beliefs in category frames were separated or merged with similar beliefs during the third coding cycle. The category frames for eliciting employee normative beliefs were labeled (a) who or what, (b) coworkers recycle, and (c) coworkers do not recycle.

Table 10

Normative Belief Category Frame

| Category Frame | Total Beliefs | Belief Code | Interview Excerpt |
|---|---------------|---|--|
| Who or What (Behavioral & Normative) | 15 | Recycling bin proximity | <ul style="list-style-type: none"> • <i>I think how many recycling bins there are is probably the thing affecting me the most, because if there isn't a recycling bin around, you obviously can't recycle</i> |
| | 14 | Managers | <ul style="list-style-type: none"> • <i>At work, my manager. At home, my grandmother. Because they both always making sure that we're recycling and putting the correct thing in the correct bin.</i> |
| | 11 | Coworkers | <ul style="list-style-type: none"> • <i>My co-workers, I know my co-workers are passionate about it, so I like to do things that make them happy. So, they think that I'm a good person.</i> |
| | 10 | Sense of peer pressure | <ul style="list-style-type: none"> • <i>I think I'd just go back to the whole peer pressure thing. I don't think I have anybody who influences me, really, to do it. I think it's just the fact, when people look at my trash, I feel kind of bad if I don't recycle.</i> |
| | 8 | Sense of wasted effort | <ul style="list-style-type: none"> • <i>When everything is dumped together, then it kind of makes you not want to separate it out.</i> |
| | 5 | Habit | <ul style="list-style-type: none"> • <i>I generally just do it, mainly out of habit.</i> |
| | 5 | Sense of responsibility | <ul style="list-style-type: none"> • <i>Me taking personal responsibility and personal action for myself. Knowing that what I do here at the house I do the same thing at work.</i> |
| Coworkers Recycle (Normative) | 16 | Peer pressure | <ul style="list-style-type: none"> • <i>I also think, like, at work, you have people looking at you weird if you don't put stuff in the right container.</i> |
| | 9 | Recycling bin proximity | <ul style="list-style-type: none"> • <i>My team would recycle more if they had a recycling bin at their desk.</i> |
| | 8 | Managers | <ul style="list-style-type: none"> • <i>Supervisors play a big role in determining everyone's recycling behavior because they set the rules. Recycling has not been shared and encouraged by those in higher management.</i> |
| | 4 | Expected to recycle correctly | <ul style="list-style-type: none"> • <i>I guess because it, I mean, it's also expected you'll recycle correctly.</i> |
| | 3 | Sense of responsibility | <ul style="list-style-type: none"> • <i>Hopefully because they know it is the right thing to do for the earth.</i> |
| Coworkers Do Not Recycle (Normative) | 2 | Sense of reducing recycling contamination | <ul style="list-style-type: none"> • <i>They want to prevent the mixing of trash and recyclables because it's a bad look for the office.</i> |
| | 23 | Lack of Recycling Knowledge | <ul style="list-style-type: none"> • <i>They don't know better, or they don't know how to properly recycled because it's the lack of training or allowed awareness.</i> |

| Category Frame | Total Beliefs | Belief Code | Interview Excerpt |
|----------------|---------------|---|--|
| | 19 | Laziness | <ul style="list-style-type: none"> • <i>I would say most likely laziness. Enough has been done out there to let us know why recycling correctly is important.</i> |
| | 18 | Sense of Wasted Effort | <ul style="list-style-type: none"> • <i>What the purpose of me going to wash something out, and then putting it into the recycling bin when that whole bag is very contaminated because someone else didn't follow the procedure prior to me?</i> |
| | 9 | Time Taken to Visit Bins | <ul style="list-style-type: none"> • <i>It's easier just to throw something in a convenient garbage cans, rather than to seek out a recycling bin.</i> |
| | 6 | Time Taken to Lookup Item Recyclability | <ul style="list-style-type: none"> • <i>I think a lot of people don't take the time to know where their trash goes as far as they're concerned. There's so much information that it becomes a lot of noise. And they might just say, Well, I don't know. Now. I think, I'm not sure and I'm going to throw it away.</i> |
| | 4 | Time Taken to Separate Waste | <ul style="list-style-type: none"> • <i>When you go in at work, you're busy, and you just want to get your job done and go home. So, I think that that might be one reason why they don't recycle</i> |
| | 3 | Recycling Bin Proximity | <ul style="list-style-type: none"> • <i>...if the containers weren't accessible or convenient...it might lead to people not recycling right.</i> |

The “who or what” category frame focused on uncovering participants' perceptions of significant sources of social pressure. The “who or what” elicited seven beliefs mentioned a total of 68 times during interviews. Normative belief codes for “who or what” ranked from most to least mentioned included: 1) Recycling Bin Proximity, 2) Managers, 3) Coworkers, 4) Sense of Peer Pressure, 5) Sense of Wasted Effort, 6) Habit, and 7) Sense of Responsibility.

The “coworkers recycle” category frame focused on uncovering positive social pressures influencing employee correct recycling behavior. The “coworkers recycle” frame elicited six beliefs mentioned a total of 42 times during interviews. Ranked belief codes for the “coworkers recycle” frame included: 1) peer pressure, 2) recycling bin proximity, 3) managers, 4) expected to recycle correctly, 5) sense of responsibility, and 6) sense of reducing recycling Contamination.

In contrast, the “coworkers do not recycle” category frame targeted negative social pressures exerted by coworkers.

The “coworkers do not recycle” frame elicited seven beliefs mentioned a total of 83 times during interviews. Normative belief codes for the “coworkers do not recycle” frame included: 1) lack of recycling knowledge, 2) laziness, 3) sense of wasted effort, 4) time taken to visit bins, 5) time taken to lookup item recyclability, 6) time taken to separate waste, and 7) recycling bin proximity.

Control – Category Frames. Table 11 presents the preliminary beliefs assigned to the control category frames. Category frames for eliciting a participant’s control beliefs focus on how confident they feel and their perception of what level of control is needed to perform the behavior.

The “stop you” category frame elicited six control beliefs a total of 46 times. Whereas the category frame “help you” elicited five beliefs a total of 60 times. The ranked control belief codes for “stop you” included: 1) recycling bin proximity, 2) sense of wasted effort, 3) time taken to lookup item recyclability, 4) improper collection, 5) coworkers not recycling correctly, and 6) nothing. The ranked control belief codes for “help you” included: 1) recycling knowledge, 2) recycling bin proximity, 3) time for recycling correctly, 4) recycling right signage, 5) nothing.

Table 11*Control Belief Category Frame*

| Category Frame | Total Beliefs | Belief Code | Interview Excerpt |
|--------------------|---------------|---|---|
| Stop You (Control) | 15 | Recycling Bin Proximity | • <i>If there was just like, one point of access in the building for recycling efforts and that was too far away from my office.</i> |
| | 10 | Sense of Wasted Effort | • <i>I often walk into the... and find bottles or cans tossed into the trash although there are recycling containers right there. It's discouraging.</i> |
| | 8 | Time Taken to Lookup Item Recyclability | • <i>Not having to think about looking to see if something can be recycled or not.</i> |
| | 7 | Improper Collection | • <i>But I think the other thing is that I have read and heard and people will say that some a lot of things you can put in the recycling bin, but they're not being recycled anyway.</i> |
| | 4 | Coworkers Not Recycling Correctly | • <i>I often walk into the... and find bottles or cans tossed into the trash although there are recycling containers right there. It's discouraging.</i> |
| | 2 | Nothing | • <i>I don't think anything would stop me, but I could see how other people would slow down if it was made more difficult to recycle.</i> |
| Help You (Control) | 19 | Recycling Knowledge | • <i>Having more knowledge of what is recyclable and how to properly sort trash. .</i> |
| | 14 | Recycling Bin Proximity | • <i>If every single person had a recycling bin at their desk to recycle papers and water bottles.</i> |
| | 12 | Time for Recycling Correctly | • <i>More time to learn how to recycle correctly and had nearby access to sort.</i> |
| | 8 | Recycling Correctly Incentive | • <i>Citywide recognition that it is important and encouragement to upper management and facility managers to recycle.</i> |
| | 5 | Recycling Right Signage | • <i>I think more simple signage, more illustrations, where things are going to dump or to access points.</i> |
| | 2 | Nothing | • <i>Man, I already recycle everything I possibly can.</i> |

Cycle 3 - Belief Acknowledgement

During employee interviews, the most commonly held beliefs were retained for item creation during the third coding cycle. The belief acknowledgment process involved merging similar belief themes identified in separate category frames, then finalizing the number of unique participants holding a given belief. Francis et al. (2004) recommended that researchers retain all

themes expressed in over 75% of participants' interviews to provide “adequate coverage of the belief population” (p. 14). Thus, all beliefs identified across 75% of participant interviews were retained for item creation. Beliefs expressed less than 75% across participants' interviews were compared to the literature and reviewed for contextual appropriateness before being discarded.

Merging similar beliefs identified in separate category frames is necessary for understanding how impactful a given belief is across the entire population. Most participant responses expressed themes that were consistent with the targeted belief intended for each interview question. However, the elicited beliefs are not mutually exclusive to a single category frame. For example, the belief theme “recycling bin proximity” was expressed in five of the eight category frames, despite the research intention that each frame would elicit a unique theme specific to the target belief. Table 12 presents the ranking of merged elicited beliefs per unique mention by respondents.

Table 12

Merged Elicited Beliefs Identified During Elicitation Study

| Salient Beliefs | Total | Elicited Beliefs | Expressed |
|------------------------------|-------|------------------------------|-----------|
| Recycling Bin Proximity | 56 | Recycling Bin Proximity | 56 |
| Recycling Knowledge | 47 | Recycling Knowledge | 19 |
| | | Lack of Recycling Knowledge | 23 |
| | | Recycling Right Signage | 5 |
| Time for Recycling Correctly | 47 | Time for Recycling Correctly | 12 |
| | | Time Taken to Visit Bins | 9 |
| | | Separating Waste Time | 4 |
| | | Time Taken to Lookup | 8 |
| | | Item Recyclability | |
| | | Time Taken to Lookup Item | 6 |
| | | Recyclability | |
| | | Time taken to separate | 4 |
| | | Visiting Bin Time | 3 |
| | | Time Taken to Lookup Item | 1 |
| | | Recyclability | |
| Sense of Wasted Effort | 43 | Sense of Wasted Effort | 36 |

| Salient Beliefs | Total | Elicited Beliefs | Expressed |
|----------------------------|-------|------------------------------------|-----------|
| Coworkers | 41 | Improper Collection | 7 |
| | | Coworkers | 11 |
| | | Peer Pressure | 16 |
| | | Sense of Peer Pressure | 10 |
| Sense of Personal Benefit | 38 | Coworkers Not Recycling Correctly | 4 |
| | | Sense of Personal Benefit | 12 |
| | | No Personal Benefit | 11 |
| | | Feeling of Doing What's Right | 7 |
| Conserve Natural Resources | 31 | Sense of Responsibility | 8 |
| | | Conserve Natural Resources | 6 |
| | | Increase Reuse | 10 |
| | | Reduce Landfill Waste | 7 |
| | | Reduce Landfill Waste Benefits | 4 |
| | | Conserve Natural Resources Benefit | 2 |
| | | Increase Reuse Benefit | 2 |
| Managers | 26 | Managers | 22 |
| | | Expected to Recycle Correctly | 4 |
| Environmental Benefit | 25 | Environmental Benefit | 17 |
| | | Improved Environment Benefit | 8 |

Four behavioral beliefs were retained in this elicitation study for item creation and then added to the phase-two survey. Behavioral beliefs included: a) benefit the environment, b) conserve natural resources, c) sense of wasted effort, and d) sense of personal benefit. Benefit for the environment refers to the belief that recycling correctly at work positively impacts the environment. Employee perception that recycling correctly preserves natural resources and lessens landfill usage was reflected by the conserving natural resources belief. The sense of wasted effort belief is the perception that individual efforts to recycle correctly do not matter because recyclables will ultimately end up in landfills. Finally, gaining a sense of doing what is right and feelings of responsibility was captured by the sense of personal benefit belief.

Normative beliefs were managers and coworkers as salient referent groups influencing employee recycling behavior. Lastly, three control beliefs were retained from the elicitation study: a) recycling knowledge, b) recycling bin proximity, c) time taken to separate waste. The

recycling knowledge belief refers to not knowing what waste items are recyclable. Recycling bin proximity belief stems from employees' feeling recycling bins are not nearby or conveniently located. Finally, time for recycling correctly reflects the belief that employees do not have time to look up the recyclability of items or travel to inconveniently located recycling bins. Table 13 summarizes salient employee beliefs retained from elicitation study for item creation and incorporations into the measurement model.

Table 13

Salient employee beliefs retained for item creation

| Behavioral Beliefs | Normative Beliefs | Control Beliefs |
|----------------------------|-------------------|------------------------------|
| Environmental Benefit | Managers | Recycling Knowledge |
| Conserve Natural Resources | Coworkers | Recycling Bin Proximity |
| Sense of Wasted Effort | | Time for Recycling Correctly |
| Sense of Personal Benefit | | |

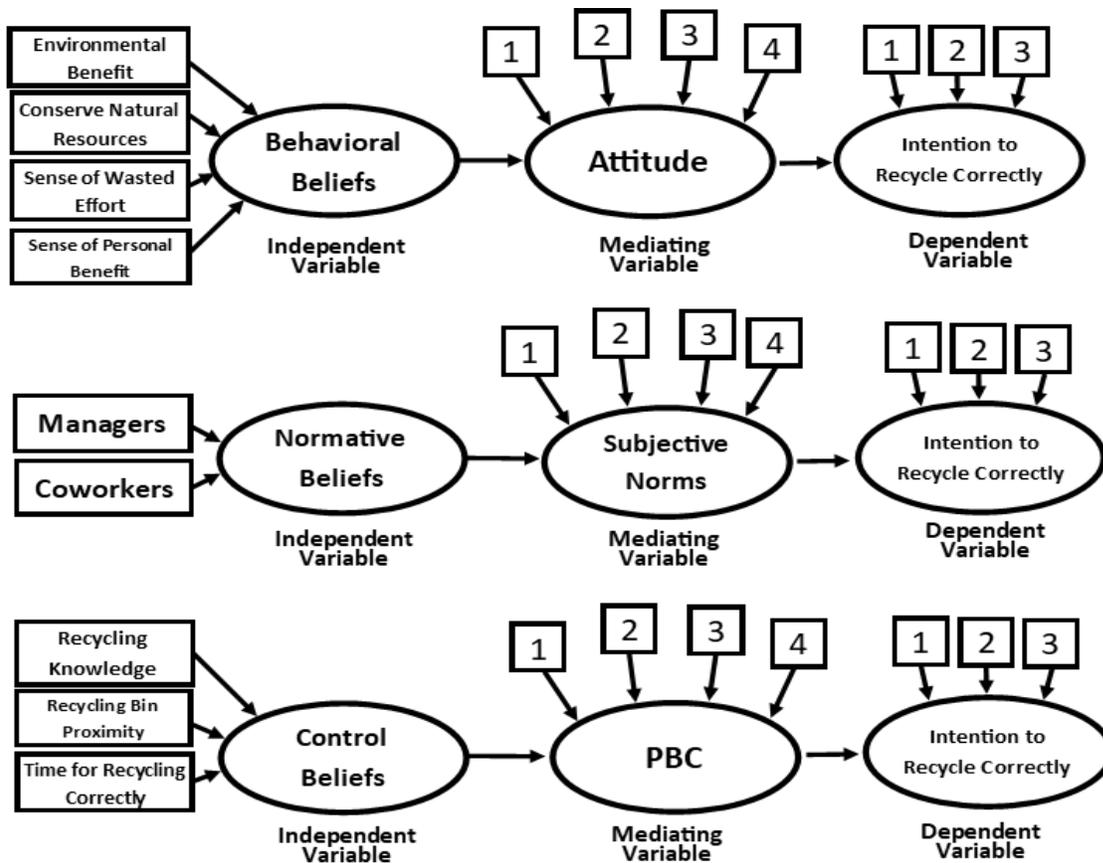
Elicitation Study Conclusion

The first research question is *What are the salient determinants predicting public employees' intentions to engage in green workplace behavior voluntarily?* To answer this question, I developed and completed an elicitation study over five separate stages. Results stemming from 22 semi-structured interviews uncovered 32 beliefs and identified nine salient beliefs. These nine salient beliefs (see Table 13) provided the answer to the first research question. The second research question then asked how important each determinant was at influencing employee intentions to recycle correctly. To answer this second research question required administering a cross-sectional survey and conducting a quantitative analysis. The

following section describes the survey development process. Figure 14 shows the nine salient beliefs from the elicitation study entered into the measurement model.

Figure 14

Measurement Model with Salient Determinants



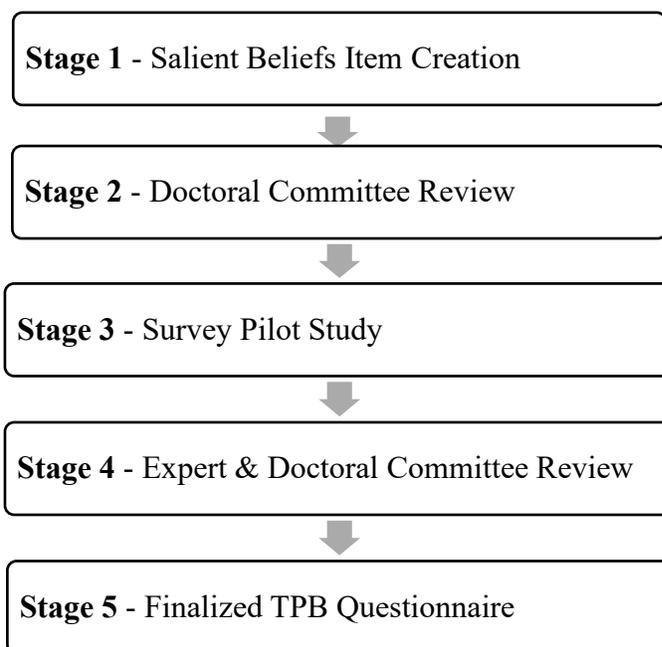
Survey Development

There is no standard questionnaire for the theory of planned behavior (TPB) because survey items must reflect the studied behavior of interest, population, and time period (Ajzen 1991). The TPB questionnaire administered in this study was developed using Ajzen's (n.d.-b) guidelines and followed the TPB protocols of Francis et al. (2004). The initial survey question

for the developed TPB questionnaire was based on the TPB constructs of behavioral intention, attitudes, subjective norms, and perceived behavioral control. Additional survey questions were included to evaluate moral norms and problem awareness, along with a series of control demographic questions. More about the initial TPB questionnaire framework can be found in Chapter 3. Survey development for this study involved: (a) creating salient belief survey items, (b) two rounds of doctoral committee reviews, (c) pilot study, and (d) outside expert review. Figure 15 presents the survey development stages in order of completion.

Figure 15

Stages in TPB Questionnaire Development



Stage 1 - Salient Beliefs Item Creation

Nine sets of belief questions were created by the researcher and incorporated into the preliminary Phase 2 survey template. The item creation process for beliefs involved converting

each belief into two item statements appropriate for a 5-point Likert response scale. The first item statement was developed to assess the strength of employees' held beliefs. The second item statement was developed as an affirmation tool to assess outcome evaluations, motivation to comply, and the power of control for employees' held beliefs. Each belief question was also assigned a survey ID code. Table 14 presents the nine sets of initial belief questions and corresponding ID codes for each question.

Table 14

Initial Survey Questions

| Elicited Belief | Initial Belief Question Statements | ID |
|----------------------------|--|-----|
| Environmental Benefit | <ul style="list-style-type: none"> If I recycle correctly at work, I will feel that I am doing something positive for the environment. | BB1 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> Doing something good for the environment is | OE1 |
| Conserve Natural Resources | <ul style="list-style-type: none"> If I recycle correctly at work, I will reduce the amount of waste going to landfills and save natural resources. | BB2 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> Reducing the amount of waste going to landfills and saving natural resources is: | OE2 |
| Sense of Wasted Effort | <ul style="list-style-type: none"> If I recycle correctly at work, I know the recyclables will not mix with the trash during its collection. | BB3 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> Not mixing recyclables with trash is | OE3 |
| Sense of Personal Benefit | <ul style="list-style-type: none"> Recycling correctly at work personally benefits me | BB4 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> At work, doing something voluntary personally benefits me is: | OE4 |
| Coworkers | <ul style="list-style-type: none"> Coworkers think I should recycle correctly. | NB1 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> What coworkers think I should do matters to me. | MC1 |
| Managers | <ul style="list-style-type: none"> Managers approve of me recycling correctly at work. | NB2 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> Manager's approval of my recycling habits is important to me. | MC2 |
| Recycling Knowledge | <ul style="list-style-type: none"> At work, how often are you confused about what's recyclable and what's not? | CB1 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> If I was confused about what items are recyclable, it would make it more difficult for me to recycle correctly. | PC1 |

| Elicited Belief | Initial Belief Question Statements | ID |
|------------------------------|--|-----|
| Recycling Bin Proximity | <ul style="list-style-type: none"> At work, how often do you feel recycling bins are located too far away? | CB2 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> If work placed recycling bins too far away, it would make it more difficult for me to recycle correctly. | PC2 |
| Time for Recycling Correctly | <ul style="list-style-type: none"> At work, how often do you encounter unanticipated events that place demands on your time? | CB3 |
| <i>Affirmation</i> | <ul style="list-style-type: none"> If I encounter unanticipated events that place demands on my time, it will make it more difficult for me to recycle correctly. | PC3 |

The purpose of affirmation items is to verify the elicited belief and gauge the directional extent to which an individual holds that belief (Ajzen, 1991). For example, the statement, “coworkers think I should recycle correctly,” was developed and included in the questionnaire to assess the strength of the elicited “coworker” normative belief. The following affirmation statement, “what coworkers think I should do matters to me,” was also developed for determining whether employees had any motivation to comply with the “coworker” normative belief. Receiving *strongly agree* responses to both item statements signified that employees within the studied municipality were influenced to recycle correctly not only by their coworkers but also to comply with the social pressure of coworkers.

Item creation for each belief statement was developed based on Francis et al. (2004) protocol and remained consistent with survey development methods used by the theory of planned behavior literature (Conner et al., 2002; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020). More information about salient belief item creation for the Phase 2 survey was included in Chapter 3.

Stage 2 - Doctoral Committee Review

The doctoral committee advising the primary researcher for this study performed an initial review of the questionnaire for general comprehension and adequate informed consent. The goal of the committee review was to ensure respondents understood the aim of the survey by clarifying wording in the introduction and informed consent sections. Changes to the survey were based on feedback obtained during a one-on-one conversation with doctoral committee members. Committee-based changes to the questionnaire included: (a) slight revisions to the introduction to clarify there are no negative consequences for employees should they choose not to participate, (b) adding descriptive wording explaining to respondents that survey questions should be answered based on workplace recycling experiences, and (c) inserted statement requesting employees who are working remotely because of COVID-19 to draw on their past in-person work experiences while completing the survey.

Stage 3 - Pilot Study of Survey

Eight respondents completed the pilot study using Qualtrics's online survey tool. The pilot study was circulated via an email that contained a link to the anonymous survey. Pilot study respondents consisted of a convenience sample of volunteers from outside the population of interest. The pilot survey contained 47 questions and took participants an average of 8 minutes to complete. Table 15 presents the Cronbach's Alpha computations for the pilot study.

