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Influences on Supply Manager Behavior Toward Environmental Responsibility

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INFLUENCES ON SUPPLY MANAGER BEHAVIOR TOWARD
ENVIRONMENTAL RESPONSIBILITY

by

James Anthony Swaim

A Dissertation

Presented in Partial Fulfillment of Requirements for the

Degree of

Doctor of Business Administration

In the

Coles College of Business

Kennesaw State University

Kennesaw, GA

2013

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Coles College of Business
Doctor of Business Administration

Dissertation Defense: April 17, 2013

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Dedication & Acknowledgements

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ABSTRACT
INFLUENCES ON SUPPLY MANAGER BEHAVIOR TOWARD
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As firms invest a substantial amount of time, effort, and funds to purchase goods and services, it is questionable if organizations will reach environmental sustainability objectives without supply manager active involvement. Although existing research has identified low supply manager support for environmental buying, there is little theoretical understanding and explanation relating corporate environmental policies and objectives to individual behaviors. Consequently, this dissertation seeks to provide insight into understanding and overcoming a lack of supply manager support for environmental sustainability. A research model based on the Theory of Planned Behavior used survey data from practicing supply managers to study the behavioral aspects of environmentally responsible buying. Support was found for all five hypotheses predicting direct effects on intention to engage in environmentally responsible behavior and actual environmentally responsible behavior. Also, direct effects for non-hypothesized relationships were found for the two moderating variables. This dissertation will potentially help researchers and practitioners better understand the antecedents related to

supply manager environmentally responsible behavior and subsequently support implementation of corporate environmental sustainability objectives.

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CHAPTER 1 INTRODUCTION

1.1 The Importance and Acceptance of Environmental Sustainability in Today's Organizations

Firms are increasingly adopting practices that focus on internal and external objectives related to both economic growth and protecting the environment (Angell & Klassen, 1999; Darnall, Jolley, & Handfield, 2008; Madu, Kuei, & Madu, 2002; Noci, 1997). Examples of corporate environmental initiatives include instituting supplier codes of conduct (Locke, Kochan, Romis, & Qin, 2007), developing environmental management systems (Darnall et al., 2008), and appointing company champions for environmental sustainability (Gattiker & Carter, 2010). While this focus is encouraging, it is also necessary for organizations to secure sufficient individual employee levels of support for corporate environmental initiatives (Carter, Kale, & Grimm, 2000).

For example, supply manager support for environmental sustainability must be part of mounting organizational expectations for performance in the supply chain management area. Contributing to this organizational adoption of environmental sustainability, supply managers can play a critical role in supporting corporate environmental initiatives through their efforts in sourcing suppliers and buying materials and services (Carter & Dresner, 2001; Carter et al., 2000). Supply managers need to accept responsibility, either individually or as part of a team, to meet these goals.

Despite the large degree of corporate adoption of environmental sustainability defined as *reducing harm to the environment* (derived from Brundtland,

1987; Shrivastava, 1995), supply managers have yet to provide the level of expected support and significantly, research has not identified nor explained the reasons for this low level of support (Carter et al., 2000; Preuss, 2005). Individual employees, and in the case of this dissertation, supply managers, must ultimately champion corporate environmental sustainability initiatives (Gattiker & Carter 2010; Schwering 2011), developing policy and strategy in a world marked by shifting priorities (Runhaar, Driessen, & Vermeulen, 2005). To this point, Cantor, Morrow, and Montabon (2012, p. 45) caution that “organizations are struggling on how to motivate their employees to become engaged in environmental activities.” Similarly, Ng and Burke (2010, p. 603) assert “what is critically missing in the literature is an identification of individual-level factors that will contribute to environmental leadership behavior among corporate executives and managers.”

Increased levels of involvement with environmental sustainability activities represent additional job duties for supply managers, and as such, add to their responsibilities of balancing traditional supplier criteria such as cost, quality, and delivery as well as coordinating intra and inter-firm flows of information (Preuss, 2005). Carter et al. (2000) affirm these organizational expectations by asserting that firm environmental goals must be embedded with supply management activities. They identify specific areas where supply managers can make contributions such as buying recycled or reusable packaging, communicating company waste reduction goals to existing and potential suppliers, and using long-term life cycle perspectives when buying materials. Despite the potential for supply managers to enhance corporate environmental sustainability effectiveness, a research gap exists as studies have not been conducted and as a result,

knowledge is lacking to explain the underlying personal factors for a lack of supply manager environmentally responsible behavior.