Table 15*Pilot Survey Cronbach's Alphas*

| Variable | BI | ATT | SN | PBC |
|-----------------------|------|---------|----------|----------|
| Number of Items | 3 | 4 | 4 | 4 |
| Sum of Variance | 0.75 | 1.59375 | 3.71875 | 3.890625 |
| Variance of Total Sum | 2.25 | 4.4375 | 9.9375 | 8.734375 |
| Cronbach's Alpha | 1 | 0.85446 | 0.834382 | 0.739416 |

The goals of the pilot study were to: (a) identify items that were confusing or challenging to answer, (b) determine whether the questionnaire length was appropriate, (c) to identify any repetitive or redundant items, (d) check the feasibility of the survey protocol, and (e) pre-test the survey measurement instrument. Pilot study feedback was collected via completed surveys and comments in individual emails from respondents. Issues that were noted among participants who completed the pilot included: (a) confusion in understanding some terms used for questionnaire items, (b) issues on question formatting and navigation, and (c) expressed desire of respondents to know how many questions remained. As a result, short descriptive language was added, and the slight rewording of technical terms was made to clarify confusing or vague items reported by respondents. Several items were also reformatted from the horizontal to vertical layout to improve item consistency and the overall survey experience.

Furthermore, a survey completion bar was added to show how many questions remained and a back button to accommodate pilot respondents' feedback. Issues that were noted during the evaluation of results from the pilot survey involved: (a) incorrect automatic scoring for several belief questions, (b) considerable discrepancy in the answers recorded for past behavior items due to respondents having difficulty recalling and labeling the percentage waste they recycled in the past two weeks, and (c) weaker Cronbach's alpha reported for the perceived behavioral

control construct. Recoded values were adjusted for belief items to overcome the automatic scoring problem. The format for the self-reported past behavior item was changed from a percentage to a categorical response. Additionally, slight rewording to improve Cronbach's alpha for the perceived behavioral control items was done. The questionnaire length was deemed appropriate for the target population. No repetitive or redundant items were uncovered within the questionnaire. Inconsistencies to question formatting were corrected, and the revised survey protocol was deemed appropriate for implementation.

Stage 4 - Expert and Doctoral Committee Review

The third survey development stage consisted of an external expert review alongside the second round of doctoral committee feedback. The following goals were established for this review stage: (a) verify questionnaire logic and flow, (b) assess questionnaire acceptability, and (c) check the appropriateness of item responses. The expert reviewer was a seasoned professional with deep knowledge and expertise about the subject matter of this survey. The doctoral committee included two survey methodologists with strong expertise in creating and administering surveys. Feedback from the third survey development stage resulted in four modifications: a) improved survey flow by relocating demographic questions to the end of the survey, b) assigned force response to items to prevent missing data, c) reworded item responses for clarification, and d) added *prefer not to answer* boxes for items touching on sensitive subjects. Appendix L presents a summary of modifications made to the TPB questionnaire throughout the four survey development stages.

Stage 5 - Finalized TPB Questionnaire

The final survey administered to municipal employees contained a total of 51 questions (See Appendix F). The questionnaire began with a brief introductory statement explaining the

aim of the survey along with the acknowledgment of informed consent. The next section of the questionnaire included seven demographic questions: gender, age, education, employment (e.g., full-time or part-time), work location, work environment, and employment length. The remainder of the questionnaire was developed following the survey format of Ajzen (n.d.-c) and the development guidelines of Francis et al. (2004). All questionnaire items were rated on a 5-point Likert scale to remain consistent with the survey methodology used in the literature from the field of employee pro-environmental behavior (Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020; Yuriev, Dahmen, et al., 2020).

The direct TPB measures had a total of 15 items. Three items targeted behavioral intentions (e.g., “I have every intention to recycle correctly at work”). Four items were related to attitude (e.g., “Recycling correctly at work is worthwhile”). Four items were related to subjective norms (e.g., “At work, most people want me to recycle correctly”). Four related to perceived behavioral control (e.g., “If I wanted to, I could recycle correctly at work”).

The indirect TPB measures for assessing antecedent beliefs had a total of 18 items. Four items targeted behavioral beliefs (e.g., “If I recycle correctly at work, I will reduce the amount of waste going to landfills and save natural resources”). Two related to normative beliefs (e.g., “My coworkers think I should recycle correctly”). Three related to control beliefs (e.g., “At work, how often are recycling bins located too far away?”) and nine affirmation items (e.g., “What coworkers think I should do matters to me”). A further six items related to problem awareness, moral norms, past behavior, and COVID-19 (e.g., “When I am at work, COVID-19 protocols have impacted my ability to recycle”).

Phase 2 Quantitative Assessment

During Phase 1, I conducted an elicitation study that identified nine beliefs expressed most often by employees about their recycling behaviors. During Phase 2, I administered the cross-sectional survey and completed a subsequent quantitative assessment to test whether significant relationships existed between the nine elicited beliefs, the prevailing mediating constructs of each elicited belief, and employees' intentions to recycle correctly. In addition, in Phase 2, I aimed to answer the second research question, which asked how much explained variance does each determinant capture when predicting employee intentions to recycle correctly?

Administration of Finalized TPB Questionnaire

Permission to administer a survey was granted by the Hood College IRB. The finalized TPB questionnaire was sent to approximately 297 municipal employees via an emailed survey invitation by the City Manager on March 4, 2021. Municipal department heads were emailed a week before to give advanced notice and were requested to give employees time to complete the questionnaire. The survey invitation included a link and QR code to the anonymous TPB questionnaire hosted on the Qualtrics survey platform. A brief description explaining the study aim and the intended use of collected data was included in the survey invitation. Instructions were also provided that asked supervisors to print and post the email QR code for field employees who may not regularly check their emails. Follow-up reminders were sent to department heads on March 9, 2021. The response rate for the survey was approximately 31%, at 95 of the estimated 300 possible respondents having completed the questionnaire on March 12, 2021.

Extension of Survey Data Collection

The initial survey closure date was March 12, 2021. However, preliminary analysis of the resulting dataset showed a disproportionate number of responses from employees who spend 75% or more of their time working within an office environment. As a result, the survey was extended an additional week because of concerns about possible sample bias stemming from an underrepresented group of employees that work in an outdoor environment. Follow-up reminders were sent to supervisors of field employees on March 16, 2021. The survey closed on March 19, 2021, with 119 of 300 possible respondents having completed the questionnaire for a completion rate of 40%.

Variables and Related Hypotheses

Table 16 shows the variables that were statistically analyzed during Phase 2. In addition, Table 17 shows the study hypotheses and the variables retained for quantitative assessment. Variables measuring problem awareness and moral norms were removed due to issues of data eligibility. Thus, the H4 and H5 were not tested in the data analysis.

Table 16

Variables Retained for Study Analysis

| Variable Name | Variable SPSS ID | Variable Type | Measurement Level | Number of Survey Questions |
|--------------------|------------------|---------------|-------------------|----------------------------|
| Intention | BI | Dependent | Ordinal | 3 |
| Attitude | ATT | Mediating | Ordinal | 7 |
| Subjective Norm | SN | Mediating | Ordinal | 4 |
| PBC | PBC | Mediating | Ordinal | 4 |
| Behavioral Beliefs | BB | Independent | Ordinal | 4 |
| Normative Beliefs | NB | Independent | Ordinal | 2 |
| Control Beliefs | CB | Independent | Ordinal | 3 |

Note. PBC = perceived behavioral control.

Table 17

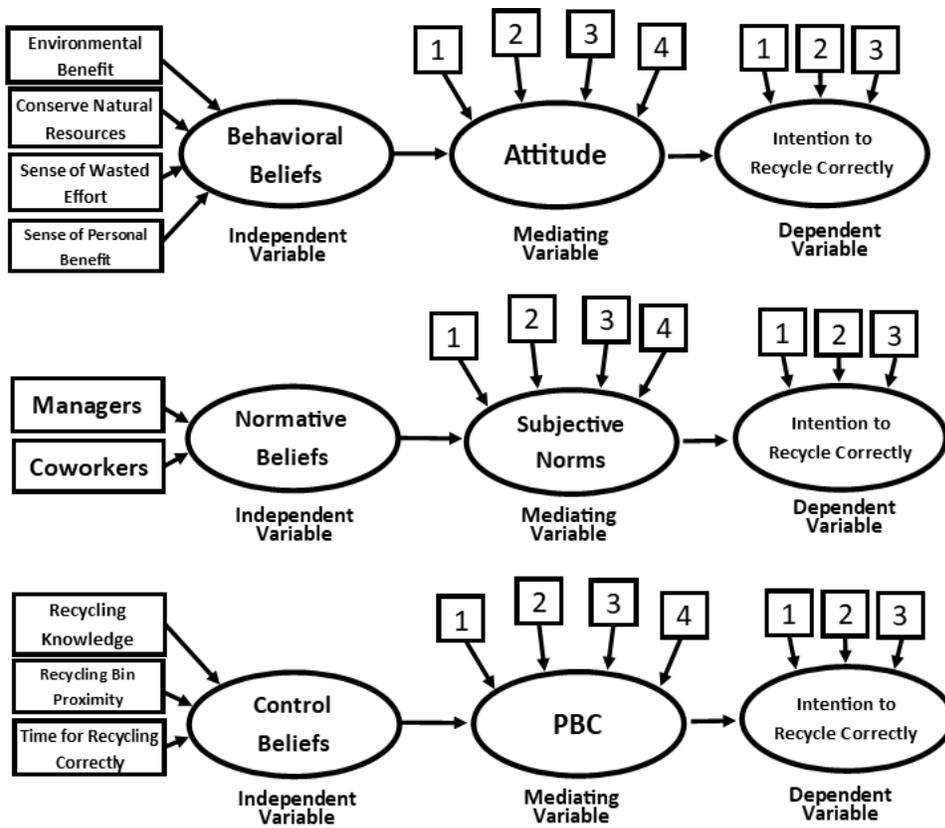
Study Hypotheses Related to Variables Under Analysis

| Hypothesis |
|--|
| H1A: Behavioral beliefs will have a direct effect on attitude (path a) |
| H1B: Attitude will have a direct effect on correct recycling intention (path b) |
| H1C: Behavioral beliefs will have a direct effect on correct recycling intention (path c') |
| H1D: Attitude will mediate the relationship between behavioral beliefs and correct recycling intention. |
| H2A: Normative beliefs will have a direct effect on subjective norms (path a) |
| H2B: Subjective Norms will have a direct effect on recycling intention (path b) |
| H2C: Normative beliefs will have a direct effect on correct recycling intention (path c') |
| H2D: Subjective Norms will mediate the relationship between normative beliefs and correct recycling intention. |
| H3A: Control beliefs will have a direct effect on Perceived Behavioral Control (path a) |
| H3B: Perceived Behavioral Control will have a direct effect on correct recycling intention (path b) |
| H3C: Control beliefs will have a direct effect on correct recycling intention (path c') |
| H3D: Perceived Behavioral Control will mediate the relationship between control beliefs and correct recycling intention. |

The second research question asks how much explained variance each determinant captures when predicting employee green behavioral intention. To answer this question, I tested each hypothesis using the SPSS extension PROCESS Macro version 3.5 (Hayes, 2018). Figure 16 shows the relationships between the study hypotheses, elicited beliefs, and the prevailing TPB constructs making up an employee's intention to recycle correctly.

Figure 16

Elicited Beliefs and Measurement Model



Note that during the initial data analysis, I found that control variables were not meaningfully impacting the data. Therefore, the control variables were removed from the final measurement model. The remaining sections in this chapter present information on participants' characteristics, survey data eligibility, assessment of complete model assumptions, and results from the statistical analysis exploring the influence of each determinant when predicting employee intentions to recycle correctly.

Characteristics of Survey Participants

Out of 119 surveys received, 105 surveys were usable for the study. Fourteen surveys were not used for the following reasons: six surveys were completed by persons outside the studied population, three surveys had incomplete responses, and five surveys were determined during data analysis to be extreme outliers. All participants who completed surveys used in the study were volunteers and employees at the studied municipality. The total sampled population was approximately 300 full-time employees. Characteristics of survey participants included 97 full-time and nine part-time public employees, with 60% of respondents falling within the banded age ranges of 35-44 and 55-64. Survey participant gender included 50 female, 49 male, one non-binary, with six respondents electing not to answer. Over 64% of survey participants had some college education or higher, and over 77% of respondents worked in an office environment 75% or more of the time. Lastly, the largest number of survey participants worked at city hall, and 52% of all respondents had been employed by the studied municipality for six years or more. Table 18 includes the demographic characteristics of survey participants.

Table 18

Demographic Characteristics of the Study Sample (n = 105)

| Personal Characteristics | Number | Percent | Work Characteristics | Number | Percent |
|--------------------------|----------|---------|---------------------------|--------|---------|
| Age | | | Employment | | |
| 18 - 34 | 20 | 18.9 | City employee (full-time) | 97 | 91.5 |
| 35 - 44 | 33 | 31.1 | City employee (part-time) | 9 | 8.5 |
| 45 - 54 | 14 | 13.2 | Workplace | | |
| 55 - 64 | 32 | 30.2 | City Hall | 47 | 44.3 |
| 65 - 74 | 2 | 1.9 | Police Department | 10 | 9.4 |
| Prefer not to say | 5 | 4.7 | Parks and Recreation | 25 | 23.6 |
| Gender | | | Public Works | 24 | 22.6 |
| Male | 49 (198) | 46.2 | Environment | | |
| Female | 50 (97) | 47.2 | 100% Office | 49 | 46.2 |
| Non-binary/third gender | 1 | 0.9 | 75% Office; 25%Field | 33 | 31.1 |
| Prefer not to say | 6 | 5.7 | 50% Office; 50% Field | 16 | 15.1 |

| Personal Characteristics | Number | Percent | Work Characteristics | Number | Percent |
|-------------------------------|--------|---------|-----------------------|--------|---------|
| Education | | | 75% Field; 25% Office | 6 | 5.7 |
| Less than high school | 1 | 0.9 | 100% Field Work | 2 | 1.9 |
| High school graduate | 8 | 7.5 | Work Length | | |
| Some college | 10 | 9.4 | Less than 1 year | 5 | 4.7 |
| 2-year degree | 20 | 18.9 | 1-2 years | 12 | 11.3 |
| 4-year degree | 37 | 34.9 | 2-4 years | 19 | 17.9 |
| Master or Professional degree | 26 | 24.5 | 4-6 years | 14 | 13.2 |
| Doctorate degree | 2 | 1.9 | 6 - 10 years | 15 | 14.2 |
| Prefer not to say | 2 | 1.9 | More than 10 years | 41 | 38.7 |

Note: Population demographic data of the studied organization indicated as bracketed (N).

Validity & Reliability of Survey Constructs and Items

The intention scale recorded lower internal consistency and consisted of 3 items ($\alpha = 0.658$). Internal consistency for the pre-model analysis attitude scale was insufficient with less than 0.60 Cronbach's alpha. Chan and Bishop (2013) suggested that moral norms can supplement a weak attitude scale. Moral norm was initially intended to be an additive variable to the core theory of planned behavior model for this research. Thus, the 3-item moral norm scale and the 4-item attitude scale were merged to create a 7-item attitude scale ($\alpha = 0.818$).

The subjective norms scale consisted of 4 items and had moderate internal consistency ($\alpha = 0.731$). Based on the results from a factor analysis of this scale, one item from the initial four items assessing perceived behavioral control (PBC) was deleted. The final PBC scale had three items and low internal consistency ($\alpha = 0.638$). Behavioral, normative, and control belief all recorded moderate levels of internal consistency and consisted of 8 items ($\alpha = 0.722$), 4 items ($\alpha = 0.807$), and 6 items ($\alpha = 0.707$), respectively. Table 19 presents Cronbach's alphas for each scale alongside descriptive statistics for each variable used in this research.

Table 19*Internal Reliability, Scoring, and Item Retainment for Scale Constructs (n=105)*

| Construct | No. of Items Retained (No. of Initial Items) | Mean Score* | Standard Deviation | Range | Minimum Individual Score | Maximum Individual Score | Cronbach's Alpha |
|--------------------|--|-------------|--------------------|-----------|--------------------------|--------------------------|------------------|
| Intention | 3 (3) | 4.85 | 0.30 | 1 to 5 | 3.67 | 5 | 0.658 |
| Attitude | 7 (4) | 4.71 | 0.41 | 1 to 5 | 3.14 | 5 | 0.818 |
| Subjective Norms | 4 (4) | 3.56 | 0.79 | 1 to 5 | 1.5 | 5 | 0.731 |
| PBC | 3 (4) | 3.61 | 0.86 | 1 to 5 | 1.33 | 5 | 0.638 |
| Behavioral Beliefs | 8 (8) | 30.37 | 8.17 | -40 to 40 | 1 | 40 | 0.722 |
| Normative Beliefs | 4 (4) | 4.25 | 6.68 | -20 to 20 | -10 | 20 | 0.807 |
| Control Beliefs | 6 (6) | 3.74 | 6.34 | -30 to 30 | -10 | 26 | 0.707 |

Note. Higher scores indicate stronger intentions, more positive attitudes, more favorable subjective norms, greater perceived behavioral control, and deeper held behavioral, normative, and control beliefs.

Descriptive Statistics Scale Variables

Higher scores represent a more favorable disposition towards performing the behavior of interest (i.e., recycling correctly at work). The scoring range for core TPB constructs was constructed based on a 1 to 5 Likert scale. Participants recorded a mean intention score of 4.85 with a standard deviation (SD) of 0.30. The mean attitude score was 4.71 (SD = 0.41), the mean score for social norms was 3.56 (SD = 0.79), and the mean score for perceived behavioral control was 3.61 (SD = 0.79). See Table 19 in the previous section for TPB belief construct scoring ranges based on a formula recommended by Francis et al. (2004). Mean scores for behavioral, normative, and control beliefs were 30.37 (SD = 8.17), 4.25 (SD = 6.68), and 3.74 (SD = 6.34), respectively.

Item-Wise Descriptive Statistics

Nearly all 105 employees who participated in this study reported positive responses to items measuring intention. For example, the intention statement, “I try to recycle correctly at work,” had a 100% positivity rate. Items capturing employee attitudes towards recycling correctly also recorded high rates of positive responses. Over 45% of respondents felt little to no social pressure to recycle correctly at work. A total of 51% of employees felt they could not control whether items were recycled correctly at work under the PBC construct. All respondents felt that reducing the amount of their workplace waste going to landfills was beneficial. A total of 52% of respondents were neutral when asked if their coworkers thought they should recycle correctly. Over 80% of respondents felt little to no confusion about the recyclability items. Descriptive statistics for individual items are reported in Table 20, along with the percentage of employees that reported a positive response (i.e., either *agree* or *strongly agree*), neutral response, and negative response (i.e., *disagree* or *strongly disagree*) for each Likert scale statement.

Table 20*Survey Statements and Descriptive Statistics by Construct*

| Construct | Statement | Median (SD) | Percent Positive | Percent Neutral | Percent Negative |
|------------------------------|--|-----------------|------------------|-----------------|------------------|
| Intention | I try to recycle correctly at work. | 5 (0.40) | 100.0 | 0.0 | 0.0 |
| | I want to recycle correctly at work. | 5 (0.35) | 98.1 | 1.9 | 0.0 |
| | I have every intention to recycle correctly at work. | 5 (0.39) | 99.1 | 0.9 | 0.0 |
| Attitude | Recycling correctly at work is: (worthwhile/not useful) | 5 (0.34) | 99.1 | 0.9 | 0.0 |
| | Recycling correctly at work is: (beneficial/harmful) | 5 (0.53) | 97.1 | 1.9 | 1.0 |
| | Recycling correctly at work is: (good/bad) | 5 (0.42) | 97.1 | 2.9 | 0.0 |
| | Recycling correctly at work is: (professional/unprofessional) | 5 (0.79) | 83.0 | 16.0 | 1.0 |
| | It would be wrong if I made no effort to recycle correctly at work. | 5 (0.53) | 96.2 | 3.8 | 0.0 |
| | I would feel guilty if I didn't try to recycle correctly at work. | 5 (0.69) | 92.4 | 5.7 | 1.9 |
| | I feel it is my moral responsibility to recycle correctly at work. | 5 (0.72) | 93.4 | 4.7 | 1.9 |
| Subjective Norm | At work, most people who are important to me think I should try to recycle correctly. | 3 (1.01) | 49.0 | 45.3 | 5.7 |
| | At work, most people want me to recycle correctly. | 4 (0.99) | 62.3 | 32.1 | 5.6 |
| | At work, I feel under social pressure to recycle correctly. | 3 (1.28) | 21.7 | 31.1 | 47.2 |
| | At work, most people whose opinions I value approve of me trying to recycle correctly. | 4 (0.93) | 68.0 | 31.1 | 0.9 |
| Perceived Behavioral Control | If I wanted to, I could recycle correctly at work. | 5 (0.90) | 87.7 | 5.7 | 6.6 |
| | I feel recycling correctly at work is: (very easy/very difficult) | 4 (1.21) | 61.3 | 13.2 | 25.5 |
| | At work, I cannot control whether items are recycled correctly. | 2 (1.24) | 34.9 | 13.3 | 51.8 |
| Behavioral Beliefs | If I recycle correctly at work, I will feel that I am doing something positive for the environment. (likely/unlikely) | 5 (0.65) | 94.3 | 3.8 | 1.9 |
| | *For me, doing something good for the environment is: | 2 (0.4) | 99.1 | 0.9 | 0 |
| | If I recycle correctly at work, I will reduce the amount of waste going to landfills and save natural resources. (likely/unlikely) | 5 (0.71) | 94.3 | 1.9 | 3.8 |
| | *Reducing my amount of workplace waste going to landfills is: | 2 (0.34) | 100 | 0 | 0 |
| | If I recycle correctly at work, I know the recyclables will not mix with the trash during its collection. | 3 (1.26) | 46.2 | 19.8 | 34 |

| Construct | Statement | Median (SD) | Percent Positive | Percent Neutral | Percent Negative |
|-------------------|--|-----------------|------------------|-----------------|------------------|
| Normative Beliefs | *Not mixing my trash and recyclables at work is: Recycling correctly at work personally benefits me. | 2 (0.53) | 21.7 | 1.9 | 0.9 |
| | *If there is a clear personal benefit, making time to do something voluntary at work is: | 4 (1.04) | 72.6 | 18.9 | 8.5 |
| | My coworkers think I should recycle correctly. | 0 (0.96) | 41.5 | 51.9 | 6.6 |
| | *What coworkers think I should do matters to me. (a lot/none) | 3 (1.27) | 30.2 | 31.2 | 37.7 |
| | Managers' care about me recycling correctly at work. (a lot/none) | 0 (1) | 44.3 | 47.2 | 8.5 |
| | *Managers' approval of my recycling habits is important to me. | 3 (1.47) | 38.7 | 22.6 | 35.9 |
| Control Beliefs | At work, how often are you confused about what is recyclable and what is not recyclable? (always/never) | 2 (0.84) | 7.6 | 11.2 | 81.2 |
| | *If I was confused about what items are recyclable, it would make it more difficult for me to recycle correctly. | 1 (0.97) | 82.1 | 10.4 | 7.5 |
| | How often are recycling bins located too far away? (always/never) | 1 (1.06) | 8.5 | 6.6 | 84.9 |
| | *If work recycling bins were located too far away, it would make it more difficult for me to recycle correctly. | 1 (1.39) | 62.3 | 9.4 | 28.3 |
| | At work, how often do you feel there is not enough time to recycle correctly? (always/never) | 1 (0.92) | 3.8 | 7.5 | 88.7 |
| | *If I was feeling pressed for time at work, it would make it more difficult for me to recycle items correctly. | 0 (1.36) | 42.5 | 15.1 | 42.5 |

Note: *Represent belief affirmation survey items.

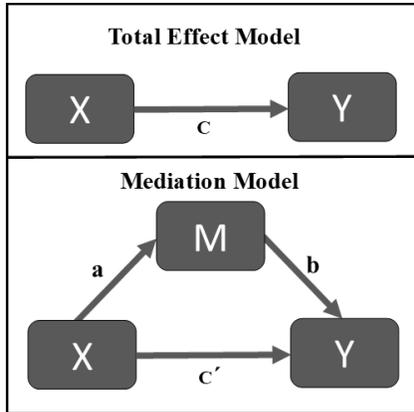
Data Eligibility

This study initially intended to use Structural Equation Modeling (SEM) for statistical analysis. However, SEM advises a minimum sample size of 200 to establish a trustworthy model fit (Preacher & Hayes, 2004). The sample size of 105 ultimately obtained for this study did not meet that qualification. For this reason, I shifted the data analysis method from SEM to three mediated multiple regression models using PROCESS (Hayes, 2018). Hayes et al. (2017) noted the differences between SEM and PROCESS results are “inconsequential” for observed variable models. I also tested one additional model that included all independent and mediator variables

based on hierarchical multiple regression (HMR). Figure 17 depicts the total effect and mediation model framework for this study.

Figure 17

Study Framework for Testing Mediation and Total Effects Models



Establishing mediation using PROCESS (Hayes, 2018) involved testing a series of paths (c, a, b, and c') between the independent variable (X), mediation variable (M), and the dependent variable (Y). First, path-c tests the total effect of the independent X and dependent Y variables. Next, path-a tests the direct effects between the independent X and mediating M variables, and path-b tests the direct effects between the mediating M and dependent Y variables. Lastly, path-c' established the direct coefficient effect between the X and Y variables while controlling for M. Figure 17 illustrates the path effects between variables.

The methodology by Hayes (2009) suggests adding the direct effect of path-c' to the total direct effect of path-a multiplied by path-b will equate to the total effects model of path-c'. Furthermore, the presence of an indirect effect, path-a, multiplied by path b, is sufficient for establishing mediation between the independent X and dependent Y variables (Zhao et al., 2010).

Researchers have also traditionally leveraged the zero-order (path c') to establish mediation, but this was found to be redundant and no longer necessary (Mascha et al., 2013).

Bootstrapping is another reason I elected to use PROCESS as the alternative analysis method. Bootstrapping is a statistical procedure for resampling datasets to generate large, replicated samples. In addition, the bootstrapping process helps correct normality issues in smaller datasets. Hayes (2009) recommends bootstrapping data 5,000 times or more when using PROCESS. The following subsections present an assessment of data eligibility for meeting the assumptions of mediated multiple regression: response validity, residual independence, linearity, homoscedasticity, multicollinearity, and significant outliers.

Response Validity

Green's (1991) formula for conducting regression analysis states, 50 plus the number of independent variables multiplied by eight is a sufficient sample size. The most extensive regression analysis in this study consisted of three independent variables (behavioral, normative, and control beliefs), as well as the three mediating variables (attitude, subjective norms, and PBC). Based on Green's (1991) formula, the minimum sample size for research is 98 cases. This study had 119 survey responses and retained 105 for statistical analysis.

Independence of Residual

The Durbin-Watson statistic was used to assess the correlation of residuals for each model to meet the first assumption of multiple regressions, which is the independence of residuals. According to Rajaretnam (2015), Durbin-Watson values should be close to 2 because it indicates only marginal serial correlation (p. 203). Thus, since all Durbin-Watson values were close to 2, residuals for the four analysis models were sufficiently independent and uncorrelated. Table 21 displays these results.

Table 21*Independence of Residuals*

| Model | Durbin-Watson Statistic |
|----------|-------------------------|
| H1 Model | 1.679 |
| H2 Model | 1.790 |
| H3 Model | 1.735 |
| CF Model | 1.765 |

Linearity

Visual inspection of scatterplots for each model was used to assess linearity. Establishing a linear relationship between the dependent and independent variables is demonstrated by residuals spanning the horizontal axis of the scatterplot (Rajaretnam, 2015). Thus, the linearity assumption for all models was met based on the visual inspection of scatterplots.

Homoscedasticity

Homoscedasticity is the third assumption of multiple regressions. Sufficient homoscedasticity is noted when there is a consistency in the residual error distribution across values of the independent variable (Rajaretnam, 2015). White and Breusch-Pagan tests of heteroskedasticity were used to evaluate homoscedasticity. Results are shown in Table 22. Since the data were found to be heteroskedastic, I decided to use heteroskedasticity consistent robust standard errors in PROCESS, when the regressions are related to the three hypotheses, to remedy this issue.

Table 22*Tests of Heteroskedasticity.*

| Test For Heteroskedasticity | Chi-Square | df | Sig. |
|-----------------------------|------------|----|------|
| White | 62.546 | 27 | .000 |
| Breusch-Pagan | 41.273 | 1 | .000 |

Multicollinearity

The fourth assumption of MLR is multicollinearity, which is the occurrence of highly correlated independent variables (Rajaretnam, 2015). Variance inflation factor (VIF) and tolerance values were used to assess multicollinearity within each model (see Table 23). Person correlation was also used to evaluate multicollinearity between the independent, control, and mediating variables (see Table 24). Violations of the multicollinearity assumption occur when the tolerance values are less than 0.1 and Pearson correlations are greater than 0.7 (Hair et al., 2014; Hayes, 2018; Rajaretnam, 2015). All tolerance values were greater than 0.1, and all Pearson correlation values were less than 0.7.

Table 23*Assessment of Multicollinearity Via VIF and Tolerance Ranges*

| Model | VIF Min | VIF Max | Tolerance Min | Tolerance Max |
|----------|---------|---------|---------------|---------------|
| H1 Model | 1.109 | 1.483 | 0.674 | 0.902 |
| H2 Model | 1.126 | 1.529 | 0.654 | 0.888 |
| H3 Model | 1.119 | 1.289 | .0776 | 0.894 |
| CF Model | 1.335 | 1.718 | 0.608 | 0.749 |

Table 24*Pearson Correlation Analysis*

| Variable | Intent | BB | ATT | SN | NB | PBC |
|----------|---------|--------|--------|--------|--------|---------|
| Intent | -- | | | | | |
| BB | .616** | -- | | | | |
| ATT | .463** | .571** | -- | | | |
| SN | .212* | .187* | .324** | -- | | |
| NB | .151 | .293** | .207* | .588** | -- | |
| PBC | .395** | .353** | .224* | .283** | .363** | -- |
| CB | -.272** | -.211* | -.039 | -.037 | -.079 | -.474** |

Note. Correlation is significant at * $p < .05$. ** $p < .01$. (1-tailed). N=105 ATT= Attitude, BB = Behavioral Beliefs, SN = Subjective Norms, NB = Normative Beliefs, PBC= Perceived Behavioral Control, CB = Control Beliefs.

Significant Outliers

Outlier-free data is the fifth assumption of multiple regressions (Leaerd Statistics, n.d.). Outliers for this research were determined based on residuals greater than or less than three standard deviations. Five outliers were initially identified and removed from the study before beginning the model analysis. Two of the outliers were found in the H1 model, one outlier in the H2 model, and two outliers in the H3 model during analysis. All five outliers were removed for data analysis.

Normality

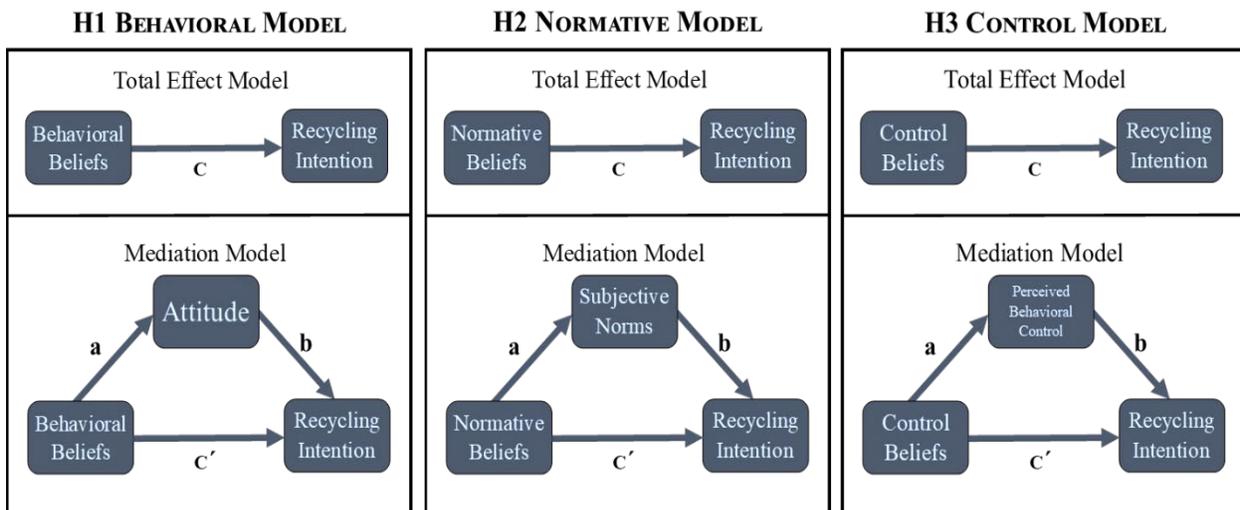
Normality is the even distribution of residuals and is the last assumption of multiple regressions. Inspection of P-P plots for each of the models was used to evaluate normality. All models tested were found to demonstrate sufficient residuals' distribution, thus not violating the normality assumption. In addition, I used bootstrapping at the rate of 5000 for all models, which also corrected for any unseen issues of normality.

Hypothesis Testing

Three mediated multiple regression models were tested using PROCESS (Hayes, 2018) add-on for SPSS. The three mediation models corresponded to the three theory of planned behavior (TPB) study hypotheses (see Figure 18). The total effects (path-c) were tested for all hypothesis models. The H1 Behavioral Model tested the direct effects between behavioral beliefs, attitude, and intention, then tested the indirect mediating effect of the attitude variable. The H2 Normative Model and H3 Control Model operated the same way. All three models were initially evaluated using gender and workplace location as controls; however, these controls were not significant and were removed from the analysis. Appendix M contains the PROCESS output tables from SPSS for each of the three models.

Figure 18

Models for Testing Study Hypothesis



H1 Behavioral Model

Multiple regression was run using PROCESS to determine the mediating effects of attitude on behavioral beliefs and intention. Heteroscedasticity-consistent standard errors and both normative and control belief variables were held constant in the model. See Table 25 for details on the regression model. The H1 Behavioral Model was statistically significant for the direct effects on attitude mediator variable [($p < .001$), with $R^2 = .3344$, $F(1, 103) = 8.8510$], for the direct effects on the dependent variable intention [$R^2 = .04251$, $F(1, 103) = 9.1007$], and for the total effect on the dependent variable intention [$R^2 = .4018$, $F(1, 103) = 12.5019$].

Table 25

H1 Behavioral Model PROCESS Results

| Variable | B | 95% CI for B | | SE (HC3) | β | R^2 | F(HC 3) |
|--|--------|--------------|--------|-------------|---------|-----------|---------|
| | | LL | UL | | | | |
| Direct Effect from Behavioral Beliefs to Attitude (path a) | | | | | | 0.3344*** | 8.8510 |
| Constant | 3.8106 | 3.3754 | 4.2459 | .2194 | | | |
| BB | .0288 | .0162 | .0414 | .0064 | .5757 | | |
| NB | .0027 | -.0053 | .0107 | .0040 | .0448 | | |
| CB | .0054 | -.0045 | .0153 | .0050 | .0858 | | |
| Direct Effects | | | | | | 0.4251*** | 9.1007 |
| Constant | 3.7866 | 2.8268 | 4.7463 | .4837 | | | |
| Direct Effect from Attitude to Intention (path b) | | | | | | | |
| ATT | .1273 | -.0800 | .3345 | .1045 | .1872 | | |
| Behavioral Beliefs to Intention (path c') | | | | | | | |
| BB | .0166 | .0078 | .0253 | .0044 | .4874 | | |
| NB | -.0018 | -.0067 | .0032 | .0025 | -.0436 | | |
| CB | -.0071 | -.0147 | .0006 | .0039 | -.1647 | | |
| Total Effect on Correct Recycling Intention (path c) | | | | | | .4018*** | 12.5019 |
| Constant | 4.2715 | 3.9682 | 4.5748 | .1529 | | | |
| BB | .0203 | .0114 | .0292 | .0045 | .5951 | | |
| NB | -.0014 | -.0063 | .0034 | .0025 | -.0352 | | |
| CB | -.0064 | -.0144 | .0017 | .0041 | -.1486 | | |
| Indirect Effect on Correct Recycling Intention | | | | | | | |
| ATT | .0037 | -.0011 | .0105 | .0030 | .1078 | | |

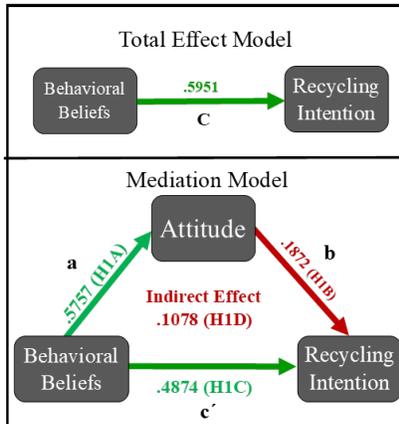
Note: N=105. * $p < .05$. ** $p < .01$. *** $p < .001$. BB = Behavioral Beliefs (IV), ATT= Attitude (M), Intention (DV), NB = Normative Beliefs (Control), CB = Control Beliefs (Control).

H1A states that behavioral beliefs will have a direct effect on attitude. And H1B states that attitudes will have a direct effect on correct recycling intention. The finding in Table 25 indicates behavioral beliefs directly affect attitudes [(B=.0288, LLCI=3.3754, ULCI=4.2459)], but the attitude was found not to directly affect correct recycling intention [(B=.1273, LLCI=-.0800, ULCI=.3345)]. Therefore, H1A is supported, and H1B is not supported.

H1C states that behavioral beliefs will have a direct effect on correct recycling intention. And H1D states that attitude will have an indirect effect on behavioral beliefs and correct recycling intention. There was a direct effect between behavioral beliefs and correct recycling intention [(B=.0166, LLCI=.0078, ULCI=.0253)], but no indirect effect was found between behavioral beliefs and correct recycling intention [(B=.0037, LLCI=-.0011, ULCI=.0105)]. Therefore, H1C was supported, and H1D was not supported. Overall, the H1 model found that attitudes did not mediate the relationship between behavioral beliefs and intention. Figure 19 shows the H1 Behavioral Model with supporting results shown in green and unsupported results in red.

Figure 19

H1 Behavioral Model Standardized Coefficients β



H2 Normative Model

I ran a second multiple regressions using PROCESS to determine the mediating effects of subjective norms on normative beliefs and intention. Again, the model used heteroscedasticity-consistent standard errors and held behavioral and control beliefs constant. See Table 26 for details on the regression model. The H2 Model was statistically significant for the direct effects on subjective norms mediator variable [($p < .001$), with $R^2 = .3463$, $F(1, 103) = 14.4171$], for the direct effects on the dependent variable intention [$R^2 = .4225$, $F(1, 103) = 9.4527$], and 5019 for the total effect on the dependent variable intention [$R^2 = .4018$, $F(1, 103) = 12$].

Table 26*H2 Normative Model PROCESS Results*

| Variable | B | 95% CI for B | | SE (HC3) | β | R ² | F(HC 3) |
|---|--------|--------------|--------|-------------|---------|----------------|---------|
| | | LL | UL | | | | |
| Direct Effect from Normative Beliefs to Subjective Norms (path a) | | | | | | .3463*** | 14.4171 |
| Constant | 3.2100 | 2.5142 | 3.9058 | .3507 | | | |
| NB | .0689 | .0465 | .0913 | .0113 | .5836 | | |
| BB | .0019 | -.0202 | .0239 | .0111 | .0189 | | |
| CB | .0016 | -.0274 | .0306 | .0146 | .0131 | | |
| Direct Effects | | | | | | .4225*** | 9.4527 |
| Constant | 4.0748 | 3.6601 | | .2090 | 4.0748 | | |
| Direct Effect from Subjective Norms to Intention (path b) | | | | | | | |
| SN | .0613 | -.0164 | .1389 | .0391 | .1778 | | |
| Normative Beliefs to Intention (path c') | | | | | | | |
| NB | -.0057 | -.0126 | .0013 | .0035 | -.1389 | | |
| BB | .0201 | .0113 | .0290 | .0045 | .5918 | | |
| CB | -.0065 | -.0141 | .0011 | .0038 | -.1510 | | |
| Total Effect on Correct Recycling Intention (path c) | | | | | | .4018*** | 12.5019 |
| Constant | 4.2715 | 3.9682 | 4.5748 | .1529 | | | |
| NB | -.0014 | -.0063 | .0034 | .0025 | -.0352 | | |
| BB | .0203 | .0114 | .0292 | .0045 | .5951 | | |
| CB | -.0064 | -.0144 | .0017 | .0041 | -.1486 | | |
| Indirect Effect on Correct Recycling Intention (a x b) | | | | | | | |
| SN | .0042 | -.0008 | .0097 | .0027 | .1037 | | |

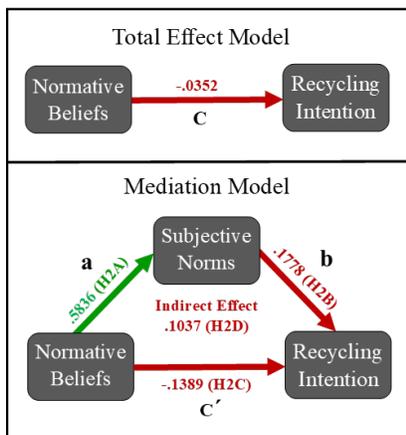
Note: N=105. *p<.05. **p<.01. ***p<.001. NB = Normative Beliefs (IV), SN = Subjective Norms(M), Intention (DV), BB = Behavioral Beliefs (Control), CB = Control Beliefs (Control).

H2A states that normative beliefs will have a direct effect on subjective norms. The finding in Table 26 indicates that normative beliefs directly affect subjective norms [(B=.0689, LLCI=.0465, ULCI=.0913)]. Therefore, H2A is supported. H2B states that subjective norms will have a direct effect on recycling intention. Moreover, H2C states that normative beliefs will have a direct effect on correct recycling intention. Neither subjective norms [(B=-.0014, LLCI=-.0063, ULCI=.0034)] nor normative beliefs [(B=-.0057, LLCI=-.0126, ULCI=.0013)] were found to have a direct effect on correct recycling intention. Therefore, both H2B and H2C were not

supported. Lastly, subjective norms had no indirect effect on the relationship between normative beliefs and correct recycling intention [(B=.0042, LLCI=-.0008, ULCI=.0097)]. Therefore, H2D was not supported. Figure 20 shows the H2 normative model relationship with supported results shown in green and unsupported results in red.

Figure 20

H2 Normative Model Standardized Coefficient β



H3 Control Model

A final multiple regression was run using PROCESS to determine the mediating effects of perceived behavioral control on control beliefs and intention. Heteroscedasticity-consistent standard errors were used, and behavioral and control beliefs were held constant. See Table 27 for details on the regression model. The H3 normative model was statistically significant for the direct effects on subjective norms mediator variable [($p < .001$), with $R^2 = .3612$, $F(1, 103) = 15.2476$], for the direct effects on the dependent variable intention [$R^2 = .4270$, $F(1, 103) = 9.0405$], and for the total effect on the dependent variable intention [$R^2 = .4018$, $F(1, 103) = 12.5019$].

Table 27*H3 Control Model PROCESS Results*

| Variable | B | 95% CI for B | | SE (HC3) | β | R ² | F(HC 3) |
|---|--------|--------------|--------|-------------|---------|----------------|---------|
| | | LL | UL | | | | |
| Direct Effect from Control Beliefs to Perceived Behavioral Control (path a) | | | | | | .3612*** | 15.2476 |
| Constant | 3.0653 | 2.4367 | 3.6938 | .3168 | | | |
| CB | -.0556 | -.0850 | -.0262 | .0148 | -.4127 | | |
| BB | .0198 | .0003 | .0393 | .0098 | .1850 | | |
| NB | .0354 | .0121 | .0586 | .0117 | .2765 | | |
| Direct Effects | | | | | | .4270*** | 9.0405 |
| Constant | 4.0780 | 3.7027 | 4.4533 | .1892 | | | |
| Direct Effect from Perceived Behavioral Control to Intention (path b) | | | | | | | |
| PBC | .0631 | .0006 | .1257 | .0315 | .1984 | | |
| Control Beliefs to Intention (path c') | | | | | | | |
| CB | -.0029 | -.0106 | .0049 | .0039 | -.0667 | | |
| BB | .0190 | .0102 | .0278 | .0044 | .5584 | | |
| NB | -.0037 | -.0089 | .0016 | .0026 | -.0900 | | |
| Total Effect on Correct Recycling Intention (path c) | | | | | | .4018*** | 12.5019 |
| Constant | 4.2715 | 3.9682 | 4.5748 | .1529 | | | |
| CB | -.0064 | -.0144 | .0017 | .0041 | -.1486 | | |
| BB | .0203 | .0114 | .0292 | .0045 | .5951 | | |
| NB | -.0014 | -.0063 | .0034 | .0025 | -.0352 | | |
| Indirect Effect on Correct Recycling Intention (a x b) | | | | | | | |
| PBC | -.0035 | -.0084 | -.0002 | .0021 | -.0819 | | |

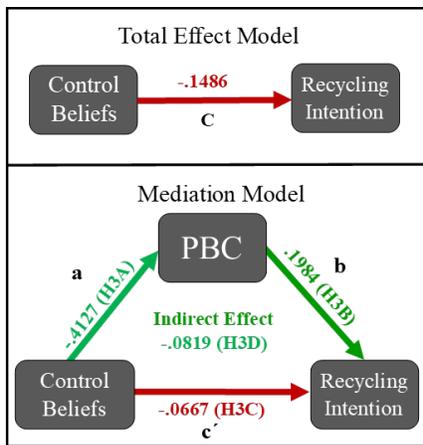
Note: N=105. *p<.05. **p<.01. ***p<.001. CB = Control Beliefs (IV), PBC = Perceived Behavioral Control (M), Intention (DV), BB = Behavioral Beliefs (Control), NB = Normative Beliefs (Control).

H3A states that control beliefs will have a direct effect on perceived behavioral control (PBC). The findings in Table 27 indicate that control beliefs directly affected PBC [(B=-.0556, LLCI=-.0850, ULCI=-.0262)]. Therefore, H3A is supported. H3B states PBC will directly affect correct recycling intention [(B=.0631, LLCI=.0006, ULCI=.1257)]. Thus, H3B was supported. H3C states that control beliefs will have a direct effect on correct recycling intention. However, the model did not directly affect control beliefs and correct recycling intentions [(B=-.0029, LLCI=-.0106, ULCI=.0049)]. Thus, H3C was not supported. Lastly, H3D states that PBC will indirectly affect the relationship between control beliefs and correct recycling intention. PBC

was found to indirectly affect the relationship between control beliefs and correct recycling intention [(B=-.0035, LLCI=-.0084, ULCI=-.0002)]. Therefore, H3D is supported. Overall, the H3 Model found that PBC mediated the relationship between control beliefs and intention. Figure 21 shows the H3 control model relationship with supported results in green and unsupported results in red.

Figure 21

H3 Control Model Standardized Coefficients β

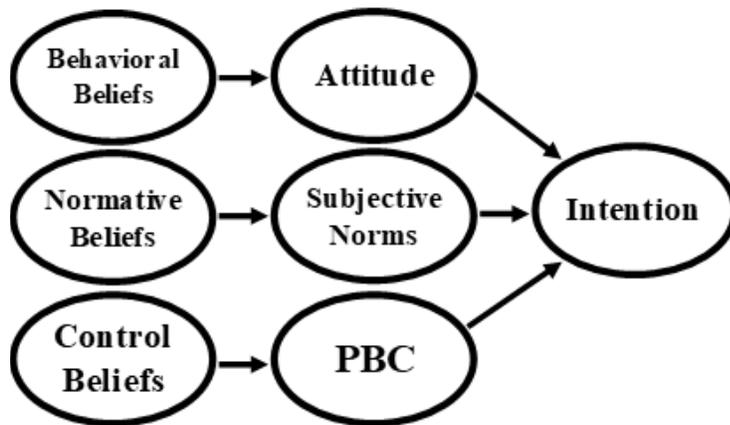


Conceptual Framework Model

The final model tested was based on the conceptual framework used for this study, which mirrors Ajzen's (1991) theory of planned behavior (see Figure 22). Based on the conceptual framework (CF) model, I used hierarchical multiple regression to test how the independent variables interact in the same model. While the CF model was not formally hypothesized in the study, I decided during data analysis that testing all TPB constructs together may yield more significant insights about how each variable behaves in the presence of one another.