1.2 Research Gap: Lack of Supply Manager Support for Environmental Sustainability

Researchers have examined multiple potential influences to increase understanding of environmentally-sustainable supply manager actions (e.g., embedding environmentally sustainable criteria in selecting suppliers and placing purchase orders). These influences include pressure from customers, suppliers, management, and regulatory agencies as well as management setting work objectives and providing training (Carter & Carter, 1998; Carter, Ellram, & Ready, 1998; Drumwright, 1994; Min & Galle, 2001). Despite these attempts to increase supply managers' involvement with environmental sustainability, extant literature reveals little support for supply manager environmental sustainability activities (Carter & Carter, 1998; Carter et al., 1998; Gattiker & Carter, 2010) leading some researchers to challenge claims made by organizations concerning pro-environmental supply management efforts. Specifically, Baden, Harwood, and Woodward (2009) indicate that even though environmental sustainability was part of decision making criteria, purchases were based on delivery and price while Boyd, Speakman, Kamauff, and Werhane (2007) found that buyers inconsistently monitor suppliers' compliance with environmental performance requirements. ElTayeb, Zailani, and Jayaraman, (2010, p. 207) clearly summarize the current lack of supply manager support for environmental sustainability as they state “the true drivers that induce firms to adopt green purchasing remain an unresolved issue.” Therefore, a gap exists in terms of research designed to identify and explain the reasons

for lack of supply manager support for environmental sustainability. Without this understanding, firms' attempts to influence supply managers in support of corporate environmental sustainability initiatives will likely be impeded.

One potential source of the lack of supply manager support may lie with insufficient individual commitment to corporate environmental goals. Starik and Rands (1995) argue that environmentally sustainable organizations can only emerge through effective employee participation and unifying employee contributions. They identify the need for deep and widespread individual commitment to environmental sustainability. Cantor et al. (2012) provide further emphasis for this argument as they identify a need for increased theoretical development and empirical testing of the influences toward employee environmentally responsible behaviors. While prior studies have focused on external pressures as attempts to increase supply manager action, this dissertation consequently seeks to examine the behavioral influences that explain supply manager orientation toward environmental responsibility.

This research effort responds to a need to further study the role of individual behavior, specifically the supply manager, toward environmental sustainability (Boudreau, Hopp, McClain, & Thomas, 2003; Cantor et al., 2012; Kollmus & Agyeman, 2002; Tokar, 2010) and as such, offers what is believed to be the first study to seek understanding of lack of supply manager support for environmental sustainability from an individual behavior context.

Given this focus, the primary research questions include:

- What factors influence supply managers' intention toward environmentally responsible behavior?

- What is the relationship between supply managers' intention to support environmentally responsible behavior and actual environmentally responsible behavior?
- Are there other factors such as personal decision making biases that influence the relationship between supply manager intention toward environmentally responsible behavior and actual environmentally responsible behavior?

1.3 Theoretical Approach and Methodology

To address the research questions, the Theory of Planned Behavior (Ajzen, 1985), from management and social sciences literature, will be used. This theory looks at the link between intention and behavior and states that attitude toward behavior, subjective norms, and perceived behavioral control, together shape an individual's behavioral intentions and behaviors (Ajzen, 1985). This frequently applied approach will provide a theoretical lens to examine the influences affecting supply manager behavioral intention toward environmentally responsible behavior and actual environmentally responsible behavior. The potential influence of two moderating variables, perceived environmental impact and hyperbolic discounting, will also be considered. These variables will be examined for their influences as biases in supply manager decision making and will therefore provide information to address the last research question. These biases, although not tested in supply chain studies, have the potential to increase explanatory power of the research model as suggested both by practitioners and in the literature (Ellen, Wiener, & Cobb-Walgren, 1991; Hall & Fong, 2007; Carter, Kaufmann, & Michel, 2007; Kim, 2011).