Figure 22

Conceptual Framework (CF) Model Testing All Study Variables



The sequence of analysis for the addition of variables into the CF model is as follows: behavioral beliefs (1) and its mediator, attitude (2); normative beliefs (3) and its mediator, subjective norms (4); control beliefs (5) and its mediator, perceived behavioral control (6).

Table 28 presents the detailed analysis for the CF model. Statistical significance for this model was established at p-values less than .01. The behavioral belief [($R^2 = .380$, $F(1, 103) = 63.063$, $p = .000$; adjusted $R^2 = .374$)], and the attitudes variable [($R^2 = .398$, $F(1, 102) = 3.105$, $p = .081$; adjusted $R^2 = .386$)] were statistically significant. Normative beliefs [($R^2 = .400$, $F(1, 101) = .241$, $p = .625$; adjusted $R^2 = .382$)] and subjective norms [($R^2 = .411$, $F(1, 100) = 1.903$, $p = .171$; adjusted $R^2 = .387$)] were not statistically significant. Lastly, control beliefs [($R^2 = .436$, $F(1, 99) = 4.411$, $p = .038$; adjusted $R^2 = .407$)] and perceived behavioral control model [($R^2 = .455$, $F(1, 98) = 3.497$, $p = .064$; adjusted $R^2 = .422$)] were found to be statistically significant.

Table 28*Conceptual Framework Model Hierarchical Multiple Regression Results*

| Model | TPB | R | R ² | Adjusted R ² | Standard Error of Estimate | R ² Change | F Change | df1 | df2 | Sig. F Change |
|-------|-----|------|----------------|-------------------------|----------------------------|-----------------------|----------|-----|-----|---------------|
| 1 | BB | .616 | .380 | .374 | .21574 | .380 | 63.063 | 1 | 103 | .000*** |
| 2 | ATT | .631 | .398 | .386 | .21357 | .018 | 3.105 | 1 | 102 | .081* |
| 3 | NB | .632 | .400 | .382 | .21437 | .001 | .241 | 1 | 101 | .625 |
| 4 | SN | .641 | .411 | .387 | .21341 | .011 | 1.903 | 1 | 100 | .171 |
| 5 | CB | .660 | .436 | .407 | .20987 | .025 | 4.411 | 1 | 99 | .038** |
| 6 | PBC | .675 | .455 | .422 | .20727 | .019 | 3.497 | 1 | 98 | .064* |

Note: N=105. *p<.10. **p<.05. ***p<.01. BB = Behavioral Beliefs (IV), ATT = Attitude (M), NB = Normative Beliefs (IV), SN= Subjective Norms (M), CB = Control Beliefs (IV), PBC = Perceived Behavioral Control (M).

The CF model coefficients and changing variable significance levels are presented in Table 29. Behavioral belief is significant throughout the entire model (Step 6 B=.016, β =.47, p<.01). Attitude is most significant (B=.112, β =.165, p<.10) with just behavioral belief present. Normative beliefs and subjective norms are not significant at any stage of the CF Model. While control beliefs were significant (B=-.007, β =-.163, p<.05) at first, they became insignificant when perceived behavioral control (B=.056, β =.176, p<.10) was introduced into the model.

Table 29*CF Model Coefficients and Significance*

| Variable | B | 95% CI for B | | SE B | t | β | F Change | R ² | ΔR^2 |
|----------|-------|--------------|-------|------|--------|---------|----------|----------------|--------------|
| | | LL | UL | | | | | | |
| Step 1: | | | | | | | 63.063 | .380*** | .380*** |
| Constant | 4.220 | 4.054 | 4.385 | .083 | 50.622 | | | | |
| BB | .021 | .016 | .026 | .003 | 7.941 | .616*** | | | |
| Step 2: | | | | | | | 3.105 | .398* | 14.665 |
| Constant | 3.788 | 3.276 | 4.301 | .258 | 14.665 | | | | |

| Variable | B | 95% CI for B | | SE B | t | β | F Change | R ² | ΔR^2 |
|----------|---------|--------------|-------|------|--------|---------|----------|----------------|--------------|
| | | LL | UL | | | | | | |
| BB | .018*** | .011 | .024 | .003 | 5.582 | .522*** | | | |
| ATT | .112* | -.014 | .238 | .064 | 1.762 | .165* | | | |
| Step 3: | | | | | | | .241 | .400 | 5.534 |
| Constant | 3.777 | 3.261 | 4.294 | .260 | 14.510 | | | | |
| BB | .018*** | .012 | .025 | .003 | 5.534 | .532*** | | | |
| ATT | .114* | -.013 | .240 | .064 | 1.778 | .167* | | | |
| NB | -.002 | -.008 | .005 | .003 | -.491 | -.040 | | | |
| Step 4: | | | | | | | 1.903 | .411 | 1.303 |
| Constant | 3.729 | 3.210 | 4.248 | .262 | 14.258 | | | | |
| BB | .019*** | .012 | .025 | .003 | 5.702 | .552*** | | | |
| ATT | .087 | -.045 | .219 | .067 | 1.303 | .128 | | | |
| NB | -.005 | -.013 | .003 | .004 | -1.198 | -.118 | | | |
| SN | .047 | -.021 | .115 | .034 | 1.380 | .137 | | | |
| Step 5: | | | | | | | 4.411 | .436** | .025** |
| Constant | 3.739 | 3.229 | 4.249 | .257 | 14.536 | | | | |
| BB | .017*** | .011 | .024 | .003 | 5.195 | .507*** | | | |
| ATT | .101 | -.030 | .231 | .066 | 1.533 | .148 | | | |
| NB | -.005 | -.013 | .003 | .004 | -1.240 | -.120 | | | |
| SN | .046 | -.021 | .113 | .034 | 1.372 | .134 | | | |
| CB | -.007** | -.014 | .000 | .003 | -2.100 | -.163** | | | |
| Step 6: | | | | | | | 3.497 | .455* | .019* |
| Constant | 3.604 | 3.080 | 4.128 | .264 | 13.650 | | | | |
| BB | .016*** | .010 | .023 | .003 | 4.908 | .479*** | | | |
| ATT | .096 | -.033 | .225 | .065 | 1.479 | .141 | | | |
| NB | -.006 | -.014 | .001 | .004 | -1.621 | -.158 | | | |
| SN | .040 | -.026 | .107 | .033 | 1.208 | .117 | | | |
| CB | -.004 | -.011 | .003 | .004 | -1.043 | -.090 | | | |
| PBC | .056* | -.003 | .115 | .030 | 1.870 | .176* | | | |

Note: $n=202$. * $p<.10$. ** $p<.05$. *** $p<.01$.

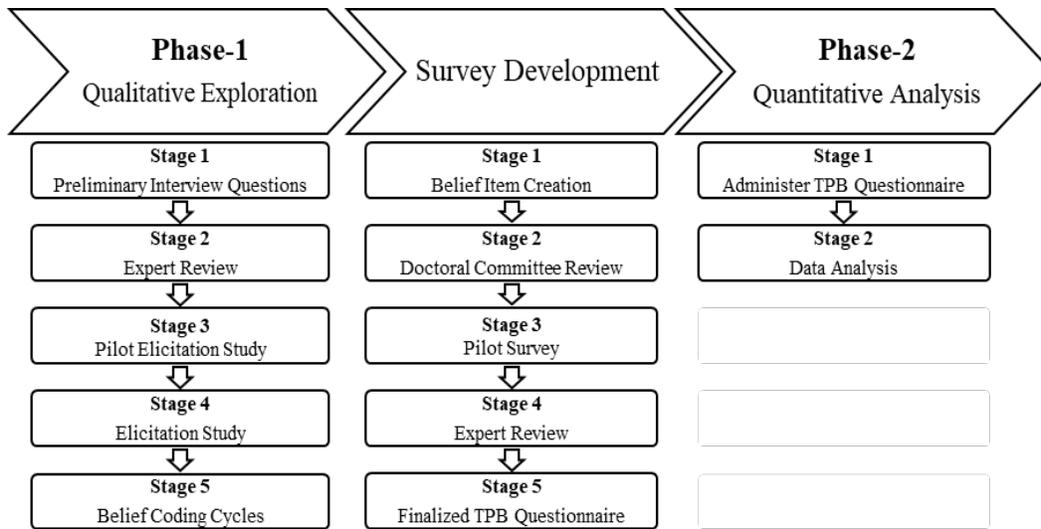
Summary

This mixed-methods study examined the link between the independent variables of behavioral, normative, and control beliefs, in addition to the mediating effects of attitude, social norms, and the perceived behavioral control on the dependent variable of correct recycling

intention. This research aimed to systematically identify and evaluate the determinants influencing employees' intention to recycle correctly. Data collection and analysis were completed during each of the two phases of this research. Figure 23 presents the major stages of each phase of research for this study.

Figure 23

Key Phases and Stages for Study



Phase 1 included an elicitation study followed by the development of a cross-sectional survey to identify and then operationalize employee beliefs thought to be influencing correct recycling behavior. During the elicitation study, I conducted 22 semi-structured interviews that resulted in the preliminary detection of 32 employee beliefs. Nine of the 32 employee beliefs were retained for item creation and then refined throughout five survey development stages. In Phase 2, I administered the survey and then performed a quantitative assessment to test whether significant relationships existed between the nine elicited beliefs, the prevailing mediating TPB

constructs for each belief, and the municipal employees' intention to engage in correct recycling behavior.

Due to an insufficient sample for SEM, three mediated multiple regression models were tested using Hayes' (2018) PROCESS as the alternative method of analysis for this study. In addition, data eligibility testing was performed to ensure the data were suitable for further analysis. All PROCESS models used heteroscedasticity-consistent standard errors and held constant the non-targeted TPB belief constructs.

Employee behavioral beliefs were found to be the most influential factor in employee intentions to recycle correctly. In contrast, the attitude variable was not found to directly impact intentions or indirectly affect the relationship between behavioral beliefs and correct recycling intention. Therefore, attitude was not supported as a mediator variable. In addition, normative beliefs and subjective norms had no direct effect on intention. Lastly, control beliefs had a direct effect on PBC and intention. PBC did not directly impact intention but indirectly affected the relationship between control beliefs and intention. Therefore, PBC was supported as a mediator variable in the H3 Model. Table 30 presents the summary of findings for this study.

Table 30

Summary of Findings

| Hypothesis | Model | Findings |
|---|-------|---------------|
| H1A: Behavioral beliefs will have a direct effect on attitude | H1 | Supported |
| H1B: Attitude will have a direct effect on correct recycling intention | H1 | Not Supported |
| H1C: Behavioral beliefs will have a direct effect on correct recycling intention | H1 | Supported |
| H1D Attitude will mediate the relationship between behavioral beliefs and correct recycling intention. | H1 | Not Supported |
| H2A: Normative beliefs will have a direct effect on subjective norms | H2 | Supported |
| H2B: Subjective Norms will have a direct effect on recycling intention | H2 | Not Supported |

| Hypothesis | Model | Findings |
|--|-------|---------------|
| H2C: Normative beliefs will have a direct effect on correct recycling intention | H2 | Not Supported |
| H2D : Subjective Norms will mediate the relationship between normative beliefs and correct recycling intention | H2 | Not Supported |
| H3A: Control beliefs will have a direct effect on Perceived Behavioral Control | H3 | Supported |
| H3B: Perceived Behavioral Control will have a direct effect on correct recycling intention | H3 | Supported |
| H3C: Control beliefs will have a direct effect on correct recycling intention | H3 | Not Supported |
| H3D : Perceived Behavioral Control will mediate the relationship between control beliefs and correct recycling intention. | H3 | Supported |

Note: Bolded text shows the meditation hypothesis.

A hierarchical multiple regression using a stepwise sequence for testing all variables simultaneously was the final data analysis conducted. Behavioral beliefs were highly significant throughout the conceptual framework (CF) model (See Table 31). Both the attitudes and control beliefs variables were significant at first but became insignificant when in the presence of other model variables. The normative beliefs and subjective norms variables were not significant at any time. Finally, the PBC was found to significantly relate to correct recycling intention at the p-value .01 level. Figure 23 presents the significant standardized coefficients for the final CF model.

Table 31

CF Model Coefficients and Significance with All Variables

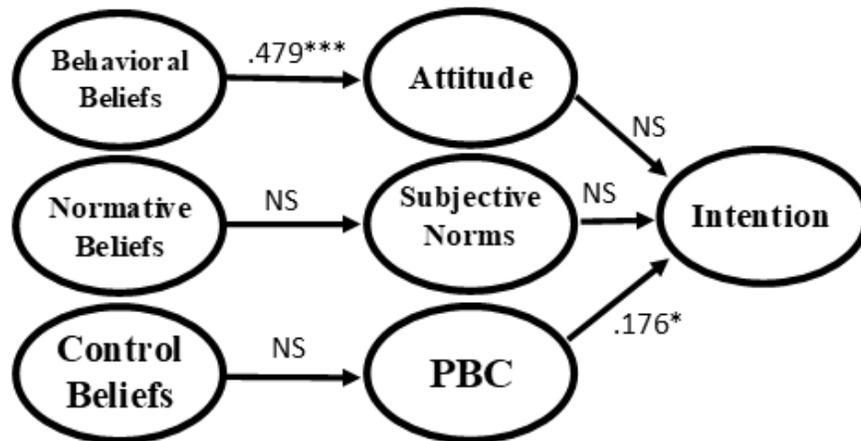
| Variable | B | 95% CI for B | | SE B | t | β | F Change | R ² | ΔR^2 |
|----------|---------|--------------|-------|------|--------|---------|----------|----------------|--------------|
| | | LL | UL | | | | | | |
| Step 6: | | | | | | | 3.497 | .455* | .019* |
| Constant | 3.604 | 3.080 | 4.128 | .264 | 13.650 | | | | |
| BB | .016*** | .010 | .023 | .003 | 4.908 | .479*** | | | |
| ATT | .096 | -.033 | .225 | .065 | 1.479 | .141 | | | |
| NB | -.006 | -.014 | .001 | .004 | -1.621 | -.158 | | | |

| Variable | B | 95% CI for B | | SE B | t | β | F Change | R ² | ΔR^2 |
|----------|-------|--------------|------|------|--------|---------|----------|----------------|--------------|
| | | LL | UL | | | | | | |
| SN | .040 | -.026 | .107 | .033 | 1.208 | .117 | | | |
| CB | -.004 | -.011 | .003 | .004 | -1.043 | -.090 | | | |
| PBC | .056* | -.003 | .115 | .030 | 1.870 | .176* | | | |

Note: n=202. *p<.10. **p<.05. ***p<.01.

Figure 24

HMR Step 6 CF Model Results



Note: NS= Not Significant, *p<.10. ***p<.001.

The findings from both Phase 1 and Phase 2 highlight the dynamic relationship between determinants of voluntary pro-environmental behavior and employee behavioral intentions. Chapter 5 offers further discussion on the theoretical and practical implications of these findings. In addition, the limitations of each research phase are reviewed to help inform the proposal of a novel research framework for future investigation of voluntary green workplace behaviors.

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CHAPTER 5 DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

This study systematically identified and evaluated the determinants influencing employees' intentions to engage in organizational citizenship behavior for the environment (OCBE). Done voluntarily, OCBE is not part of employees' formal job responsibilities but benefits both the organization and the environment. Employee intention to recycle correctly at work was the studied OCBE behavior of interest for this research. I focused on investigating correct recycling intention rather than correct recycling behavior because obtaining data for assessing proper recycling behaviors at an individual level is challenging. Furthermore, I concentrated this research on employee intention to recycle “correctly” rather than recycling “as much as possible” because contamination is a major global problem in waste management (Geyer et al., 2017).

I applied tenets from the theory of planned behavior (TPB) (Ajzen 1991, 2002, 2012b, 2020) and conducted an elicitation study that uncovered commonly held beliefs of employees about workplace recycling. The TPB suggests that employee attitude, subjective norms, and perceived behavioral control mediate the relationship between salient beliefs and intention. Therefore, I tested three mediated multiple regression models using PROCESS (Hayes, 2018).

The Phase 1 qualitative analysis of employee beliefs unearthed several themes that could be prioritized to increase the success of recycling behavior change initiatives. The Phase 2 quantitative findings highlighted how employee correct recycling intention is highly nuanced by behavioral beliefs. In this chapter, I discuss the study results, research limitations, and implications for practice and policy. I end the chapter with a discussion of future research.

Phase 1 Qualitative Discussion

The first research question (R1) addressed the salient beliefs influencing public employees' intentions to recycle correctly. Beliefs are a “cognitive component of an attitude” and denote what an individual believes to be true regarding the performance of a given behavior (Rust & Golombok, 2021, p.18). Higgins (1996) described salient beliefs as limited to one's “readily accessible” feelings about a given behavior (p. 10). This is true even though subconsciously, people can hold many different beliefs about a particular behavior (Miller, 1956). Salient beliefs are the foremost thoughts respondents express when asked open-ended questions (Sutton et al., 2003). The theory of planned behaviors (TPB) posits that a person's salient beliefs most influence an individual's behavioral performance (Ajzen, 1991).

Salient beliefs are important because they can explain why employees perform a given green workplace behavior. However, the literature on voluntary recycling behaviors tends to use TPB quantitatively to account for the variance in intention (Largo-Wight et al., 2012). Although there are research contexts for which solely quantitative TPB methodologies are appropriate (Francis et al., 2004), these studies can only speculate why this variance in intentions exists (Ajzen, 2015). Furthermore, because there is a general lack of research on employees' green behaviors (Yuriev, Boiral, & Guillaumie, 2020), there are even fewer TPB-based studies exploring the salient beliefs of green workplace behaviors (Yuriev, Boiral, & Guillaumie). As a result, there is minimal research conducting qualitative explorations to identify the salient beliefs influencing employee recycling behaviors.

The one notable exception is Greaves et al. (2013) study that used TPB to explore employee generalized recycling intention. While Greaves et al.'s study emphasized “generalized”

and not “correct” recycling intentions, their findings from the TPB elicitation phase provided the most comparable results from the available literature.

Greaves et al. (2013) identified several salient beliefs similar to the beliefs elicited during Phase 1 of this research study. Greaves et al. reported four behavioral beliefs: (a) reduce the use of natural resources, (b) increase reuses, (c) reduce landfills, and (d) think about natural resources. Greaves et al. also elicited two salient normative beliefs: (a) key stakeholders and (b) colleagues. Lastly, they reported three control beliefs (a) lack of recycling facilities, (b) time taken to separate waste, and (c) time taken to visit bins. Thus, Greaves et al. reported a total of nine beliefs.

In my study, I uncovered 32 different beliefs about correct recycling behavior during the elicitation phase. Nine of these initial beliefs were ultimately acknowledged as salient and considered the prevailing determinants influencing employee correct recycling intention and actions within the target population. Each belief fell under the behavioral, normative, or control TPB belief constructs. Table 32 provides an operational description alongside the elicited beliefs appropriate for comparison from Greaves et al. (2013).

Table 32

Comparison of Phase 1 Elicited Beliefs and Greaves et al.’s Findings

| TPB Construct | Elicited Belief (Unique Mentions) | Description | Greaves et al. (2013) Beliefs |
|---------------|-----------------------------------|---|-------------------------------|
| Behavioral | Sense of Wasted Effort (43) | The notion that employee efforts to recycle correctly at work are not meaningful because recyclables will ultimately end up in landfills. | |
| | Sense of Personal Benefit (38) | Recycling correctly at work gives the individual a sense of professional responsibility and doing what is morally right. | |

| TPB Construct | Elicited Belief (Unique Mentions) | Description | Greaves et al. (2013) Beliefs |
|---------------|-----------------------------------|---|--|
| | Conserve Natural Resources (31) | Recycling waste correctly at work will save and conserve natural resources for future generations. | “Reduce the use of natural resources.” |
| | Environmental Benefit (25) | Recycling waste correctly at work will protect and conserve the existing environment. | |
| Normative | Coworkers (41) | A sense that coworkers disapprove of individuals who make no effort to recycle correctly while at work. | “Colleagues” |
| | Managers (26) | A sense that managers approve off employee extra efforts to sort and recycle items properly while at work. | |
| Control | Recycling Bin Proximity (56) | Employee perception that the location and proximity of recycling bins affect the ability to recycle correctly. | “Lack of recycling facilities” |
| | Recycling Knowledge (47) | The perception that knowing what waste items can be recycled will affect the ability to recycle correctly. | |
| | Recycling Correctly Time (47) | Employee perception that the time it takes to travel to bins, separate waste, and verify item recyclability affects their ability to recycle correctly. | |

Behavioral beliefs refer to what people anticipate the outcome will be when they perform a given behavior (Ajzen, 1991). Most respondents in Phase 1 of this study reported positive behavioral beliefs toward recycling correctly. For example, several volunteers expressed that they protected the environment by recycling correctly while at work. The salient behavioral beliefs identified in this study were: (a) sense of wasted effort, (b) sense of personal benefit, (c) conservation of natural resources, and (d) environmental benefit.

The “conservation of natural resources” salient belief was the lone behavioral belief found in both this study and Greaves et al. (2013). Since the behavior of interest focuses on correctness, it was surprising that more respondents did not express that by recycling correctly, their actions will directly reduce waste entering landfills. By contrast, the emergence of the

“sense of wasted effort” belief could have stemmed from interview questions focusing on correct recycling intention rather than the generalized intention to recycle as much as possible. For example, the goal of correct recycling is the accurate and proper sorting of recyclable materials to avoid waste contamination. In contrast, the goal of recycling as much as possible is to maximize the total amount of waste materials recycled. Thus, the subtle difference in behavioral intention and the wording of elicitation questions may have generated different salient beliefs.

Furthermore, it is conceivable that employee behavioral beliefs about correct recycling behavior may change between contexts within the studied organization. For instance, in areas where waste contamination is a known issue, employees may feel recycling correctly is not worth the added effort because they believe their sorted recyclables will ultimately end up in landfills regardless of their recycling behaviors. On the other hand, employees working in lower waste contamination areas may feel more strongly that correct recycling protects the environment because they do not hold concerns about waste contamination.

Coworkers and managers were the two normative belief groups identified as normative beliefs for this study. Respondents said they felt a sense of peer pressure to recycle because coworkers disapproved of individuals who make no effort to recycle correctly while at work. Not surprisingly, Greaves et al. (2013) also found colleagues to be a prominent referent group.

Lastly, respondents from the elicitation study most often mentioned three control beliefs: (a) recycling bin proximity, (b) recycling knowledge, and (c) recycling correctly time. Control beliefs refer to how confident people are at doing the behavior and how much overall power they have to perform it (Ajzen 1991). For instance, employees with inadequate recycling knowledge may feel less confident at performing the behavior, whereas employees with more robust recycling knowledge may feel more confident they are correctly performing the behavior.

Nevertheless, when there are no recycling bins available, employees cannot perform the behavior no matter how confident they are in their ability to recycle correctly.

The control beliefs “recycling bin proximity” and “recycling correctly time” in this study are comparable to the three control beliefs reported by Greaves et al. (2013). Thus, these findings suggest that employees within the studied organization may have limited access to recycling bins or lack the necessary recycling knowledge to perform the behavior. These findings are also noteworthy because successful behavioral change initiatives rely on the target population having access to the necessary resources to perform the behavior and behavioral activation barriers being removed (Ajzen, n.d.-a). Therefore, the development of correct recycling initiatives within the studied organization should prioritize and address the three salient control beliefs identified in this study.

Overall, the Phase 1 elicitation study finding suggests a strong manifestation of positive behavioral beliefs towards recycling correctly. The one exception is the “sense of wasted effort” belief which appears to stem from individuals who rightly believe waste contamination causes recyclables to end up in landfills. Also, feelings of peer pressure from coworkers were the primary referent group identified for normative beliefs. Finally, control beliefs were the most elicited belief throughout the entire elicitation study. In addition, the control belief identified in this study aligned with several control beliefs identified by Greaves et al. (2013). This finding suggests that control beliefs may have emerged due to organizational barriers and that organizational barriers may be generalizable across different populations.

Phase 2 Quantitative Discussion

The second research question (R2) examined how much explained variance each determinant captured when predicting employee correct recycling intention. Thus, Phase 2 tested

and evaluated the predictive ability of TPB determinants on intention within the population of interest. The end goal of the research phase was to isolate the most impactful determinants leading to correct recycling intention to inform future behavior change initiatives within the studied municipality.

Behavioral beliefs were the most influential determinants explaining 38% of the model variance in employee intention to recycle correctly. In addition, behavioral beliefs had a significant total effect on intentions [(B=.0203, LLCI=.0114, ULCI=0.0292)]. This finding is similar to the behavioral belief direct effect on recycling intention [(B=0.01, LLCI=.01, ULCI=0.02)] in Greaves et al. (2013).

The CF model accounted for 46% of the variance in behavioral intentions toward recycling correctly at work. This finding is also comparable to prior research by Greaves et al. (2013) that found TPB constructs accounted for 53% of the variance in employee intention to recycle as much waste as possible. Furthermore, findings from this research phase indicated that the TPB construct, perceived behavioral control, mediated the relationship between salient beliefs and intention. This suggests control beliefs were influencing employee perceptions about their ability to recycle correctly at work.

Behavioral and control beliefs were significant predictors for correct recycling intentions in this context, while normative beliefs were not. Ajzen (1991) warned that the relative importance of the TPB constructs could change from one population to another. Nonetheless, it is possible that this finding could be explained by differences in the perceived social pressures of employees from different workplace locations (i.e., City Hall, Public Works, Police Department, and Parks Department). These contextual differences may have led to discrepancies in

employees' expectations of important referent groups and their motivation to comply with social pressures regarding correct recycling behaviors.

Furthermore, attitudes towards the behavior and subjective norm were not found to mediate the relationship between belief and intention in this study. However, despite having no mediating relationship, the TPB constructs, attitude and behavioral beliefs, together with the CF model, were significant ($p < .10$). Ajzen (1991) theorized that significant changes in beliefs should produce small changes in each prevailing TPB construct and even more minor changes in behavioral intention. Nevertheless, the relationship between behavioral beliefs and attitudes does not appear to match the additive premise of Ajzen's TPB theoretical framework.

The stepwise introduction of studied variables within the CF model offers interesting insights into the underlying dynamics regarding the emergence of determinants. Again, the sequence of analysis for the CF model was:

- behavioral beliefs (1) and its mediator, attitude (2);
- normative beliefs (3) and its mediator, subjective norms (4); and
- control beliefs (5) and its mediator, perceived behavioral control (6).

The behavioral belief variable stayed highly significant throughout each step of the CF Model.

Holding behavior beliefs constant, the introduction of attitudes into the CF model was significant ($p < .10$) during step two. Yet, the overall model change was small [$F(1,104) = 3.015$], accounting for little additional explained variance ($R^2 = .018$) when attitudes were added to the model. This suggests public employee behavioral beliefs dominated the relationship on correct recycling behavior when in the presence of the attitude variable.

Furthermore, the attitude variable became insignificant when normative beliefs and subjective norms were added into the CF model during steps three and four, respectively.

Simultaneously, the standardized coefficient for behavioral beliefs ($B=.552$) increased to the strongest point, although explained variance increases nominally ($R^2=.031$) during steps three and four in the CF Model. These findings indicate that the addition of normative beliefs and subjective norms impacted the attitudes variable but did not influence the strength of the behavioral beliefs variable.

Lastly, control beliefs and perceived behavior control variables were added to the CF model during steps five and six. Control beliefs were significant ($p<.05$) during step 5 but became insignificant when perceived behavior control was added to the model during step six. Moreover, the total explained variance for the CF Model rose to the highest point ($R^2=.455$), and perceived behavior control was significant at step six. These findings imply that control beliefs were impacted by the perceived behavior control variable, which suggests public employees' perception of self-efficacy towards control factors such as recycling knowledge and bin location served as barriers to correct recycling behavior.

Post Study Data Analysis

This study found that behavioral beliefs and attitudes explained 87% of the total model variance in public employee intention toward performing correct recycling behaviors at work. I tested a post-study mediation model with attitudes as the independent variable and behavioral beliefs as the mediator variable to further explore the relationship between behavioral beliefs, attitudes, and correct recycling intention. The post-study model represented the flipped version of the H1 behavioral belief model, with the H1 independent variable (behavioral beliefs) swapping places with the H1 mediator variable (attitude). In alignment with the H1, H2, and H3 models, this post-study model used heteroscedasticity-consistent standard errors and the same

5,000 bootstrapping protocol. Likewise, PROCESS (Hayes, 2018) add-on for SPSS was used while holding normative and control beliefs constant.

The post-study model was statistically significant [($p < .001$), with $R^2 = .3888$, $F(1, 103) = 17.5324$] for the direct effects from attitude to the behavioral beliefs mediator variable [$R^2 = .04251$, $F(1, 103) = 9.1007$] for the direct effects on both the dependent and mediator variables on intention, and lastly [$R^2 = .2800$, $F(1, 103) = 8.0522$] for the total effect on the dependent variable correct recycling intention.

Table 33

Post-study Mediation Model PROCESS Results

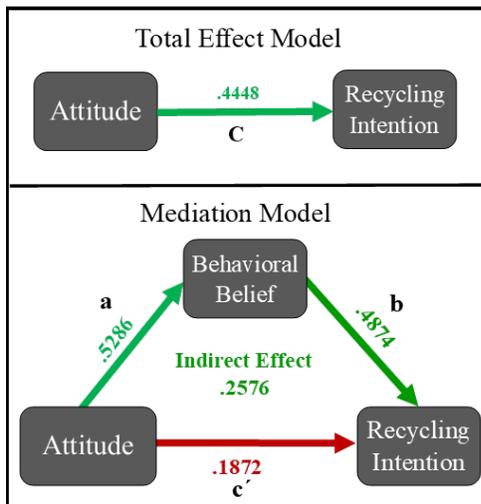
| Variable | B | 95% CI for B | | SE (HC3) | β | R^2 | F(HC 3) |
|---|---------|--------------|---------|----------|---------|-----------|---------|
| | | LL | UL | | | | |
| Direct Effect from Attitude to Behavioral Beliefs (path a) | | | | | | .3888 *** | 17.5324 |
| Constant | -19.366 | -37.805 | -.9269 | 9.2953 | | | |
| ATT | 10.5588 | 6.7169 | 14.4007 | 1.9367 | .5286 | | |
| NB | .2030 | .0250 | .3810 | .0897 | .1697 | | |
| CB | -.2230 | -.4113 | -.0347 | .0949 | -.1771 | | |
| Direct Effects | | | | | | 0.4251*** | 9.1007 |
| Constant | 3.7866 | 2.8268 | 4.7463 | .4837 | | | |
| Direct Effect from Behavioral Beliefs to Intention (path b) | | | | | | | |
| BB | .0166 | .0078 | .0253 | .0044 | .4874 | | |
| Attitudes to Intention (path c') | | | | | | | |
| ATT | .1273 | -.0800 | .3345 | .1045 | .1872 | | |
| NB | -.0018 | -.0067 | .0032 | .0025 | -.0436 | | |
| CB | -.0071 | -.0147 | .0006 | .0039 | -.1647 | | |
| Total Effect on Correct Recycling Intention (path c) | | | | | | .2800*** | 8.0522 |
| Constant | 3.4654 | 2.3314 | 4.5993 | .5716 | | | |
| ATT | .3024 | .0696 | .5352 | .1173 | .4448 | | |
| NB | .0016 | -.0034 | .0066 | .0025 | .0392 | | |
| CB | -.0108 | -.0177 | -.0038 | .0035 | -.2510 | | |
| Indirect Effect on Correct Recycling Intention | | | | | | | |
| BB | .1751 | .0680 | .2873 | .0559 | .2576 | | |

Note: N=105. * $p < .05$. ** $p < .01$. *** $p < .001$.) ATT= Attitude (IV), BB = Behavioral Beliefs (M) Intention (DV), NB = Normative Beliefs (Control), CB = Control Beliefs (Control).

The independent variable, attitudes, directly affected behavioral beliefs ($B=10.5588$, $LLCI=6.7169$, $ULCI=14.4007$) and had a total effect on intention ($B=.3024$, $LLCI=.0696$, $ULCI=.5352$). While the behavioral beliefs variable directly affected intention ($B=.0166$, $LLCI=.0078$, $ULCI=.0253$), the attitude variable did not have a direct effect on intention ($B=.1273$, $LLCI=-.0800$, $ULCI=.3345$). Thus, behavioral beliefs were found to mediate the relationship between attitudes and intention. Figure 24 depicts the significant relationships via standardized coefficients of the post-study model.

Figure 24

Post-Study Model: Attitude Mediated by Behavioral Beliefs Standardized Coefficients β



Findings from the post-study model indicate that behavioral beliefs mediate the relationship between attitude and correct recycling intention. Furthermore, the post-study model demonstrates the substantial degree of influence behavioral beliefs have on predicting employee intentions to recycle correctly. Coupled with findings from the H1, H2, and H3 hypothesis models, the post-study model finding validated behavior beliefs as the foremost determinants influencing employee correct recycling behavior at the studied organization. Moreover, these

findings revealed that the correct recycling intention of employees with positive attitudes toward behavior was explained by their behavior beliefs.

In this study, the behavioral belief construct represents four central themes concerning employee perceptions about the outcome of correct recycling: (a) environmental benefit, (b) conservation of natural resources, (c) a sense of personal benefit, or (d) wasted effort. Findings suggest these four determinants are important sources of feelings for deciding to engage (or not engage) in correct recycling behavior. Therefore, these findings suggest that managers within the studied organization could leverage these beliefs to foster greater employee motivation toward correct recycling behaviors.

In summary, I evaluated the nine salient beliefs stemming from the elicitation study. Employee attitudes and behavioral beliefs were initially found to be the strongest determinants of correct recycling intention. Upon further analysis via the post-study model, behavioral beliefs replaced attitudes toward the behavior of interest. Employee coworkers and managers were not found to influence correct recycling intention. Finally, control beliefs, such as recycling bin proximity, are perceived behavioral controls to correct recycling behaviors within the studied organization. Further discussion of the implications of these findings concerning practitioners is discussed in the following sections of this chapter.

Post-Research Framework Discussion

This study was based on formative research techniques (e.g., Francis et al., 2004; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020; Yuriev, Dahmen, et al., 2020) and was conducted purposefully and systematically using the theory of planned behavior (TPB). I completed this study using a two-phase approach employing mixed methods that consisted of qualitative exploration followed by quantitative assessment. The objective of Phase 1 was to

uncover and retain employee beliefs about correct recycling. The objective of Phase 2 was to test the impact of employee beliefs along with their attitudes, subjective norms, and perceived behavioral control on employee intention to recycle correctly at work. The Phase 1 qualitative exploration was carried out over the course of 10 separate stages, and the Phase 2 quantitative assessment was done in five separate stages.

Several studies from the literature have used a similar two-phase research framework for evaluating the determinants of employees' pro-environmental behavioral intentions (e.g., Lam 1999; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020). Yet, these studies only offered baseline insights into their methodology for explaining the process of identifying and retaining the most commonly held employee beliefs. For example, a meta-analysis conducted by Yuriev, Dahmen, et al. (2020) found that only 36% of TPB-based studies looking at employee pro-environmental behaviors reported on their qualitative explorations. The sparse discussion on qualitative methodology within the TPB-based pro-environmental behavior literature makes it difficult for scientists to replicate existing research accurately. Furthermore, a meta-analysis conducted by Yuriev, Dahmen, et al. also clearly demonstrates how studies violating TPB guidelines set by Ajzen (2011) can produce unreliable results. Such results can lead to misinterpretations about the studied population and derail research efforts within the field of pro-environmental behavior.

The inconsistent reporting of TPB elicitation studies and the unreliable findings from studies violating TPB guidelines will continue without an explicit framework in place to reliably study pro-environmental behavior at work. Therefore, I developed a post-research framework to help guide scholar-practitioners through a systematic process for studying green workplace behaviors. The post-research framework is presented in Figure 25. My framework aligns with

TPB guidelines presented by Ajzen (2011) and is based on best practices from the field (Francis et al., 2004; Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020; Yuriev, Dahmen, et al., 2020).

Figure 25

Post-Study Conceptual Research Framework

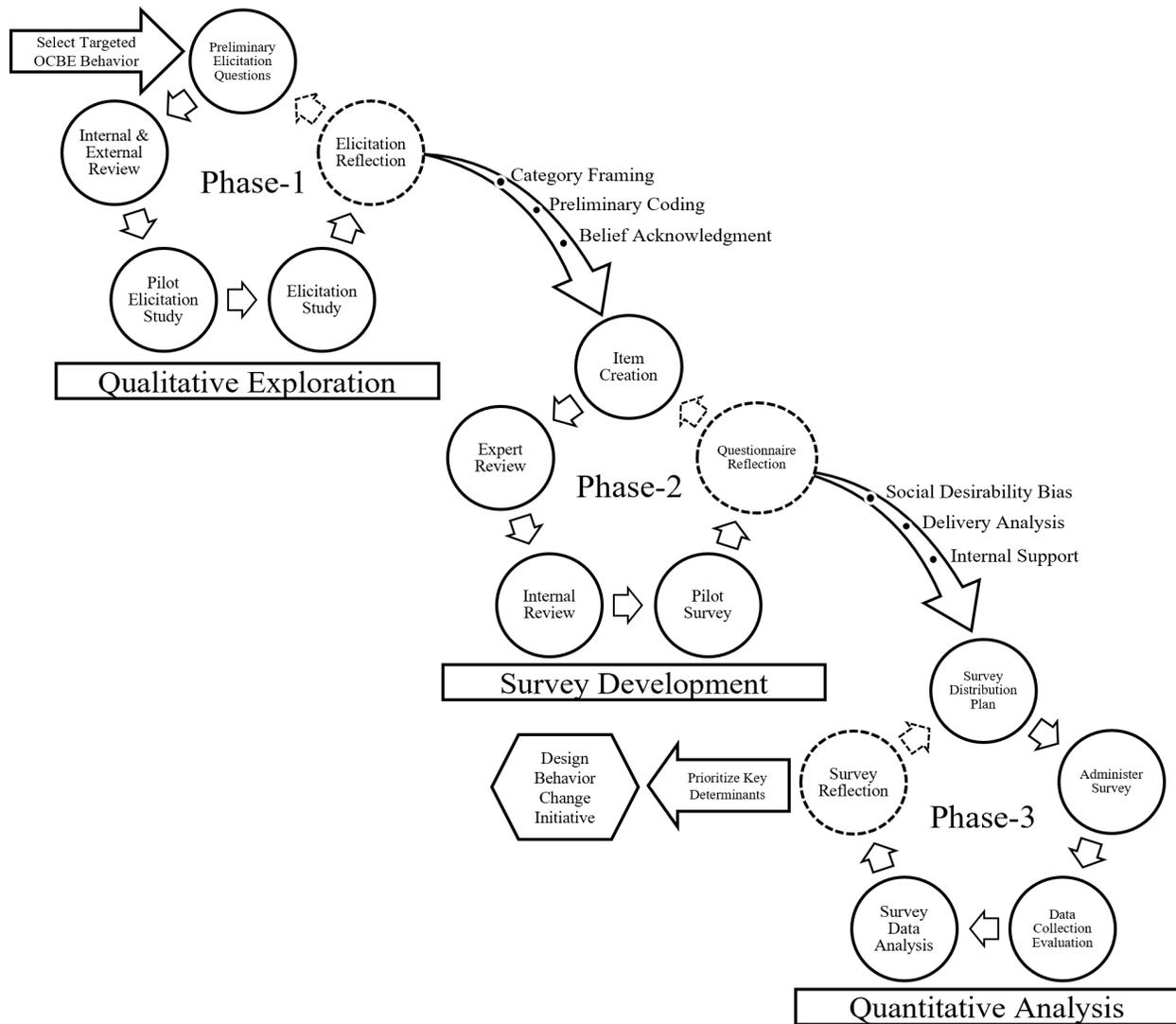


Table 34*Stage Descriptions for Post-Study Conceptual Research Framework*

| Stage | Phase 1 (Qualitative Exploration) | Phase 2 (Questionnaire Development) | Phase-3 (Quantitative Analysis) |
|-------|---|---|---|
| 1 | <u>Preliminary Questions</u> Create initial open-ended elicitation questions & interview protocol targeting the green workplace behavior of interest. | <u>Item Creation</u> Creation of survey item questions from retained salient beliefs (7-point liker scale). | <u>Distribution Plan</u> Establish means and methods for delivering a survey to sample respondents. |
| 2 | <u>Internal & External Review</u> Respondent focus group reviews elicitation questions for general comprehension. Subject matter experts verify interview protocol logic & flow. | <u>Expert Review</u> Subject matter expert review to verify questionnaire logic, flow and structure of survey protocol, item scoring, and data analysis preview. | <u>Administer Survey</u> Conduct a cross-sectional survey within the target population. |
| 3 | <u>Pilot Elicitation Study</u> Pre-test open-end elicitation questions & interview protocol. | <u>Internal Review</u> Respondent focus group reviews questionnaire for general comprehension and appropriateness of item responses. | <u>Data Collection Check</u> Reflection point where research makes the decisions to either extends or close survey based on response rate. |
| 4 | <u>Elicitation Study</u> Conduct a series of 25 to 30 interviews within the target population. | <u>Pilot Survey</u> Pre-test survey for proper length, confusing or challenging items, & survey protocol feasibility. | <u>Survey Data Analysis</u> Test data to establish significant relationships and verify salient determinants. |
| 5 | <u>Elicitation Reflection</u> Complete preliminary analysis of interview data, and if saturation is not met, conduct additional interviews. | <u>Questionnaire Reflection</u> Review the entire questionnaire to ensure the scope and purpose of items explicitly targets the behavior of interest. | <u>Survey Reflection</u> Assess successful tactics & problematic issues regarding survey data collection and analysis. |
| T1 | <u>Category Framing</u> Categorization and framing elicitation responses based on TPB constructs. | <u>Social Desirability Bias</u> Assess risk level of social desirability bias and possible preventive measures. | <u>Prioritizing Key Factors</u> Generate selection of noteworthy elicitation and data analysis determinants. |
| T2 | <u>Preliminary Coding</u> Initial assignment of belief themes to elicitation responses. | <u>Delivery Analysis</u> Inventory all possible survey delivery methods. | <u>Change Initiative</u> Develop a behavior change program using a combination of prioritized determinants. |

| Stage | Phase 1 (Qualitative Exploration) | Phase 2 (Questionnaire Development) | Phase-3 (Quantitative Analysis) |
|-------|---|--|--|
| T3 | <u>Belief Acknowledgment</u> Retain all themes expressed in over 75% of participants' interviews & retain beliefs with scholarly or contextual importance at their discretion. | <u>Internal Support</u> Leverage the support from internal champions to raise survey awareness. | |
| Goal | Identify Salient OCBE Determinants | Create Trustworthy OCBE Measure | Establish Most Impactful OCBE Determinants |

Note: T1, T2, and T3 refer to the transition points between either phase initiation or close-out.

Formative by design, the post-study research framework used a three-phased, mixed-method approach. Table 34 presents stage descriptions for the post-study conceptual research framework. The framework begins by selecting an OCBE behavior of interest, and it ends with the designing of an OCBE behavior change initiative. The outcome of each research phase is informative because it provides practitioners with a valuable tool for creating, executing, and assessing green workplace behavior. For instance, Phase 1 unearths the hidden determinants driving employee behavioral performance. Phase 2 develops a reliable measure to assess determinants of green behaviors. Finally, Phase-3 verifies the most impactful relationships between determinants and an individual's willingness to engage in voluntary pro-environmental behavior at work

Each research phase within the post-study model is mutually associated as well as a standalone process that the practitioner can repeat when necessary. For example, Phase 1 of the framework is a five-stage process for developing and conducting an elicitation study. Practitioners begin by crafting preliminary elicitation interview questions. Subsequently, after an internal and external review, practitioners pilot the questions and interview protocol.

Practitioners then move into the elicitation reflection stage and make one of three decisions; (a) perform another iteration of Phase 1, (b) transition to Phase 1 closeout, or (c) transition to Phase 2 questionnaire development. Insufficient levels of saturation may indicate that another iteration of Phase 1 is needed. Practitioners transitioning to close-out would have obtained adequate information about determinants, thus ending their investigation. Lastly, practitioners seeking to create trustworthy measures enabling a subsequent quantitative analysis of determinants would transition into stage one of Phase 2. The transition points for Phase 1 are identical to the three coding cycles described in Chapter 4 of this study.

Integrated touchpoints within this post-study research framework leverage systems thinking by continually engaging the target population throughout the development process. For instance, item creation involves practitioners translating the salient determinants into cross-sectional survey questions. Practitioners would then review their preliminary survey items with subject matter experts, followed by an internal focus group comprised of sample participants. While the removal of focus group participants from the final sample is not perfect when studying smaller-sized populations, researchers should not underestimate the value-added from using an internal focus group to gauge general comprehension and appropriateness of item responses. Practitioners concerned with limited sample size should consider piloting the survey outside the studied organization within a population of similar characteristics.

The last stage of Phase 2 is the questionnaire reflection stage, during which practitioners again make one of three decisions: (a) perform another iteration of Phase 2, (b) transition to Phase 2 closeout, or (c) transition to Phase 3 survey administration and data analysis. Recording poor Cronbach alpha scores during the pilot survey may indicate that another iteration of Phase 2 is needed. Practitioners not planning to administer the survey would transition to Phase 2

closeout, while practitioners seeking to verify relationships of determinants within the studied organization would transition to stage one of Phase 3.

Understanding how impactful each determinant is at motivating employees to perform green behaviors is invaluable for a practitioner. Thus, the third and final research phase uses the same format presented in this study to assess determinants quantitatively. Again, practitioners would cycle through all five stages before retaining the necessary information to prioritize the most impactful determinants. Finally, these verified determinants would be selected as the principal focus of practitioner-designed campaigns targeting voluntary green workplace behavior.

This post-study framework offers both researchers and practitioners several considerable advantages. First, the framework allows for the gradual emergence of action-oriented information that is usable by practitioners and operationalized by organizations. For instance, using semi-structured questions and various mnemonic devices within elicitation studies can unearth latent beliefs not previously considered (Miller, 1956). Furthermore, organizational policy decisions can be made to remove barriers to implementation that inhibit the performance of green workplace behaviors during the quantitative research phase.

Secondly, the framework is scalable or incremental by application. This means researchers may choose to add additional stages for more rigorous behavioral examination. Conversely, while it is recommended that practitioners complete all three phases consecutively when developing full-scale behavior change initiatives, there are contexts in which practitioners can reliably use each phase independently. For instance, successful environmental managers must facilitate numerous green workplace behaviors within their organization (Ones & Dilchert, 2012a). However, employee green behaviors can stem from distinctly different disciplines that

may fall outside a practitioner's area of expertise. Therefore, practitioners may find Phase 1 of this framework a handy exploratory device that introduces the psychological underpinnings driving the performance of a given green behavior. For even further refinement under the appropriate conditions, the scaling down of saturation levels for qualitative investigations may be possible as well (O'Reilly & Parker, 2013).