1.4 Research Contributions

This dissertation will offer important contributions to both scholars and practitioners. The initial purpose of the dissertation is to fill the aforementioned research gap by providing insights into supply manager lack of support to adopt environmentally sustainable buying. This will provide answers to long-standing academic questions about the drivers of supply management environmentally responsible behavior and help corporations better motivate employees and support environmentally sustainable buying objectives. Next, from a methodology standpoint, the research presents a behavior-based micro-level analysis of individual supply manager behavior believed to be rare in existing supply management literature. Finally, this research will offer two secondary contributions. First, while the Theory of Planned Behavior is widely-accepted and well known in other research streams, no studies have been found that apply the theory in a corporate supply management context. The other contribution consists of applying two biases to the basic Theory of Planned Behavior model to potentially increase overall predictability. The first variable, perceived environmental impact, examines how personal beliefs and resulting actions might influence the relationship between attitude and behavioral intention toward environmentally responsible behavior. And the second variable, hyperbolic discounting, determines the possible role of decision making biases on the relationship between supply manager behavioral intention and actual environmentally responsible behavior.

1.5 Summary

This section began with a brief discussion of the overall importance and acceptance of environmental sustainability by organizations. It described the enabling role that supply managers can play toward environmental initiatives and presenting potential factors that might increase their individual environmentally responsible behavior. Next, a lack of supply manager support for organizational environmental sustainability programs was cited, building evidence for the research gap of a lack of understanding of the drivers for supply manager environmentally responsible behavior. Finally, the section was brought to a close by presenting the research questions and reviewing the theoretical approach, leading to identification of the research methodology and expected research contributions described in greater depth in the chapters that follow.

CHAPTER 2 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Overview

In this section, a comprehensive literature review will be presented and hypotheses developed to address the research gap of a lack of supply manager support for corporate environmental sustainability objectives. First, environmental sustainability will be defined, and the lack of supply manager support found in the literature will be discussed in detail. Next, the opportunity for applying organizational behavioral theory in the supply chain management area will be described. This is followed by a discussion of the Theory of Planned Behavior (Ajzen, 1985) and a review of the theory's constructs. This will then lead to a presentation of how the Theory of Planned Behavior has been operationalized in the literature, and specifically, how it has been used in environmental studies. This section then culminates with an explanation of how additional constructs might enhance the theory's predictive capability, presentation and discussion of the research model, and development of hypotheses.

2.2 Overview of Environmental Sustainability

The origin of environmental sustainability begins with Brundtland (1987), which defined *sustainability* as the ability to meet current generational needs without impinging on the needs of future generations. Shrivastava (1995) adds to this description of sustainability by stating that it represents, “the potential for reducing long-term risks

associated with resource (e.g., air, water, natural materials) (Liu, 2007) depletion and pollution and waste management.” (p. 955). Drawing on these established definitions, this dissertation defines environmental sustainability as *reducing harm to the environment*. Examples include minimizing waste, curtailing harmful emissions, and conserving natural resources.

As mentioned earlier, firms increasingly pursue objectives related to both economic growth and protecting the environment (Angell & Klassen, 1999; Darnall et al., 2008; Madu et al., 2002; Noci, 1997). Environmental sustainability remains a significant topic as customers, regulatory organizations, advocate groups, and even employees continue to demand that corporations effectively manage environmental issues impacted by their operations (Carter & Easton, 2011). To make an effective contribution, firms need to develop a deeper understanding of the requirements to be more environmentally responsible. This knowledge can reduce the negative effects of their activities on the environment while simultaneously, capitalize on innovation opportunities that lead to reduced costs (Christmann, 2000; Earnhart & Lizal, 2007).

2.2.1 Financial implications: organizations engaging in sustainability activities.

Organizational support for environmental sustainability continues to gain strategic importance (Jeffers, 2010). Firms embed environmental sustainability practices in their operations and develop environmental management systems to meet customer expectations, respond to regulations, and drive cost reductions (Darnall et al., 2008). Additionally, firms realize that along with generating tangible benefits through waste elimination, emissions reduction, and recycling, environmental sustainability orientation help them create a favorable public image by promoting their use of clean technologies

and processes and developing products that help preserve the environment (Azzone & Bertele, 1994; Bansal & Roth, 2000; Porter & Kramer, 2002).

Existing research identifies mixed financial implications for environmental sustainability (Table 1). On one hand, environmental sustainability has been related to increased net income and reduced cost of goods sold (Carter et al., 2000), cost savings due to reduced packaging waste (Rosenau, Twede, Mazzeo, & Singh, 1996), improved return on assets (Russo & Fouts, 1997), and extraordinarily-high stock returns (Klassen & McLaughlin, 1996). However, other researchers find no economic effects associated with environmental sustainability (Gilley, Worrell, Davidson, & El-Jelly, 2000; Watson, Klingenberg, Polito, & Geurts, 2004) while Cordeiro and Sarkis (1997) and Wagner (2005) actually identify negative economic outcomes for earnings-per-share growth forecasts and return on equity.

Supply managers are faced with the challenge of making positive contributions to both financial and environment sustainability goals. Total expenditures for purchased materials and services continue to grow (Burt, Dobler, & Starling, 2004) and are estimated to range between 50% and 90% of corporate expenses (Green, Morton, & New, 1996). Supply managers, due to their organizational role in committing company funds (Preuss, 2005), can make a positive impact by increasing environmental sustainability and reducing cost. However, the aforementioned mixed financial results may cause confusion regarding supply manager understanding cost and benefits associated with environmental sustainability.

Table 1: *Environmental Sustainability Outcomes*

	Financial Results	Researcher(s)
<i>Positive</i>	Increased net income, reduced cost of goods sold	Carter et al., 2000
	Extraordinarily-high stock returns	Klassen & McLaughlin, 1996
	Cost savings from reduced packaging waste	Rosenau et al., 1996
	Improved return on assets	Russo & Fouts, 1997
<i>Neutral</i>	No economic effect	Gilley et al., 2000; Watson et al., 2004
<i>Negative</i>	Negative earnings-per-share growth forecast	Cordeiro & Sarkis, 1997
	Reduced return on equity	Wagner, 2005

2.2.2 Potential role of supply managers in an organization's effort toward environmental sustainability.

Prior to the 1980s, personnel working in supply management were viewed as primarily tactical and even clerical, using manual systems to order materials and manage inventory and focusing on price reductions instead of helping develop strategic plans (Burt et al., 2004; Handfield, Walton, Sroufe, & Melynk, 2002). However, supply managers now play a more critical organizational role by aligning resources with company objectives and strategies (Carr & Smeltzer, 1997; Kraljic, 1983). These higher level expectations set the stage for increased participation of supply managers for environmental sustainability, stated very clearly by Carter et al. (2000) as embedding firm environmental goals within supply management activities.

Supply managers need to be active participants to help organizations achieve environmental sustainability objectives. For instance, Preuss (2005) emphasizes the

monitoring and controlling role that supply managers must play to assure environmental compliance of purchased goods and services. Carter et al. (2000) concur as they indicate that supply managers must reflect firm environmental goals in their sourcing and buying practices. Moreover, Krause, Vachon, and Klassen (2009) provide support for active supply manager involvement in environmental sustainability activities by advocating increased transparency in setting goals, prioritizing activities, and determining supplier environmental compliance.

Supply manager actions that support corporate environmental sustainability goals represent environmentally responsible behavior. Environmentally responsible behavior has been discussed extensively but not specifically defined (Iwata, 2001; Rojsek, 2001; Vaske & Kobrin, 2001). In past research, supply manager orientation toward environmental sustainability has been called *environmentally conscious purchasing* (Handfield et al., 2002), *green purchasing* (Min & Galle, 1997), *green supply* (Bowen, Cousins, Lamming, & Farukt, 2001), and *environmental purchasing* (Carter et al., 2000). These terms relate to this dissertation as all concern integrating corporate environmental objectives with traditional objectives of cost, quality and delivery. Related terms are *environmentally sensitive or conscious behavior* (Albayrak, Caber, & Moutinho, 2011) and *environmentally significant behavior* (Stern, 2000).