Furthermore, the researcher's reflection stages within this framework function as pivot points. The exploratory nature of formative research can uncover powerful latent beliefs or cultures that may force changes in the direction away from the initial research scope. While far from ideal, researchers can use the elicitation and questionnaire reflection stages to reset and pivot their research accordingly. Whereas solely quantitative research designs do not accommodate redesigns well, other non-iterative approaches are unclear as to where pivot points exist. For instance, researchers often cannot and should not re-survey the same population in many instances when using solely quantitative methods. The elicitation reflection stages in this framework ensure that researchers are targeting determinants relevant to the studied organization. And, the questionnaire reflection stage in this framework provides researchers with confidence in their measurement instruments.

Thirdly, this post-study framework is agile and theoretically flexible. For instance, Ajzen's (1991) theory of planned behavior requires a substantial degree of behavioral specificity. For example, Yuriev, Dahmen, et al. (2020) indicated ambiguously interpreted green workplace behaviors, such as "care for the environment," lack the preciseness needed for TPB-based research models (p. 8). Nevertheless, one can certainly gain practicality from generalizing the determinants of an employee's aptitude to care about the environment. Practitioners might use such insights as proxies for gauging an organization's greening capacity or as their hyperbole

Dowsing rods for seeking agents of change to foster greening campaigns within the organization. While this post-study framework was a model for Ajzen's (1991) theory of planned behavior, researchers can apply other behavior change theories to this framework for accommodating the study of more generalized green workplace behaviors.

For these reasons, this post-study framework is workable in both academic and professional settings. For example, doctoral-level researchers may apply other theoretical concepts to the framework to further the theory behind green workplace behaviors. In contrast, master-level students could adopt a more refined version of this framework which may help guide them in conducting formative research. Furthermore, practitioners could use an even more simplified version of this framework as a basis for conducting stakeholder analysis. The goal is to move past greening initiatives driven merely by one's intuition to that which is based on best practices in formative research.

Implications for Practitioners

Apart from the implications discussed in the post-research framework section, this formative research study generated several additional implications relevant to practitioners at the studied organization. First, practitioners can use the findings to create promotional measures that foster the greater performance of correct recycling behavior. Formative research is the process of identifying and evaluating attributes within a target population (Higgins et al., 1996). The knowledge created from formative research is integral for program development and for enhancing existing behavior change curricula (Gittelsohn et al., 2006). Disentangling the psychosocial determinants is key for practitioners because salient beliefs function as the attributes explaining why people's attitudes, subjective norms, and perceived behavioral control influence a given behavior (Ajzen, 2012b). Since this study identified salient beliefs and

evaluated their relationship on employees' intentions to recycle correctly following this formative research approach, it is appropriate for practitioners within the studied organization to leverage employee beliefs to enhance recycling initiatives.

There are several strategies managers could adopt to promote correct recycling behavior based on the study findings. For instance, nearly all employees within the sample held positive intentions toward recycling correctly. This suggests a strong preexisting predisposition among employees within the studied population to act on the behavior of interest. Thus, managers should focus their promotional efforts on enabling employees by removing barriers to implementation versus concentrating their efforts on motivating employees who are not inclined to perform the behavior. From a practitioner's perspective, the salient control beliefs identified in this study are likely to serve as activation barriers to correct recycling behavior. Thus, managers should focus on dispelling or removing internal barriers to correct recycling behaviors by targeting the identified salient control beliefs. For example, practitioners could host activities that improve employee correct recycling knowledge. Additionally, "lunch-and-learns," where coworkers come together to eat food and talk about recycling, is one possible mechanism for improving knowledge on the behavior of interest. Practitioners could also place more recycling bins with artistically enhanced awareness signs in higher visibility areas to help employees quickly locate nearby recycling locations.

In this study, positive intentions towards the behavior of interest were likely inflated by social desirability bias. In addition, underrepresented latent groups within the studied organization may have also further contributed to this problem. Social desirability bias is a response bias in which respondents answer questions based on what they think others view as favorable (Fisher, 1993). For example, this study found that 93% of sampled respondents

reported positive or neutral views about whether their coworkers feel they should recycle correctly. Yet, this study also recorded only eight surveys from field employees who spend greater than 50% of their time at work outdoors. While the exact number of field employees is unknown, the large number of outdoor public services (i.e., grass mowing) performed by the studied municipality implies that field employees within the sample may have been underrepresented. For that reason, positive intentions toward recycling correctly may not be as universally held by employees as was suggested by the findings in this study. Therefore, environmental managers should take special precautions to seek out and identify latent groups of employees that may not hold such positive intentions towards the behavior of interest.

Behavioral beliefs were the most meaningful determinant predicting correct recycling intention in this study. This behavioral belief construct alone accounted for 38% of the explained variance within the conceptual framework model. Prior research has shown that positive beliefs about the importance of recycling correlate with a greater locus of control over the performance of recycling behavior (McCarty & Shrum, 2001). Thus, practitioners within the studied municipality could design signage to leverage employee behavioral beliefs and address issues of perceived behavioral control. For example, signage raising awareness about the negative environmental consequences of recycling contamination offers directions for correct recycling that could be particularly effective.

Finally, this study focused solely on identifying and understanding the relationship of determinants of workplace recycling intention. However, there are numerous types of voluntary green workplace behaviors employees can perform while at work. For example, Ones and Dilchert (2012a) found over 3,000 different green workplace behaviors across various organizational contexts and industries. In addition, most green behaviors have a multitude of

unexplored and possibly highly influential determinants that impact employee behavior performance (Hahn & Ostertag, 2018). For instance, the elicitation phase of this study alone uncovered 32 distinct determinants for just one specific type of green workplace behavior. Furthermore, Yuriev et al. (2018) expressed suspicions that green workplace behavior practiced at home and within an organizational system may have different underlying dynamics than green behaviors performed solely at work. There is also an overall lack of research on the determinants of green employee behaviors (Yuriev, Dahmen, et al., 2020). Thus, many possible determinants influence employee performance of green behaviors, and the literature on this topic is slow in coming.

Nevertheless, successful employee-driven greening initiatives can positively impact the natural environment because organizational environmental performance is primarily based on individual-level green workplace behaviors (Robertson & Barling, 2013). Unfortunately, the current state of environmental performance for many organizations is insufficient to prevent catastrophic natural environmental problems such as climate breakdown.

In summary, there is a dire need for practitioners to adopt formative research techniques to augment academic researchers. Such approaches would focus on unearthing the salient determinants essential for increasing the pace of change employee-level greening initiatives have on organizational-level environmental performance. Accordingly, this study proposes a framework for practitioners to use as a blueprint to explain why employees engage (or do not engage) in voluntary pro-environmental behaviors at work.

Implications for Greening Municipalities

While the study I conducted examined the behavioral underpinnings for only one specific employee-level action, the finding and post-study discussion present several opportunistic

strategies for greening municipalities. For instance, all cities face sustainability pressures and have considerable room for improvement towards addressing environmentally related issues (Feingold et al., 2018; Rees & Wackernagel, 2008). For this reason, municipal greening initiatives are essential drivers for creating sustainable urban environments. Unfortunately, however, employees who perceive organizational greening policies as ineffective, unsubstantial, or unsupportive are much less likely to perform pro-environmental behaviors (Paillé, & Raineri, 2015).

Organ (1997) notes the repositioning of organizational citizenship behavior (OCB) from the voluntary extra-role framework to the equally important contextual performance framework within modern organizations. OCB serving as the theoretical foundation of OCBE implies OCBEs are becoming more entrenched within organizational frameworks. Therefore, managers will inevitably seek to foster the greater performance of voluntary green workplace behaviors. Thus, the value and need for effect pro-environmental behavior interventions will grow.

According to Wiernik et al. (2018), there are four types of pro-environmental behavior interventions: a) salience interventions, b) informational interventions, c) monitoring and feedback interventions, and d) psychosocial interventions. Salience interventions focus on making green behaviors easier for employees to perform (e.g., adding additional workplace recycling bins). Informational interventions provide employees with the knowledge and skills to perform the behavior (e.g., signage for sorting recycling correctly). Monitoring and feedback interventions entail tracking employee environmental performance then incentivizing or penalizing performance outcomes (e.g., employee bonuses for meeting recycling contamination goals). Lastly, psychosocial interventions leverage employee attitudes and norms to influence employee performance of green workplace behaviors (e.g., managers hosting recycling

challenges). Adopting policies and setting organizational agendas to encourage the four types of interventions of Wiernik et al. is key for optimizing environmental performance. For this reason, practitioners can use the post-study conceptual research framework to help them determine which type of intervention would be most effective. Organizations could then prioritize the policies for administering the selected green workplace intervention.

For example, I conducted research using a similar methodology to the one presented in the post-study research framework in this study. I found that most all employees have a strong existing intention to recycle correctly. Therefore, designing and administering a psychosocial intervention to leverage employee attitudes for increasing behavioral intention would likely not be as effective as an information-based initiative. Instead, an informational intervention would be more worthwhile because it provides employees who already intend to engage the behavior the knowledge and the skills to perform that behavior correctly.

Accordingly, practitioners in the studied municipality seeking to enhance recycling behavior could adopt an informational approach by designing informative recycling signage. The municipality could then prioritize the recycling signage by allocating money for fabrication and adopting policies for installing signage near all recycling facilities. The municipality could follow this with a tailored monitoring and feedback intervention. Siero et al. (1996) studied organizational energy consumption behavior and found that comparative feedback is highly effective. For instance, home energy bills comparing the homeowner's energy efficiency to that of their neighbor's energy efficiency is a form of comparative feedback. Likewise, the studied municipality could monitor the recycling contamination rates for all city-owned buildings and share those results with employees.

Furthermore, there are several additional strategies municipalities can take to promote correct recycling behavior. First, control beliefs appear to be potential barriers to employee performance of correct recycling behavior. One noteworthy control belief was recycling knowledge, which means knowing what waste items can be recycled correctly. Jones (2010) demonstrated how social constrictions could serve as activation barriers for obtaining knowledge. To help remove this activation barrier, the studied municipality could adopt a policy for annual training on best recycling practices. Whether or not an item can be recycled is based on the technology of sorting facilities and the recycling industry's demand for a given raw material. Therefore, an annual training could educate employees on correct recycling practices and provide updates concerning recycling changes.

Second, this study demonstrates the practicality of engaging employees in the development of promotional greening efforts. From an organizational perspective, policy changes could be made to support the continuation of these employee-informed greening initiatives. For example, the studied organization could establish a policy for rewarding or recognizing employees who support greening activities. Moreover, the studied organization could establish policies that allow employees to engage in more green work activities.

Third, the municipality could implement green human resource management (GHRM), which integrates environmental tenets into traditional human resource management practices. GHRM includes green recruitment and orientation, environmental leadership, pollution prevention training, and environmental-centered talent management (Ciocirlan, 2018). For example, Princeton University's Drink Local Program provides incoming freshmen with reusable water bottles and has had major success in fostering water conservation behaviors on campus (Santos & van der Linden, 2016). Similarly, a municipal human resources department could

provide new employees with correct recycling desk magnets during onboarding. Such a GHRM practice could help promote correct recycling behaviors and further develop a sustainable workplace environment. Overall, adopting GHRM policies would likely lead to an increase in the voluntary participation of employees in future phases of formative research within the studied organization.

The post-research framework process equips practitioners with the justification necessary for convincing their organization to adopt greening initiatives. Likewise, organizations also benefit from legitimizing greening expenses to stakeholders and garnering improved confidence toward enhancing the environmental performance of operations. However, many organizations still struggle to implement greening initiatives because there is often a disconnect between an organization's espoused philosophy of sustainability and employees' implementation of greening practices supporting sustainable policies (Brennan et al., 2015). Therefore, measuring and tracking the outcomes of greening initiatives is critical for avoiding the disconnect between correct recycling policy and practices at a studied municipality.

Callewaert and Marans (2018) evaluated a tracking tool called the Sustainability Cultural Indicators Program (SCIP) for gauging the impact of several University of Michigan greening initiatives over time. Using data collected by the SCIP, the researchers found that university employees who had participated in greening initiatives engaged in significantly more green workplace behaviors than non-participating employees. Furthermore, Callewaert and Marans suggest the SCIP tool is valuable to practitioners to help focus efforts and target key staff members. Pairing the post-research framework in this study with a longitudinal tracking tool like the SCIP would help create a culture of sustainability and pro-environmental behavior among public employees at the studied municipality.

Implications for Researchers

Future research should investigate the determinants of voluntary green workplace behaviors for building more comprehensive measures. There are multiple promising research avenues because many unexplored constructs influence employee green behaviors (Boiral, Paillé, & Raineri, 2015; Lange & Dewitte, 2019). For example, a recent exploratory study conducted by Boiral et al. (2019) investigated employee connectedness to nature. After interviewing 50 respondents working in environmental management, Boiral et al. discovered most employees felt “disconnected” from their natural environment. Thus, researchers could continue exploring the role of employee connectedness to nature and its impact on green workplace behaviors. Such a study could demonstrate the importance of providing employees with opportunities to connect with nature to enhance organizational environmental performance.

Public service motivation (PSM) is another promising determinant of green workplace behavior in the context of municipal government. PSM refers to an employee’s commitment to the missions, goals, and values of public institutions. Stritch and Christensen (2016) found evidence linking PSM to predicting OCBE and other public stewardship-type behaviors. Furthermore, Ajzen and Kruglanski (2019) recently extended the TPB to include goal theory, which suggests individuals most often perform behaviors to achieve goals. Cross-exploration of PSM through the lens of the TPB extended by goal theory could provide valuable insights on OCBE and the conditions for optimizing voluntary green workplace behavior.

Future studies should also pay special attention to addressing the intention-behavior gap (Ajzen, 2015; Sniehotta et al., 2014; Yuriev, Dahmen, et al., 2020), which refers to instances when an individual intends to perform a behavior but does not follow through on performing that behavior. Yuriev, Dahmen, et al. (2020) suggested this intention-behavior gap may exist due to

the limited number of validated measures for green workplace behaviors (Francoeur et al., 2021). Again, future studies should continue exploring new types of green behaviors and, when appropriate, use measurement instruments targeting behavioral action rather than behavioral intention. Examples of possible green behaviors to explore are stormwater pollution prevention, green purchasing, and behaviors involved with climate mitigation and adaptation strategies.

This study also demonstrates the importance of exploring antecedent beliefs as behavioral determinants within the target population. Without these antecedent beliefs, the practical implications of this study diminish significantly. For instance, if this study had taken a solely quantitative approach, the discussion would have been limited to seeing whether a relationship between TPB variables and intention existed or did not exist. However, this study used a mixed-method design to explore antecedent beliefs; therefore, it was possible to discuss the presence of significant relationships and explain why these relationships existed. For this reason, researchers should use formative and mixed-method research designs in this field when applying TPB as the theoretical framework for exploring the determinants of green behavior.

Despite the explanatory value of exploring antecedents, I was surprised to learn that over 70% (n=88) of TPB studies used solely quantitative methods to evaluate green behaviors (Yuriev, Dahmen, et al., 2020). Furthermore, the small number of TPB studies using elicitation studies provided minimal insights for describing how that qualitative research phase was conducted. The theory of planned behavior (TPB) model is well suited for identifying beliefs that can be altered to change intentions (Ajzen, 2015). The TPB elicitation guidelines described by Ajzen (n.d.-a) are generalized for universal application. This flexibility makes TPB a favorable model across many academic fields (Yuriev, Dahmen, et al., 2020); however, there is a tradeoff for this flexibility. Researchers using the TPB-based framework must make carefully informed decisions

concerning TPB procedures by relying on the methodology set by best practices within their field of research. Furthermore, TPB-based research is grounded in mixed-method research designs, which requires researchers applying TPB approaches to be well versed in the tenets of both methodological processes.

To my knowledge, there is little to no existing literature detailing the procedures for conducting an elicitation study and its subsequent evaluation and retention of emerging beliefs relating to voluntary pro-environmental workplace behaviors. This is important because different elicitation methods can yield substantially different sets of determinants retained for a given quantitative analysis. For example, on the wording of open-ended elicitation questions, Sutton et al. (2003) found that phrasing the same question differently elicited different kinds of beliefs. Furthermore, Sutton et al. note that differently worded questions coupled with inconsistent decision rules for retaining beliefs can render substantially different sets of studied beliefs within the same sample. For this study, I identified nine salient beliefs using procedures set by Sutton et al. (2003) with a decision rule to retain any belief expressed in over 75% of participants' interviews, which was based on recommendations by Francis et al. (2004) and best practices from the field (Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020).

This study addresses this gap in the literature by reporting the technical information for conducting a full-scale elicitation study specific to investigating voluntary pro-environmental behaviors of employees at work. Future TPB-based researchers could model their research designs after the elicitation methodology presented in this study. Studies seeking to either affirm or discount the study elicitation protocols would also be an appropriate future research avenue. Furthermore, researchers using TPB-based approaches to study pro-environmental workplace behaviors need to report more detailed information on their elicitation phases.

Without this information, future literature in this field will lack the required information for assessing why separate elicitation studies can yield different sets of beliefs concerning the same green workplace behavior of interest. Even though TPB research findings in the academic sense have limited generalizability due to the inclusion of organizational-specific precepts in its measurement tools, there are other instances where such results are useful (Ajzen, 2011). Furthermore, the underreporting of elicitation methodology prevents theoretical discussions and affects researchers' ability to perform empirical comparisons for establishing best research practices specific to this academic field.

There are also practical reasons why researchers may choose to extrapolate the research findings of TPB-based studies. For instance, the control beliefs elicited by TPB studies may indicate an organizational barrier that prevents employees from engaging in the studied behavior. It is not unreasonable to hypothesize that the control beliefs of green workplace behaviors echo the existence of organizational barriers and that both control beliefs and barriers may be universally held by employees across various organizational contexts and industries. Therefore, future studies should focus on reporting more details regarding their elicitation phases and exploring the relationship of control beliefs and organizational barriers to green behavior performance. Such findings could help researchers confirm or deny the limited generalizability of TPB-based results. Future research could also help practitioners more successfully implement greening initiatives by creating a detailed list of barriers to green workplace behaviors.

Lastly, the findings in this study explained 46% of the variance in behavioral intentions toward recycling correctly at work. Moral norms (Poškus, 2015), problem awareness (Wan et al., 2017), and past behaviors (Lavelle et al., 2015) are noteworthy constructs from the literature I had initially planned to explore in this study. However, these constructs were removed due to

research complications outlined in Chapter 4. Thus, future studies should seek to overcome methodological issues and incorporate moral norms, problem awareness, and past behavior constructs into an integrated TPB model for studying workplace recycling behavior.

Beyond workplace recycling behavior, researchers were able to demonstrate 12.1% more variance, on average, when adding additional model variables that influence pro-environmental behaviors (Yuriev et al. 2020). Thus, future research using TPB to assess other green workplace behaviors should also consider adding additional variables to the TPB model to help explain more significant model variance. For instance, Glanz, Rimer, and Viswanath (2008) recommended using an integrated model extending the TPB with other influential theories (p. 77). Therefore, researchers may consider adding additional variables from other theoretical frameworks, such as social exchange theory (Paillé & Boiral, 2013), value-belief-norm theory (Stern et al., 1999), and normative activation model (Fang et al. 2019). Other constructs such as intrinsic satisfaction and personal commitment have also impacted recycling behaviors and may account for additional model variance (Lee & De Young, 1994; Lee, De Young, & Marans, 1995). Leadership styles influencing employee environmental engagement and the performance of green workplace behaviors may also warrant more research (Luu, 2019). In addition, several recent investigations have been conducted on the spillover effects between pro-environmental behaviors at work (Maki et al., 2019; Verfuert & Gregory-Smith, 2018).

The findings presented in this study provide a baseline for the existing determinants of correct recycling behavior. Therefore, the studied municipality is well-positioned for a follow-up investigation by researchers exploring how significant determinants of correct recycling behaviors influence other green behaviors in the target population. In addition, future researchers should consider using Hayes's (2018) PROCESS as their method of analysis because of the

advantages of bootstrapping, a statistical procedure for resampling datasets to generate large, replicated samples (Laerd Statistics, n.d.). The bootstrapping process helps correct normality issues in smaller datasets, thus allowing for greater model exploration by researchers.

Limitations

Apart from the prior discussion on implications for future researchers, the five principal limitations of this study may also help identify avenues for further scholarly exploration. First, this study explored intentions and not behavior because individual-level data on correct recycling behavior is challenging to obtain. While the literature recognizes the need to examine the intention-behavior gap (Ajzen, 2011; Sniehotta et al., 2014; Yuriev, Dahmen, et al., 2020), there are many instances where validated measures for investigating green workplace behaviors do not exist (Francoeur et al., 2021). Nevertheless, future researchers could consider tracking recycling contamination rates per facility bin location. While bin-specific contamination data would not be relatable to a specific employee, such data collection efforts could yield more direct insights concerning the impacts of recycling initiatives when targeting a given facility.

Second, the findings in this study have limited generalizability because the measurement instruments were developed using information specific to the studied organization. The literature cautions researchers that the results of TPB-based studies should not be extrapolated to another context without the appropriate justification (Ajzen, 2015; Sniehotta et al., 2014; Yuriev, Dahmen, et al., 2020). However, this study's findings have been clearly outlined; moreover, there was a particular emphasis placed on reporting detailed protocols and decision-making rationales for the elicitation phase of this study. Thus, researchers have access to the necessary information to make future assessments about whether components of this study apply to their research contexts.

Third, this study had some TPB variables with lower than ideal Cronbach alpha scores. Attitudes towards the behavior had an alpha score less than 0.6 initially. However, Chan and Bishop's (2013) research suggests that moral norms can supplement a weak attitude scale. Accordingly, the attitudes and subjective norms constructs were merged for an alpha of .818.

Fourth, the most frequently mentioned beliefs do not necessarily indicate the most potent beliefs influencing intention. This study identified nine salient beliefs expressed in over 75% of participants' interviews based on the recommendations of Francis et al. (2004) and best practices from the field (Greaves et al., 2013; Yuriev, Boiral, & Guillaumie, 2020). While there is no standardized process for assessing the emergence and acknowledgment of green workplace beliefs, special care was given to ensure contextually meaningful beliefs were retained for the Phase 2 analysis. Some beliefs removed due to lower expression rates across the target population may impact employee intention if entered into the model. Furthermore, there could also be beliefs influencing correct recycling intentions that were simply not uncovered during the elicitation phase.

Fifth, social desirability bias is also a limitation of this research because data collection relied solely on self-reported measures (Podsakoff et al., 2012). Kormos and Gifford (2014) noted the problems associated with using self-reported behaviors for measuring pro-environmental behaviors. The use of confidential one-on-one interviews and anonymous surveys links in this study may have limited this issue. However, nearly all 105 survey respondents reported positive or neutral intentions towards correctly recycling at work. Furthermore, the subtle distinction between employees' correct recycling intention and their generalized intentions to recycle as much as possible may have further skewed intention scores. Ajzen (2015) mentioned that high rates of intention show the difference between motivating people who are

not interested in performing the behavior versus enabling people who already have a positive disposition toward performing the behavior. In addition, the high levels of positive behavioral belief scores suggest the population already has a strong predisposition toward correct recycling. The use of affirmation questions to verify each behavioral belief's direction also reduces response bias. Nevertheless, some form of social desirability bias likely impacted this study. Therefore, practitioners in the studied organization should seek to verify the intention-behavior gap by tracking waste contamination rates.