Regardless of the particular term, environmental responsibility refers to overall care toward the environment and environmentally responsible behavior converts this care into action (Bamberg & Moser, 2007; Korfiatis, Horvadas, & Pantas, 2004). Therefore, for the purposes of this dissertation, the term *environmentally responsible behavior* will be used due to its more neutral name as it excludes the words "green" and "conscious." It

also has generalizability for potential applications in areas other than supply management as it avoids the use of "supply" and "purchasing." Environmentally responsible behavior is thus defined from a supply manager perspective as *following corporate environmental sustainability objectives while also purchasing materials and services that meet cost, delivery, and quality requirements*. This definition recognizes the idea of balancing environmental concerns with other, sometimes conflicting, corporate objectives.

2.2.3 Supply manager reaction toward environmental sustainability.

Early research presents some supply manager support for environmental sustainability showing that supply managers desired greater participation in environmental issues and actively evaluated suppliers' environmental sustainability capabilities (Handfield et al., 2002; Murphy, Poist, & Braunschweig, 1996; Zsidisin & Hendrick, 1998). However, the literature primarily indicates that supply managers often fail to adopt environmental sustainability practices (Carter & Carter, 1998; Carter et al., 1998; Gattiker & Carter, 2010). For instance, as part of environmental compliance audits, Min and Galle (1997) found that less than one-third of supply managers include supplier environmental commitment in selection criteria and generally do not fully recognize the benefits of green buying. Moreover, Drumwright (1994) indicated that supply managers tend to ignore opportunities for environmental sustainability and resist initiatives from colleagues. As such, Gattiker and Carter (2010) designate supply management as environmental sustainability-resistant.

The literature has yet to empirically explain this low level of support as it has only examined external, non-behavioral influences. Thus, this dissertation focuses on individual behavioral characteristics, none which have been located in literature to study

supply manager environmentally responsible behavior. Table 2 summarizes the reasons for or examples of low supply manager environmental sustainability support that have been presented by researchers thus far.

One reason for low support may be related to difficulty in translating a macro concept like organizational environmental sustainability to individual supply manager responsibilities. Reflecting on Shrivastava (1995) and Stead and Stead (1996), Carter and Rogers (2008, p. 363) state, “Because Brundtland’s definition (of environmental sustainability) is so far reaching, organizations often find it difficult to determine individual roles within this broader, macro-economic perspective.” As another reason for lack of supply manager environmental sustainability support, Krause et al. (2009) identify the difficulty of measuring sustainability actions as compared to more traditional activities such as quality, cost, and delivery. They also highlight the trade-off of investing supply management resources to current priorities (e.g., assuring stable supply and pursuing lower costs for materials and services) and future objectives (e.g., setting expectations for and coordinating supplier environmental sustainability capabilities).

Preuss (2001) identifies supply manager focus primarily on internal user requirements and financial targets, suggesting that this leads to exclusion of environmental sustainability activities. Preuss also cites a lack of access to corporate environmental sustainability policies as an obstacle. Further, Walton, Handfield, & Melnyk (1998, p. 3) depict supply managers as having a basic lack of interest in advancing environmental sustainability illustrated by statements such as, “We need only comply to the letter of the law,” and “If we ignore it, it might go away.” This basic level of unconcern is defined in a slightly different way by Boyd et al. (2007, p. 353) as they

state, "Some buyers shut their eyes and avoid facing the issues." These examples reflect a general attitude of "resistant adaptation" wherein employees are reluctant to internalize environmental issues and strategies (Walley & Whitehead, 1994).

Additional explanations for lack of supply manager environmental sustainability support include low individual knowledge about environmental issues and insufficient understanding of the relationship between supply management capabilities and organizational environmental sustainability initiatives (Bowen et al., 2001). Min and Galle (1997) identify several other reasons including beliefs that environmental initiatives are financially costly, a lack of clear environmental sustainability costs and benefits measurements, tendencies to be reactive to daily, tactical responsibilities, and focus on avoiding environmental penalties instead of incorporating environmental goals.

Summarizing the above discussion, supply management represents a key potential enabler of corporate environmental initiatives, yet existing research reveals a lack of supply manager behavior to operationalize environmental sustainability practices. As mentioned earlier, Starik and Rands (1995) advocate that supply managers must play an active role in creating and maintaining environmentally sustainable organizations. So it is important to better understand the drivers of behavioral intention and actual behavior for environmental sustainability among supply managers. Hence, there is a need to apply a behavioral lens in the study of individual supply manager intention and behavior relative to environmental sustainability.

Table 2: *Reasons for and Examples of Lack of Supply Management Environmental Sustainability Support*

Reasons For or Examples of Reluctance	Researcher(s)
<ul style="list-style-type: none"> • Low knowledge about environmental issues • Low understanding of how supply management job duties relate to environmental sustainability initiatives 	Bowen et al., 2001
<ul style="list-style-type: none"> • Ignored opportunities to work on environmental sustainability programs • Resist initiatives for environmental sustainability from colleagues 	Drumwright, 1994
<ul style="list-style-type: none"> • Viewed as resistant to environmental sustainability during selection process for program champion 	Gattiker & Carter, 2010
<ul style="list-style-type: none"> • Did not recognize benefits of environmentally-oriented buying • Excluded supplier commitment to environmental sustainability as selection criteria • Lacked methods to measure benefits and costs of environmental sustainability • Believed that environmental initiatives are costly • Lacked management commitment • Had tendencies to be reactive and "put out fires" • Focused on avoiding environmental penalties instead of incorporating environmental goals 	Min & Galle, 1997
<ul style="list-style-type: none"> • Focused primarily on financial targets and user requirements • Lacked access to environmental sustainability policies 	Preuss, 2001
<ul style="list-style-type: none"> • Did not internalize environmental issues and strategies 	Walley & Whitehead, 1994
<ul style="list-style-type: none"> • Passively complied with environmental regulations (at a minimal level) 	Walton et al., 1998

2.3 Organizational Behavior and Supply Chain Management

Studies pertaining to the human element in supply chain management and its major subset, supply management, have been late in emerging (Gino & Pisano, 2007). Tokar (2010) describes how areas of judgment and decision making have generally been overlooked in supply chain management. Perhaps this is due to an absence of training in organizational behavior or alternatively because of the belief that rational behavior occurred as a function of properly aligned (primarily monetary) incentives (Gino & Pisano, 2007). As a reflection on the maturing of supply chain management as a discipline (Tokar, 2010), Bendoly, Donohue, and Schultz (2006, p. 738) set the stage for potential integration of organizational behavior and supply management research. These researchers maintain, "When it comes to implementation, the success of operations management tools and techniques, and the accuracy of its theories, relies heavily on our understanding of human behavior." Hayes, Wheelwright, and Clark (1988) further argue that high performing organizations depend on human skills, problem solving, learning capabilities, and motivation. Despite this call to action to better understand how employees can make a contribution to organizational success, people are often not a focal point in supply management research as they are considered to be logical and predictable (Boudreau et al., 2003; Gino & Pisano, 2007). This premise ignores the limits on decision making and assumes a condition of complete rather than bounded (constrained) rationality (Simon, 1972).

Bendoly et al. (2006) advocate an organizational behavior perspective to study supply management composed of intentions, actions, and reactions. Gino and Pisano (2007) agree that a behaviorally-based view can generate enhanced understanding of

operational results. In response to such calls to integrate organizational behavior theory with supply management, the next section introduces the Theory of Planned Behavior (Ajzen 1985) as a framework to better understand the reasons for lack of supply managers' environmental sustainability intentions and behavior.