COVID-19

Findings from this study are subject to the incidental influences caused by the COVID-19 pandemic. Most employees participating in this study had likely been working remotely for several months. Therefore, remote working employees participating in elicitation interviews may have different salient beliefs than those working on-site at city-owned facilities. Thus, the dependent variable, correct recycling intention, may have been influenced by an employee's recycling behaviors practiced outside of work. Yuriev et al. (2018) explained how pro-environmental workplace behaviors are dynamic by suggesting that green workplace behavior practiced both at home and within an organizational system may be treated differently than green behaviors that can be performed only in a workplace setting.

Furthermore, this study was initially designed and optimized to evaluate green workplace behaviors within a pre-pandemic municipal workforce environment. However, the actual study was completed during the middle of the COVID-19. Thus, there were several logistical changes made to accommodate the data collection methodology for this study. For example, it is possible that conducting interviews via an online meeting platform versus a face-to-face format may have elicited different sets of salient beliefs. It is also possible that the online distribution of the survey

questionnaire was restricted for some select groups of the studied organization. For example, employees working on-site or outside may have had limited computer access due to COVID facility protocols and restrictions. Thus, such barriers may have severely limited response rates from those groups of employees. Lastly, the COVID pandemic may have disproportionately impacted departmental workloads. For instance, employees of the police and public works departments may have had additional COVID-related work assignments, which may have also resulted in lower survey completions rates by those groups of employees.

Conclusion

To my knowledge, this is the first TPB-based research study on green workplace behaviors to report a detailed protocol and analysis of findings from the elicitation phase. Additionally, this is likely the first study on employee green behaviors to explore employee intentions to recycle correctly versus generalized recycling intentions to recycle as much as possible. This study took a formative research approach to identify and evaluate the determinants driving public employee intention to recycle correctly. The elicitation phase unearthed 32 initial determinants; nine were identified as salient determinants. Of those nine salient determinants, seven were found to significantly impact public employee correct recycling intentions. In addition, public employees' behavioral beliefs, the most influential factor impacting intention, had four salient determinants. Lastly, perceived behavioral control was found to mediate the relation between control beliefs and intention. This finding suggests that the three salient determinants making up control beliefs are barriers preventing correct recycling behavior in the target population. Overall, these findings can help inform behavior change programs to reduce waste contamination in the studied municipality.

This study also advances research in the field of pro-environmental workplace behaviors. The post-study framework provides academics and practitioners with a formative research basis to explore new green workplace behaviors. Using a mixed-methods approach, the proposed framework is a three-phased blueprint useful for explaining the reasons why employees engage (or do not engage) in voluntary pro-environmental behaviors. The goal is to improve the willingness of employees to voluntarily engage in greening activities. Thus, more research on the determinants of green behavior is needed because practitioners can target these factors to motivate employees' individual-level behaviors to meet larger organizational-level sustainability goals.

End Notes

Throughout this study, my personal goal was to report research protocols as clearly and concisely as possible while simultaneously offering readers a much higher level of procedural and methodological detail than other studies within this field of research. The more scholarly something is, the more effort it takes to execute; therefore, it can become more time-consuming. However, as an environmental practitioner, I recognize the applied value of formative research and its overall utility in advancing local sustainability. That is why the true worth of this study stems from the proposed framework that is (a) systematic, (b) realistically repeatable, (c) inherently informative, (d) practitioner-oriented, and most importantly, (e) scalable in purpose.

The more scholarly something is, the more readers require a prerequisite knowledge base to grasp its application. Novice scholar-practitioners seeking to explore other green workplace behaviors should consider reviewing environmental textbooks by Bechtel and Churchman (2003) and Gallagher (2012) to familiarize themselves with the topic. The following paragraphs offer a

few other recommendations and lessons learned to help study green workplace behaviors within a municipal context.

First, the theoretical framework used in this study was the theory of planned behavior (TPB), which requires both qualitative and quantitative components. Disregarding either one of those components compromises the explanatory merit of TPB. Therefore, practitioners tempted to scale down this study must understand the consequence of removing methodological steps executing a more streamlined approach.

Second, establishing a representative sample is essential, especially when using the TPB, because the contextual factors influencing behavioral intent can change substantially depending on where employees are positioned within the organization. Therefore, a study with underrepresented groups of employees can lead to misleading results that may shape unsuccessful green behavior change programs. Practical recommendations for overcoming this issue include: 1) obtaining a larger sample size, 2) reworking survey delivery methods for targeting difficult to access groups, 3) judging current levels of employee engagement concerning the behavior of interest, 4) reviewing potential participation barriers, 5) softening survey language for lay understanding, and 6) ensuring the behavior of interest applies to the targeted population.

Third, this study used intention as a proxy for measuring behavior. Using the intention proxy is a valuable tool in situations where the behavior of interest is not easily measured. However, measuring actual green behaviors (e.g., recycling weight) is always the best option whenever possible. Moreover, I suspect issues of social desirability bias may be amplified in workplace environments. Therefore, concerted efforts to develop new and innovative measures

of actual green behaviors can ultimately create a clear picture for advancing promotional greening efforts.

Lastly, the keystone species of any organizational ecosystem are the employees who regularly go the extra mile by consistently going above and beyond the call of duty. These employees form the basis for how well a business operates and impact the success of company policies. Therefore, practitioners should focus on creating greening processes that leverage the participatory energy of these employees. For example, greening processes could include motivational interviews to promote the early adoption of environmentally sensitive policies, which would likely have spill-over greening effects on other employees. Furthermore, practitioners may consider using tents from Roger's (1962) diffusion of innovation to set green behavior adoption targets based on measuring behaviors.

Overall, a promising result of this study is a small step towards the environmental improvement of the surrounding community. While significant changes to one green behavior within a municipal workforce would likely have a minimal impact on the surrounding community, it is reasonable to suspect that the cumulative effect of increased participation in all green workplace behaviors would profoundly impact city operations and, ultimately, the surrounding community. Hence, this study provides a blueprint for future research to assess green workplace behaviors for achieving more sustainable cities.

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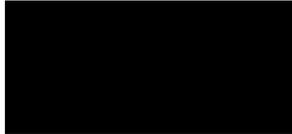
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Appendix A

Approval of Participating Municipality



Memorandum

To: [Redacted]
[Redacted]

From: Michael Weyand
[Redacted]

Date: July 21, 2020

Subject: Research Approval Request

Summary

The purpose of this memo is to request CMO approval for conducting my doctoral dissertation research at the [Redacted]. My research will involve conducting around eight staff interviews followed by an electronic questionnaire survey emailed to the entire municipal workforce. All data and information collected during this research will remain confidential and reported anonymously based on Hood College's Institutional Review Board (IRB) standards for protecting the welfare, rights, and privacy of human research participants. Upon receiving CMO approval for conducting this research, I will apply to Hood's IRB for review to ensure my study's procedures meet federal regulations and institutional policy for conducting safe and ethical research. I then plan to send a follow up email to CMO to verify my IRB approval and gain permission to begin conducting phase-one of my research study.

Research Purpose:

The purpose of this study is to systematically identify and evaluate the determinants influencing employees' intentions recycle correctly at work. The study seeks to better understand why an individual may decide to recycle, or not recycle. I anticipate findings from this study will be used create an outreach campaign to promote greater workplace recycling within the organization. Research findings will also be used to extend academic understanding in the field of workplace pro-environmental behaviors.

Study Duration:

Assuming CMO approval, I anticipate the study taking interviews taking place this Fall. The research would be conducted in two phases, phase-I is the completion of eight staff interviews and phase-II is an electronic survey emailed to all municipal employees.



Employee Confidentiality

The records of this study will be kept private. Employees taking part in interviews will be assigned pseudonym to protect their identify. Employees completing online surveys will not report their name or email address. Only the Primary Researcher will have access to the responses, which will be saved on a secure database; interview results will not be stored on the municipal network. All information will be stored on Hood's College's Microsoft cloud which requires a username and password to access. Published reports and/or presentation will not include any information that will make it possible to identify a participant.

Furthermore, Employee participation in this study is completely voluntary. Employees decision whether or not to participate will not affect their current or future relations with the municipality or Hood College or any of its representatives. Any employees who decide to participate in this study, are free to withdraw from the study at any time without affecting those relationships.

Staff Commitment:

Staff commitment stems from the time it takes to complete interviews and online surveys. Interviews will take 30-60 minutes to complete. They will be asked to respond to 8 open-ended question about recycling within the organization. The survey is 39 questions and is estimated to take approximately 10 minutes to complete.

Research Benefits:

Completing this research will aid staff in the development of a recycling outreach campaign to reduce waste contamination. The principals used in this research can be used in future environmental initiatives to support behavioral change for greater community sustainability. I also anticipate the results of this study will be appropriate to share with Mayor and City council as well as meet environmental directives outlined in the City's strategic plan.

Thank you for considering this research proposal, if you would like to discuss this more please feel free to call me at [REDACTED] anytime.

-Michael Weyand

cc:

[REDACTED]

Appendix B

University Institutional Review Board (IRB) Approval



October 27, 2020

Mr. Michael Weyand
401 Rosemont Ave.
Frederick, MD 21701

Dear Mr. Weyand,

The Hood College Institutional Review Board reviewed your revised proposal for the study entitled “*Determinants of Municipal Organizational Citizenship Behavior for the Environment*” (Proposal Number 2021-4). The committee approves this study for a period of 12 months. This approval is limited to the activities described in the procedure narrative and extends to the performance of these activities at each respective site identified in the IRB research proposal. Nice job providing us with that documentation, along with a clear statement about the boundaries of your employment responsibilities relative to potential participants. This approval does not authorize you to recruit participants or conduct your study on site at other institutions. Should you decide you would like to systematically recruit participants and/or conduct your study on location at other institutions or facilities you will need to receive IRB approval from those organizations *prior* to any recruitment activities or data collection.

In addition, due to the current COVID 19 precautions, Hood’s IRB is restricting all in-person (e.g. face-to-face) data collection with participants at this time. You may only recruit participants and collect data online. You are not authorized to meet in person with your participants for the purpose of data collection until notice from this IRB. In accordance with this approval, the specific conditions for the conduct of this research and informed consent from participants must be obtained as indicated.

All individuals engaged in human subjects research are responsible for compliance with all applicable Hood Research Policies:
<https://www.hood.edu/sites/default/files/Hood%20IRB%20Policy%20revised%20September%202013.pdf>.

The Lead Researcher of the study is ultimately responsible for assuring all study team members review and adhere to applicable policies for the conduct of human sciences research.

The Hood College IRB approval expiration date is October 27th, 2021. As a courtesy, approximately 30-60 days prior to expiration of this approval, it is your responsibility to apply for continuing review and receive continuing approval for the duration of the study as applicable. Lapses in approval should be avoided to protect the safety and welfare of enrolled participants.

No substantive changes are to be made to the approved protocol or the approved consent and assent forms without the prior review and approval of the Hood IRB. All substantive changes (e.g. change in procedure, number of subjects, personnel, study locations, study instruments, etc.) must be prospectively reviewed and approved by the IRB before they are implemented.

Sincerely,

Diane R. Graves, PhD
Chair, Hood College Institutional Review Board

Appendix C

Recruitment Email

Good afternoon:

Hope all's well.

I'm emailing to see whether you have the time and the interest to be a participant in an interview for my research study on workplace recycling.

Your participation in this study is completely voluntary and in no way will affect your relationship with the City. Furthermore, any information you share in the interview will be kept private. If you choose to participate, you will be asked 8 questions about workplace recycling (see attached interview protocol). The interview will be recorded so that I can transcribe our conversation for the purposes of designing a survey that I plan to administer to all City employees later this year.

I anticipate the interview taking approximately 30-60 minutes long and will take place on GoToMeeting.

If you're interested in participating in my study please read, sign, and email a copy of the voluntary consent form (see attached PDF). Also, please propose a time for the interview that works best for you.

Thank you,
-Michael Weyand

Appendix D

Informed Consent Form

IRB Use Only:

HOOD COLLEGE INFORMED CONSENT FORM

Determinants of Municipal Organizational Citizenship Behavior for the Environment Consent Form

Semi-Structured Interviews

1. INTRODUCTION

You are invited to be a participant a research study about workplace recycling behavior. Please read this document and ask any questions you may have before agreeing to be in the study. Participants in this study must be at least 18 years old. The study is being conducted by Michael Weyand (Primary Researcher), in affiliation with Hood College, as part of his doctoral program.

2. BACKGROUND AND PURPOSE OF THE STUDY

The purpose of this study is to systematically identify and evaluate the determinants influencing employees' intentions to recycle correctly at work. The study seeks to better understand why an individual employee decides to recycle, or not recycle, while at work. Findings from this study will be used to inform an outreach campaign to promote greater workplace recycling within your organization. Research findings will also be used to extend academic understanding in the field of workplace pro-environmental behaviors.

3. DURATION

Interviews will take approximately 30-60 minutes to complete. You will be asked to respond to 8 open-ended question.

4. PROCEDURES

If you agree to be in this study, we will ask you to do the following things:

- Read the consent form carefully
- Please electronically sign and email an PBF copy of this consent form to Michael Weyand at Michael.Weyand@[REDACTED]
- Coordinate an interview time the works best for your schedule.
- Familiarize yourself with the attached interview question before participating in the interview.

- Join the following GoToMeeting link at the agreed upon time to complete the interview.

GoToMeeting Link: <https://global.gotomeeting.com/join/474338045>

5. RISKS/BENEFITS

This study has the following risks: It is expected that participation in this study will provide you with no more than minimal risk or discomfort, which means that you should not experience it as any more troubling than your normal daily life. However, there is always the chance that there are some unexpected risks. A possible risk may be an accidental disclosure of your identity, but that is unlikely because you will always be identified with the pseudonym you choose for the study.

The benefits of participating in the study are not tangible. Unfortunately, I do not have a study budget to provide you with a financial stipend or gift. However, you may experience the positive emotions connected with doing a good deed for a colleague and assisting him in pursuit of a doctoral degree.

6. CONFIDENTIALITY

The records of this study will be kept private. You will be assigned a pseudonym to protect your identity. Your name and email address will not be collected. Only the Primary Researcher will have access to your responses, saved on a secure database; interview results will not be stored on your organization network. All information will be stored on Hood's College's Microsoft cloud, which requires a username and password to access. Published reports and presentations will not include any information that will make it possible to identify a participant.

7. VOLUNTARY NATURE OF THE STUDY

Your participation in this study is entirely voluntary and in no way affects your employment status. Your decision to participate will not affect your current or future relations with the surveyed organization or Hood College or any of its representatives. If you decide to participate in this study, you are free to withdraw from the study at any time without affecting those relationships.

8. CONTACTS AND QUESTIONS

The researcher conducting this study is Michael Weyand. You may ask any questions you have right now. If you have questions later, you may contact the researchers at Michael.Weyand@[REDACTED] or [REDACTED].

If you have questions or concerns regarding this study and would like to speak with someone other than the researcher(s), you may contact Dr. Joy Ernst, Institutional Review Board Chair, Hood College, 401 Rosemont Ave., Frederick, MD 21701, ernst@hood.edu.

10. STATEMENT OF CONSENT

You will be given a copy of this form to keep for your records.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I am at least eighteen years old. I understand that my participation is voluntary and that I may withdraw anytime without penalty. If I have any concerns about my experience in this study (e.g., that I was treated unfairly or felt unnecessarily threatened), I may contact the Chair of the Institutional Review Board or the Chair of the sponsoring department of this research regarding my concerns.

Participant

signature _____ Date _____

Appendix E

Interview Protocol

Thank you for agreeing to meet with me and share your feelings about proper recycling techniques. I will be asking you a series of questions; there are no right or wrong responses. I am merely interested in your personal opinion on the topic. When responding to my questions, feel free to list any feelings that come immediately to your mind. I am recording this interview for the sole purpose of transcribing this conversation. Know that your answers will remain completely confidential and that I will destroy this recording after completing this study. As a friendly reminder, your participation in my research is entirely voluntary. I intend to use the information you share with me today to develop a program to help facilitate more remarkable workplace recycling.

1. Do you use recycling bins at work? If so, which ones?
2. Think back to your childhood. What were your experiences with recycling while growing up? (Probe: This could be anything you remember about recycling)
3. Would you say there is a difference between the philosophy of recycling “as much as possible” versus recycling “as correctly as” possible?

Behavioral outcomes and experiences

4. Why do you try to recycle correctly at work?
5. Would you say recycling at work personally benefits you? (Probe: why or why not?)
6. Are there any personal disadvantages or negative impacts to you personally for not recycling correctly at work?
7. Think about the last time you were deciding whether to place an item in the recycling bin -- could you try to explain -- or describe the reasons why you might have decided to recycle or not recycle that item? (Probe: This can be anything you think that might have motivated you or entered your mind)

Normative referents

8. Would you describe your coworkers as recycling advocates?
9. Do you ever feel social pressure to recycle at work? (Probe: Do you think that impacts your ability to recycle correctly?)

Control factors

10. What would stop you from recycling correctly at work?
11. What would help you recycle more correctly at work?

Sentence completions

Recycling at work makes me feel...

The most likely thing to stop me from recycling is...

I would care more about recycling at work if...

At work, the most important reason to recycle correctly is...

At work, the most important reason someone would **not** recycle correctly is...

The most annoying thing about recycling at work is...

My coworkers would recycle more if they...

The hardest part about recycling correctly is...

Everyone would recycle at work if...

Appendix F

Final Survey

Welcome to the recycling study!

This should take less than 10 minutes.



The survey's purpose is to collect employee feedback on workplace recycling. Your feedback will be used for academic research and improving the City's recycling services. Your responses will be kept completely anonymous. Your participation in this research is voluntary. There will be no negative consequences if you decide not to participate. Feel free to contact the principal investigator, Michael Weyand (██████████), with any additional questions about this research study.

By clicking the "I consent" button below, you acknowledge:

- Your participation in the study is voluntary.
- You are at least 18 years of age.
 - I consent
 - I do not consent

***Outcome Evaluations (OE) - Indirect Measure (BB x OE = ATT)**
- Please Read -

Answer all survey questions from the perspective of being at work. If you've been working remotely, please draw on your past in- person work experiences while completing the survey.

For me, doing something good for the environment is:

- Worth the added effort.
- Somewhat worth the added effort.
- Neither worth nor not worth the added effort.
- Somewhat not worth the added effort.
- Not worth the added effort.

Reducing my amount of workplace waste going to landfills is:

- Worth the added effort.

- Somewhat worth the added effort.
- Neither worth nor not worth the added effort.
- Somewhat not worth the added effort.
- Not worth the added effort.

Not mixing together my trash and recyclables at work is:

- Worth the added effort.
- Somewhat worth the added effort.
- Neither worth nor not worth the added effort.
- Somewhat not worth the added effort.
- Not worth the added effort.

If I feel there is a clear personal benefit, making time to do something voluntary at work is:

- Worth the added effort.
- Somewhat worth the added effort.
- Neither worth nor not worth the added effort.
- Somewhat not worth the added effort.
- Not worth the added effort.

*** Problem Awareness (PA)**
- Please Read-

Recycling Contamination occurs when trash is mixed together with recyclables.

Recycling contamination is a problem at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Prefer not to answer

***Moral Norms (MN)**
- Please Read -

Recycling correctly refers to the proper sorting of waste, so that recyclables and trash are not mixed together.

It would be wrong, if I made no effort to recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree

- Somewhat disagree
- Strongly disagree

I would feel guilty, if I didn't try to recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I feel it is my moral responsibility to recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

*** Past Behavior (PB) Self-Reported**

I always recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Prefer not to answer

All Direct Measures - (BI = ATT + SN +PCB)

I feel recycling correctly at work is:

- Very difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Very easy

At work, most people who are important to me think I should try to recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree

- Somewhat disagree
- Strongly disagree

Recycling correctly at work is:

- Good
- Somewhat good
- Neither good nor bad
- Somewhat bad
- Bad

I try to recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

At work, recycling items correctly is entirely my decision to make.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

At work, most people whose opinions I value approve of me trying to recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Recycling correctly at work is:

- Harmful
- Somewhat harmful
- Neither harmful nor beneficial
- Somewhat beneficial
- Beneficial

I want to recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

If I wanted to, I could recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

At work, most people want me to recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Recycling correctly at work is:

- Unprofessional
- Somewhat unprofessional
- Neither professional nor unprofessional
- Somewhat professional
- Professional

I have every intention to recycle correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

At work, I cannot control whether items are recycled correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree

- Strongly disagree

At work, I feel under social pressure to recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Recycling correctly at work is:

- Worthwhile
- Somewhat worthwhile
- Neither worthwhile nor not useful
- Somewhat not useful
- Not useful

***Motivation to comply (MC) - Indirect Measure (NB x MC = SN)**

What coworkers think I should do matters to me.

- A great deal
- A moderate amount
- A little
- Not at all
- Prefer not to answer

Managers' approval of my recycling habits is important to me.

- A great deal
- A lot
- A moderate amount
- A little
- Not at all
- Prefer not to answer

***Behavioral beliefs (BB) - Indirect Measure (BB x OE =ATT)**

If I recycle correctly at work, I will feel that I am doing something positive for the environment.

- Extremely likely

- Somewhat likely
- Neither likely nor unlikely
- Somewhat unlikely
- Extremely unlikely

If I recycle correctly at work, I will reduce the amount of waste going to landfills and save natural resources.

- Extremely likely
- Somewhat likely
- Neither likely nor unlikely
- Somewhat unlikely
- Extremely unlikely

If I recycle correctly at work, I know the recyclables will not mix with trash during its collection.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Recycling correctly at work personally benefits me.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Control beliefs (CB) - Indirect Measure (CB x PC = PCB)

At work, how often are you confused about what is recyclable and what is not recyclable?

- Always
- Most of the time
- About half the time
- Sometimes
- Never

At work, how often are recycling bins located too far away?

- Always
- Most of the time

- About half the time
- Sometimes
- Never

At work, how often do you feel there is not enough time to recycle correctly?

- Always
- Most of the time
- About half the time
- Sometimes
- Never

***Power of Control Factors (PC) - Indirect Measure (CB x PC= PCB)**

If I was confused about what items are recyclable, it would make it more difficult for me to recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

If work recycling bins were located too far away, it would make it more difficult for me to recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

If I was feeling pressed for time at work, it would make it more difficult for me to recycle items correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

***Normative beliefs (NB) - Indirect Measure (NB x MC =SN)**

My coworkers think I should recycle correctly.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Prefer not to answer

Managers' care about me recycling correctly at work.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Prefer not to answer

***Demographic Variables (ov)**

What gender do you identify as?

- Male
- Female
- Non-binary/third gender
- Prefer not to say

What's your age?

- 18 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 - 74
- 75 or older

What is the highest degree or level of education you have completed?

- Less than high school
- High school graduate
- Some college
- 2 year degree (eg. Associate)

- 4 year degree (eg. Bachelor)
- Master or Professional degree
- Doctorate degree
- Prefer not to say

What's your employment status?

- City employee (full-time)
- City employee (part-time)
- Other

What's your primary work location? (when not working remotely)

- City Hall
- Public Works
- Parks and Recreation
- Police Department
- Other

Does your job involve work that is inside a city facility or outdoors?

(pick the choice best describing your work environment when not working remotely)

- Almost always inside a City-owned facility.
- Inside City-owned facility with occasional outdoor work
- Half inside City-owned facility and half outdoor work
- Outdoors with some occasional work inside City-owned facilities
- Almost always outdoors
- Other

How long have you worked for the City?

- Less than 1 year
- 1-2 years
- 2-4 years
- 4-6 years
- 6 - 10 years
- More than 10 years

COVID

When I am at work, COVID-19 protocols have impacted my ability to recycle.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Prefer not to answer

Appendix G

Email Forwarded by City Manager

Email forwarded by city manager informing municipal employees of recycling survey.

Michael Weyand is conducting a workplace recycling survey as part of the research for his doctorate degree. He will also use the data collected to help guide the City's recycling efforts. Please take a few minutes and fill out the survey. It can be a great opportunity to take a break and help out a fellow employee.