2.4 The Theory of Planned Behavior

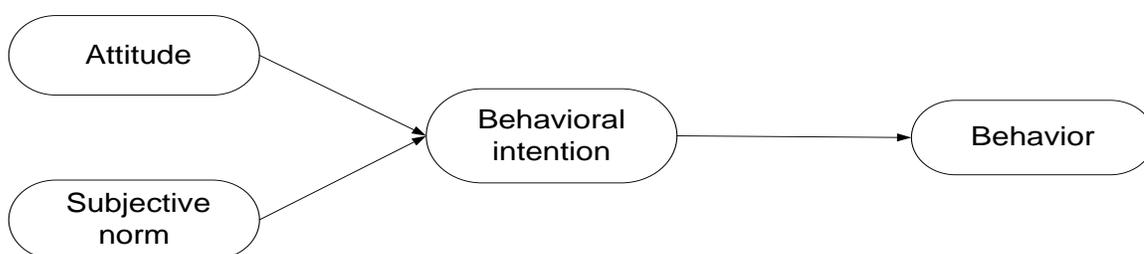
Research from management and social sciences provides support for the Theory of Planned Behavior (Ajzen, 1985, 1991), a model designed to predict and explain behavioral intention and actual behavior for situations where an individual does not have complete control over outcomes. As a type of expectancy-value model (Pligt & Vries, 1998; Sutton, 2001; Weinstein, 1993), the Theory of Planned Behavior is based on subjective expected utility theory (Edwards, 1954). As such, it relies on a combination of constructs (Ajzen, 1991) where people form intentions and make decisions by selecting outcomes having the greatest expected value (Pligt & Vries, 1998; Weiss, Weiss, & Edwards, 2010). The next section presents a brief description of the background leading to the development of the Theory of Planned Behavior as well as an overview of its constructs and their relationships.

2.4.1 Background and overview of the Theory of Planned Behavior.

Rosenberg (1956) was the chief researcher to usher in an initial class of theories providing a conceptual link between attitude and other evaluative criteria used to make choices. Adding to Rosenberg, Fishbein developed the Fishbein Behavioral Intention Model (Fishbein, 1967), which was later renamed the Theory of Reasoned Action (Fishbein & Ajzen, 1975) (Figure 1). This model illustrates how attitude and subjective

norm (conformance to beliefs of others) simultaneously yet independently affect behavioral intention that leads to desired behavior. A primary assumption of the Theory of Reasoned Action is that individuals have complete control over their actions in terms of making choices.

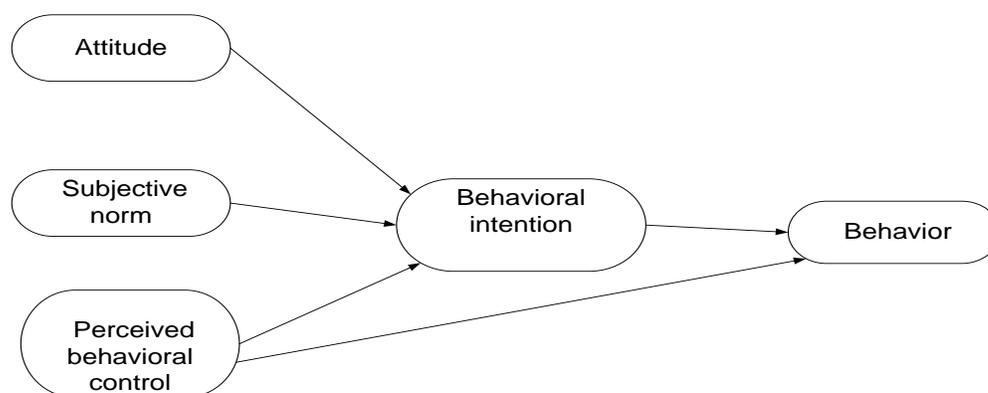
Figure 1: *Theory of Reasoned Action Model (Fishbein and Ajzen, 1975)*



Ajzen later maintained that many situations were not under an individual's control due to the presence of such conditions as low perceived control, lack of knowledge, or insufficient resources. He therefore challenged the complete control condition of the Theory of Reasoned Action by arguing that this assumed condition adversely affected the predictive ability of the Theory of Reasoned Action (Ajzen, 1985). Consequently, Ajzen added a construct entitled perceived behavioral control to the Theory of Reasoned Action and called the new model the Theory of Planned Behavior (Ajzen, 1985) (Figure 2). Past studies reflect better predictability for the Theory of Planned Behavior versus the Theory of Reasoned Action due to the inclusion of the perceived behavioral control construct (Chang, 1998; Hagger, Chatzisarantis, & Biddle, 2002; Kurland, 1995; Randall &

Gibson, 1991; Zint, 2002). Given this, the Theory of Planned Behavior is adopted as the theory used to develop the dissertation research model.