Hey everyone: Please consider taking my recycling survey below. (Takes less than 10mins).

More about the Survey: I'm conducting this survey as a school research project. The survey's purpose is to understand better why we recycle at work. I'm also hopeful we'll use this information to help plan future City recycling initiatives. The survey is meant for all City employees (both managers and full-time/part-time staff) from all departments (e.g. Police, PW, Parks, City Hall, etc.). It's completely voluntary and will take less than 10 minutes to complete. The survey will close next Friday, 3/5. All survey responses are reported anonymously. No identifying information such as your name, email address, IP address will be collected at any time, and data will be analyzed in an aggregated manner. Please try to complete this survey if you have time.

Here's the link to the survey: [Workplace Recycling Survey](#)

Supervisors: Please print and share this email/QR Code with employees who may not regularly access their email.



Appendix H

Survey Reminder Email

Sent to all municipal employees.

Good afternoon everyone:

The recycling survey closes this Friday, so I'm sending out this reminder. Below is a recap from the original email sent out last Monday. Thanks!

I'm enrolled in Hood College's Doctorate of Organization Leadership program and seeking volunteers to complete my research study on workplace recycling. The hope is that data collected will provide insight on building environmental outreach initiatives for promoting pro-environmental behaviors. Please know that information collected will be kept private, and your name and email address will not be collected.

SURVEY LINK: (Survey link will be added later)

Thanks everyone,
-Michael Weyand

Appendix I

Initial Email to Department Heads

Email to prep to department heads of upcoming recycling survey.

Good morning everyone:

I'm sending you this email to inform you about a recycling survey staff will receive this upcoming Monday. If it's possible, I ask that you allow time for any employee interested in completing the survey. The survey should take roughly 10 minutes and is entirely voluntary.

Below is a draft of the email everyone will receive.

Thank you!
-Michael Weyand

Good morning everyone:

I'm enrolled in Hood College's Doctorate of Organization Leadership program and seeking volunteers to complete my research study on workplace recycling. The hope is that data collected will provide insight on building environmental outreach initiatives for promoting pro-environmental behaviors. Please know that information collected will be kept private, and your name and email address will not be collected.

SURVEY LINK: (Survey link will be added later)
Thanks everyone,
-Michael Weyand

Appendix J

Expert Review Modifications

Stage 2 - Expert review modifications to initial elicitation questions.

| Order | Initial Order | Question | Sentence Completion | Research Alignment |
|-------|---------------|--|--|-----------------------|
| EQ1 | New | Think back to your childhood, what were the experiences you had with recycling while growing up? | - | Anchoring |
| EQ2 | New | Do you feel there is a difference between your recycling habits at home vs. at work? | - | Recycling Experiences |
| EQ3 | New | Do you use recycling bins at work? If so, which ones? | - | Anchoring |
| EQ4 | EQ1 | Why do you try to recycle correctly at work? | The most important reason to recycle at work is... | Behavioral Beliefs |
| EQ5 | New | Would you say there is a difference between the philosophy of recycling “as much as possible” versus recycling “as correctly as” possible? | - | Vocabulary Clarity |
| EQ6 | New | What do you think happens when someone places a non-recyclable item in the recycling bin? | - | Anchoring |
| EQ7 | New | What do you do when you are not sure if something is recyclable? | - | Recycling Experience |
| EQ8 | EQ2 | Would you say recycling at work personally benefits you? | Recycling at work is... | Behavioral Beliefs |
| EQ9 | EQ3 | Are there any personal disadvantages or negative impacts to you personally for not recycling correctly at work? | Recycling at work is not... | Behavioral Beliefs |
| EQ10 | EQ4 | Think about the last time you were deciding whether to place an item in the recycling bin -- could you try to explain -- or describe the reasons why you might have decided to recycle or not recycle that item? | Always knowing what items are recyclable would... | Behavioral Beliefs |
| EQ11 | EQ5 | What do you think the main reasons why coworkers recycle correctly? | Everyone would recycle more at work if... | Normative Beliefs |
| EQ12 | EQ6 | *What are the main reasons why coworkers do not recycle correctly at work? | Recycling at work could be... | Normative Beliefs |
| EQ13 | EQ7 | *What would stop you from recycling correctly at work? | The hardest part about recycling at work is... | Control Beliefs |
| EQ14 | EQ8 | *What would help you recycle more correctly at work? | I would recycle more often at work if... | Control Beliefs |

Appendix K

Revisions to Pilot Elicitation Study

Stage 3 – observed issues and corrective actions during elicitation pilot study.

| Order | Observed Issues | Corrective Action | Final Elicitation Question | Research Alignment |
|-------|---|------------------------|--|-----------------------|
| EQ1 | - | - | Think back to your childhood, what were the experiences you had with recycling while growing up? | Anchoring |
| EQ2 | - | - | Do you feel there is a difference between your recycling habits at home vs. at work? | Recycling Experiences |
| - | Inadequate responses and caused participant apprehension. | Removed from Survey | Do you use recycling bins at work? If so, which ones? | Anchoring |
| EQ3 | Short responses | Slightly Reworded | What are the main reasons why you recycle at work? | Behavioral Beliefs |
| EQ4 | Participants would ask for the question to be repeated | Shortened and Reworded | What does “recycling correctly” mean to you? | Vocabulary Clarity |
| EQ5 | - | - | What do you think happens when someone places a non-recyclable item in the recycling bin? | Anchoring |
| EQ6 | - | - | What do you do when you are not sure if something is recyclable? | Recycling Experience |
| EQ7 | It did not capture the act of "recycling correctly." | Slightly Reworded | Does trying to recycle items correctly at work personally benefit you? | Behavioral Beliefs |
| EQ8 | Participants would ask for the question to be repeated | Shortened and Reworded | Are there any disadvantages to trying recycling items properly at work? | Behavioral Beliefs |
| EQ9 | Participants would ask for the question to be repeated | Shortened and Reworded | Who or what influences your workplace recycling habits the most? | Behavioral Beliefs |
| EQ10 | - | - | What do you think the main reasons why coworkers recycle correctly? | Normative Beliefs |
| EQ11 | - | - | What are the main reasons why coworkers do not recycle correctly at work? | Normative Beliefs |
| EQ12 | - | - | What would stop you from recycling correctly at work? | Control Beliefs |
| EQ13 | - | - | What would help you recycle more correctly at work? | Control Beliefs |

Appendix L

Summary of Survey Development Revisions

Stage 4 - Summary of survey development revisions during expert review

| Questionnaire Components | Item IDs | Reported or Observed Issue | Stage Reported | Corrective Action Taken |
|--|--------------------------|--|----------------|--|
| Informed Consent | IC | Address Employee Non-Participation | 2 | Added, "There are no negative consequences if you decide not to participate." |
| Context Description | DES1 | Explain Employee Remote Working Context | 2 | Added, "If you've been working remotely, please draw on your past in-person work experiences while completing the survey." |
| Outcome Evaluations (OE) | OE1 OE2 OE3 OE4 | Nebulous Likert Scale Response Statement | 3 & 4 | Reworded Likert responses from "undesirable" to "worth the added effort." |
| Context Description | DES 2 | Clarify the term "Recycling Contamination" | 3 | Added "Recycling Contamination occurs when trash is mixed together with recyclables." |
| Problem Awareness (PA) | PA1 | Level of Measurement Recorded Inconsistent Responses | 3 | Changed to Strongly Agree Likert Response Scale |
| Context Description | DES 3 | Clarify the term "Recycling Correctly" | 1 | Added "Recycling correctly refers to the proper sorting of waste, so that recyclables and trash are not mixed together." |
| Moral norm (MN) | MN1 MN2 MN3 | MN3 "Morally obligated" Term Confused Respondents | 4 | Reworded to "moral responsibility." |
| Past Behavior (PB) | PB1 | Level of Measurement Recorded Inconsistent Responses | 3 | Changed to Strongly Agree Likert Response Scale |
| Behavioral Intention (BI) (to recycle correctly) | BI1 BI2 BI3 | Identified as Possible Sensitive Topic to Employees | 4 | Added "Prefer Not to Answer" Response |

| Questionnaire Components | Item IDs | Reported or Observed Issue | Stage Reported | Corrective Action Taken |
|------------------------------------|--|--|----------------|---|
| Attitude (ATT) | ATT1 ATT2 ATT3 ATT4 | ATT1 - Identified for Nebulous Likert Scale Response Statement | 4 | Reworded Likert responses from "desirable" to "worthwhile" |
| Subjective Norm (SN) | SN1 SN2 SN3 SN4 | Respondents Skipped Over Items During Pilot | 3 | Made Items Force Response |
| Perceived Behavioral Control (PBC) | PCB1e PCB2e PCB3c PCB4c | PCB3c - Recorded Lower Cronbach's Alpha | 3 | PCB3c Reworded to "At work, I cannot control whether items are recycled correctly." |
| Motivation to Comply (MC) | MC1 MC2 | Incorrect Grammar. | 4 | Added Apostrophe to MC2. |
| Behavioral Beliefs (BB) | BB1 BB2 BB3 BB4 | Questioned Value Added for BB4. | 1 & 4 | None. Belief Retained from Elicitation Study. |
| Control Beliefs (CB) | CB1 CB2 CB3 | CB2 - Caused Respondent Confusion | 1 & 3 | CB2 Reworded to "At work, how often are recycling bins located too far away?" |
| Power of Control Factors (PC) | PC1 PC2 PC3 | None | None | Made Force Response. |
| Normative beliefs (NB) | NB1 NB2 | Identified as Possible Sensitive Topic to Employees | 4 | Added "Prefer Not to Answer" Response. |
| Demographic (DEM) | DEM1 DEM2 DEM3 DEM4 DEM5 DEM6 DEM7 | Suggested to Move to End of Questionnaire to Facilitate Higher Completion Rate | 4 | Relocated to Demographic Questions to End of Questionnaire. |
| COVID-19 | COV | Pilot Respondents Reported Context Confusion | 2 | Added "When I am at work" before item statement. |

Appendix M

PROCESS Output for H1 Behavioral, H2 Normative, & H3 Control Models

H1 Behavioral PROCESS Output

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5.3 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
Y : I_MEAN_B
X : I_BB_OE
M : I_MEAN_A

Covariates:
I_NB_MC I_CB_PC

Sample
Size: 105

OUTCOME VARIABLE:
I_MEAN_A

Model Summary

| | R | R-sq | MSE | F(HC3) | df1 | df2 | p |
|--|-------|-------|-------|--------|--------|----------|-------|
| | .5783 | .3344 | .1102 | 8.8510 | 3.0000 | 101.0000 | .0000 |

Model

| | coeff | se(HC3) | t | p | LLCI | ULCI |
|----------|--------|---------|---------|-------|--------|--------|
| constant | 3.8106 | .2194 | 17.3678 | .0000 | 3.3754 | 4.2459 |
| I_BB_OE | .0288 | .0064 | 4.5377 | .0000 | .0162 | .0414 |
| I_NB_MC | .0027 | .0040 | .6648 | .5077 | -.0053 | .0107 |
| I_CB_PC | .0054 | .0050 | 1.0857 | .2802 | -.0045 | .0153 |

Standardized coefficients

| | coeff |
|---------|-------|
| I_BB_OE | .5757 |
| I_NB_MC | .0448 |
| I_CB_PC | .0858 |

OUTCOME VARIABLE:
I_MEAN_B

Model Summary

| | R | R-sq | MSE | F(HC3) | df1 | df2 | p |
|--|-------|-------|-------|--------|--------|----------|-------|
| | .6520 | .4251 | .0444 | 9.1007 | 4.0000 | 100.0000 | .0000 |

Model

| | coeff | se(HC3) | t | p | LLCI | ULCI |
|----------|--------|---------|--------|-------|--------|--------|
| constant | 3.7866 | .4837 | 7.8277 | .0000 | 2.8268 | 4.7463 |
| I_BB_OE | .0166 | .0044 | 3.7615 | .0003 | .0078 | .0253 |

| b-path | | | | | | |
|----------|--------|-------|---------|-------|--------|-------|
| I_MEAN_A | .1273 | .1045 | 1.2181 | .2260 | -.0800 | .3345 |
| I_NB_MC | -.0018 | .0025 | -.7136 | .4771 | -.0067 | .0032 |
| I_CB_PC | -.0071 | .0039 | -1.8219 | .0715 | -.0147 | .0006 |

Standardized coefficients

| | coeff |
|----------|--------|
| I_BB_OE | .4874 |
| I_MEAN_A | .1872 |
| I_NB_MC | -.0436 |
| I_CB_PC | -.1647 |

***** TOTAL EFFECT MODEL *****

OUTCOME VARIABLE:

I_MEAN_B

Model Summary

| | R | R-sq | MSE | F(HC3) | df1 | df2 | p |
|--|-------|-------|-------|---------|--------|----------|-------|
| | .6339 | .4018 | .0458 | 12.5019 | 3.0000 | 101.0000 | .0000 |

Model

| | coeff | se(HC3) | t | p | LLCI | ULCI |
|----------|--------|---------|---------|-------|--------|--------|
| constant | 4.2715 | .1529 | 27.9395 | .0000 | 3.9682 | 4.5748 |
| I_BB_OE | .0203 | .0045 | 4.5155 | .0000 | .0114 | .0292 |
| I_NB_MC | -.0014 | .0025 | -.5840 | .5605 | -.0063 | .0034 |
| I_CB_PC | -.0064 | .0041 | -1.5662 | .1204 | -.0144 | .0017 |

Standardized coefficients

| | coeff |
|---------|--------|
| I_BB_OE | .5951 |
| I_NB_MC | -.0352 |
| I_CB_PC | -.1486 |

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y

| | Effect | se(HC3) | t | p | LLCI | ULCI | c_ps |
|------|--------|---------|-------|-------|-------|-------|------|
| c_cs | .0203 | .0045 | | | | | |
| | 4.5155 | .0000 | .0114 | .0292 | .0743 | .5951 | |

Direct effect of X on Y

| | Effect | se(HC3) | t | p | LLCI | ULCI | c'_ps | c'_cs |
|--|--------|---------|--------|-------|-------|-------|-------|-------|
| | 0166 | .0044 | 3.7615 | .0003 | .0078 | .0253 | .0608 | .4874 |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_A | .0037 | .0030 | -.0011 | .0105 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_A | .0135 | .0104 | -.0044 | .0358 |

Completely standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_A | .1078 | .0825 | -.0349 | .2823 |

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

WARNING: Variables names longer than eight characters can produce incorrect output when some variables in the data file have the same first eight characters. Shorter variable names are recommended. By using this output, you are accepting all risk and consequences of interpreting or reporting results that may be incorrect.

----- END MATRIX -----

H2 Normative Model PROCESS Output

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5.3 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
Y : I_MEAN_B
X : I_NB_MC
M : I_MEAN_S

Covariates:
I_BB_OE I_CB_PC

Sample
Size: 105

OUTCOME VARIABLE:
I_MEAN_S

| Model Summary | R | R-sq | MSE | F(HC3) | df1 | df2 | p |
|---------------|-------|-------|-------|---------|--------|----------|-------|
| | .5885 | .3463 | .4211 | 14.4171 | 3.0000 | 101.0000 | .0000 |

| Model | coeff | se (HC3) | t | p | LLCI | ULCI |
|----------|--------|----------|--------|-------|--------|--------|
| constant | 3.2100 | .3507 | 9.1522 | .0000 | 2.5142 | 3.9058 |
| I_NB_MC | .0689 | .0113 | 6.1097 | .0000 | .0465 | .0913 |
| I_BB_OE | .0019 | .0111 | .1683 | .8667 | -.0202 | .0239 |
| I_CB_PC | .0016 | .0146 | .1110 | .9118 | -.0274 | .0306 |

Standardized coefficients

| | coeff |
|---------|-------|
| I_NB_MC | .5836 |
| I_BB_OE | .0189 |
| I_CB_PC | .0131 |

OUTCOME VARIABLE:
I_MEAN_B

| Model Summary | R | R-sq | MSE | F(HC3) | df1 | df2 | p |
|---------------|---|------|-----|--------|-----|-----|---|
| | | | | | | | |

.6500 .4225 .0446 9.4527 4.0000 100.0000 .0000

Model

| | coeff | se (HC3) | t | p | LLCI | ULCI |
|----------|--------|----------|---------|-------|--------|--------|
| constant | 4.0748 | .2090 | 19.4921 | .0000 | 3.6601 | 4.4896 |
| I_NB_MC | -.0057 | .0035 | -1.6157 | .1093 | -.0126 | .0013 |
| I_MEAN_S | .0613 | .0391 | 1.5656 | .1206 | -.0164 | .1389 |
| I_BB_OE | .0201 | .0045 | 4.5168 | .0000 | .0113 | .0290 |
| I_CB_PC | -.0065 | .0038 | -1.6899 | .0942 | -.0141 | .0011 |

Standardized coefficients

| | coeff |
|----------|--------|
| I_NB_MC | -.1389 |
| I_MEAN_S | .1778 |
| I_BB_OE | .5918 |
| I_CB_PC | -.1510 |

***** TOTAL EFFECT MODEL *****

OUTCOME VARIABLE:

I_MEAN_B

Model Summary

| R | R-sq | MSE | F (HC3) | df1 | df2 | p |
|-------|-------|-------|---------|--------|----------|-------|
| .6339 | .4018 | .0458 | 12.5019 | 3.0000 | 101.0000 | .0000 |

Model

| | coeff | se (HC3) | t | p | LLCI | ULCI |
|----------|--------|----------|---------|-------|--------|--------|
| constant | 4.2715 | .1529 | 27.9395 | .0000 | 3.9682 | 4.5748 |
| I_NB_MC | -.0014 | .0025 | -.5840 | .5605 | -.0063 | .0034 |
| I_BB_OE | .0203 | .0045 | 4.5155 | .0000 | .0114 | .0292 |
| I_CB_PC | -.0064 | .0041 | -1.5662 | .1204 | -.0144 | .0017 |

Standardized coefficients

| | coeff |
|---------|--------|
| I_NB_MC | -.0352 |
| I_BB_OE | .5951 |
| I_CB_PC | -.1486 |

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y

| Effect | se (HC3) | t | p | LLCI | ULCI | c_ps |
|--------|----------|--------|-------|--------|-------|--------|
| c_cs | | | | | | |
| -.0014 | .0025 | -.5840 | .5605 | -.0063 | .0034 | -.0053 |
| -.0352 | | | | | | |

Direct effect of X on Y

| Effect | se (HC3) | t | p | LLCI | ULCI | c'_ps |
|--------|----------|---------|-------|--------|-------|--------|
| c'_cs | | | | | | |
| -.0057 | .0035 | -1.6157 | .1093 | -.0126 | .0013 | -.0207 |
| -.1389 | | | | | | |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_S | .0042 | .0027 | -.0008 | .0097 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_S | .0155 | .0098 | -.0030 | .0359 |

Completely standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_S | .1037 | .0644 | -.0201 | .2333 |

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

WARNING: Variables names longer than eight characters can produce incorrect output when some variables in the data file have the same first eight characters. Shorter variable names are recommended. By using this output, you are accepting all risk and consequences of interpreting or reporting results that may be incorrect.

----- END MATRIX -----

H3 Control Model PROCESS Output

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5.3 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
Y : I_MEAN_B
X : I_CB_PC
M : I_MEAN_P

Covariates:
I_BB_OE I_NB_MC

Sample
Size: 105

OUTCOME VARIABLE:
I_MEAN_P

Model Summary

| | R | R-sq | MSE | F(HC3) | df1 | df2 | p |
|--|-------|-------|-------|---------|--------|----------|-------|
| | .6010 | .3612 | .4832 | 15.2476 | 3.0000 | 101.0000 | .0000 |

Model

| | coeff | se(HC3) | t | p | LLCI | ULCI |
|----------|--------|---------|---------|-------|--------|--------|
| constant | 3.0653 | .3168 | 9.6742 | .0000 | 2.4367 | 3.6938 |
| I_CB_PC | -.0556 | .0148 | -3.7530 | .0003 | -.0850 | -.0262 |
| I_BB_OE | .0198 | .0098 | 2.0111 | .0470 | .0003 | .0393 |
| I_NB_MC | .0354 | .0117 | 3.0195 | .0032 | .0121 | .0586 |

Standardized coefficients

| | coeff |
|---------|--------|
| I_CB_PC | -.4127 |
| I_BB_OE | .1850 |
| I_NB_MC | .2765 |

OUTCOME VARIABLE:

I_MEAN_B

Model Summary

| | R | R-sq | MSE | F (HC3) | df1 | df2 | p |
|--|-------|-------|-------|---------|--------|----------|-------|
| | .6534 | .4270 | .0443 | 9.0405 | 4.0000 | 100.0000 | .0000 |

Model

| | coeff | se (HC3) | t | p | LLCI | ULCI |
|----------|--------|----------|---------|-------|--------|--------|
| constant | 4.0780 | .1892 | 21.5571 | .0000 | 3.7027 | 4.4533 |
| I_CB_PC | -.0029 | .0039 | -.7303 | .4669 | -.0106 | .0049 |
| I_MEAN_P | .0631 | .0315 | 2.0020 | .0480 | .0006 | .1257 |
| I_BB_OE | .0190 | .0044 | 4.2742 | .0000 | .0102 | .0278 |
| I_NB_MC | -.0037 | .0026 | -1.3927 | .1668 | -.0089 | .0016 |

Standardized coefficients

| | coeff |
|----------|--------|
| I_CB_PC | -.0667 |
| I_MEAN_P | .1984 |
| I_BB_OE | .5584 |
| I_NB_MC | -.0900 |

***** TOTAL EFFECT MODEL *****

OUTCOME VARIABLE:

I_MEAN_B

Model Summary

| | R | R-sq | MSE | F (HC3) | df1 | df2 | p |
|--|-------|-------|-------|---------|--------|----------|-------|
| | .6339 | .4018 | .0458 | 12.5019 | 3.0000 | 101.0000 | .0000 |

Model

| | coeff | se (HC3) | t | p | LLCI | ULCI |
|----------|--------|----------|---------|-------|--------|--------|
| constant | 4.2715 | .1529 | 27.9395 | .0000 | 3.9682 | 4.5748 |
| I_CB_PC | -.0064 | .0041 | -1.5662 | .1204 | -.0144 | .0017 |
| I_BB_OE | .0203 | .0045 | 4.5155 | .0000 | .0114 | .0292 |
| I_NB_MC | -.0014 | .0025 | -.5840 | .5605 | -.0063 | .0034 |

Standardized coefficients

| | coeff |
|---------|--------|
| I_CB_PC | -.1486 |
| I_BB_OE | .5951 |
| I_NB_MC | -.0352 |

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y

| | Effect | se (HC3) | t | p | LLCI | ULCI | c_ps |
|------|--------|----------|---------|-------|--------|-------|--------|
| c_cs | -.0064 | .0041 | -1.5662 | .1204 | -.0144 | .0017 | -.0234 |
| | -.1486 | | | | | | |

Direct effect of X on Y

| | Effect | se (HC3) | t | p | LLCI | ULCI | c'_ps |
|-------|--------|----------|--------|-------|--------|-------|--------|
| c'_cs | -.0029 | .0039 | -.7303 | .4669 | -.0106 | .0049 | -.0105 |
| | -.0667 | | | | | | |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_P | -.0035 | .0021 | -.0084 | -.0002 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_P | -.0129 | .0075 | -.0303 | -.0008 |

Completely standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|----------|--------|--------|----------|----------|
| I_MEAN_P | -.0819 | .0479 | -.1914 | -.0049 |

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

NOTE: A heteroscedasticity consistent standard error and covariance matrix estimator was used.

WARNING: Variables names longer than eight characters can produce incorrect output when some variables in the data file have the same first eight characters. Shorter variable names are recommended. By using this output, you are accepting all risk and consequences of interpreting or reporting results that may be incorrect.

----- END MATRIX -----