Figure 2: *Theory of Planned Behavior Model (Ajzen, 1985)*



2.4.2 Operationalizing and applying the Theory of Planned Behavior.

The Theory of Planned Behavior posits that individuals rely on all available information and rationally make decisions before taking action (Ajzen, 1985). People have high degrees of behavioral intention and engage in predicted behavior when they view the potential behavior favorably (attitude), when they comply with social pressure to act (subjective norm), and/or when they believe they can perform the behavior (perceived behavioral control) (Ajzen, 1985) (Figure 3).

Literature from multiple fields of research illustrates the robust nature of the Theory of Planned Behavior, and meta-analyses reflect the predictive ability of the complete model (Armitage & Conner, 2001; Conner & Sparks, 2005) and its individual components (Notani, 1998). Application is extremely broad and diverse, as exemplified by its use in research projects considering not only general business and supply chain

management but also physical exercise, cigarette smoking, blood donation, and complaining (Armitage & Conner, 2001). A representative sample of general business and environmental sustainability applications appears in Table 3. Armitage and Conner (2001) report that on average, the Theory of Planned Behavior accounts for 39% of the variance in behavioral intention and 27% of the variance in actual behavior. The unexplained variance represents a gap that may be explained by the inclusion of additional direct or moderating variables.

Table 3: Theory of Planned Behavior Business Applications and Environmental Sustainability

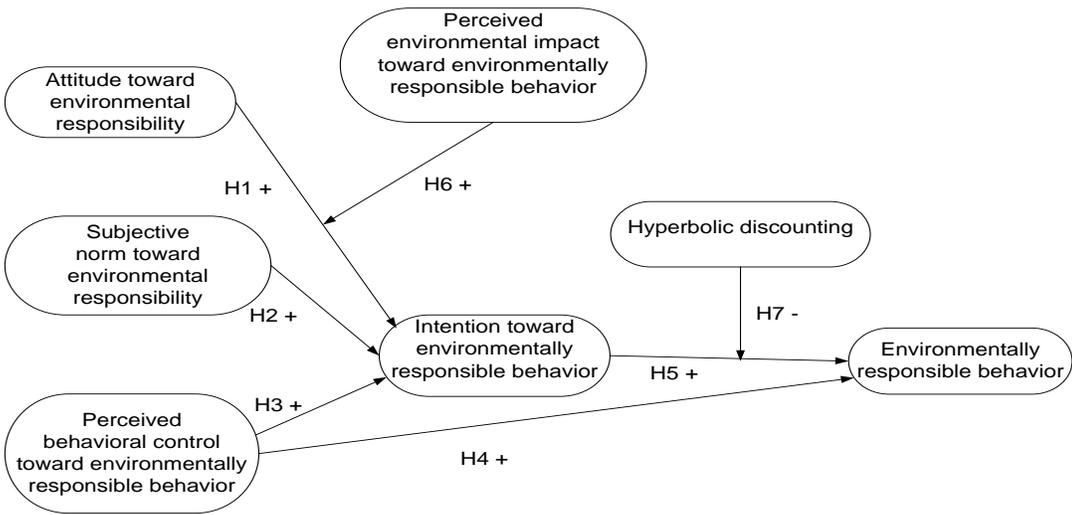
Researcher(s)	Theory of Planned Behavior Business Applications	Theory of Planned Behavior Environmental Sustainability Applications
Aboelmaged, 2010	e-Procurement	
Bobek & Hatfield, 2003	Tax compliance	
Chao & Lin, 2009	Shipping container security services	
George, 2004	Internet purchasing	
Lin & Lee, 2004	Management knowledge sharing	
Chan & Lau, 2002		Consumer green buying behavior
Cheung et al., 1999		Wastepaper recycling
Flannery & May, 2000		Wastewater management
Hurlimann et al., 2009		Water conservation
Kim & Han, 2010		Green hotel patronage

The goal of this study is to apply the Theory of Planned Behavior as a framework for supply manager environmentally responsible behavior. Now that the Theory of Planned Behavior has been discussed, the next section introduces the overall research model and its constructs. Each construct will be elaborated and developed into a research hypothesis.

2.5 The Theory of Planned Behavior: Predictor of Environmentally Responsible Behavior

This section aligns the Theory of Planned Behavior model with existing literature to logically develop the research hypotheses regarding supply manager environmentally sustainable behavioral intention and actual behavior. The final research model seeks to improve the predictive ability of the general Theory of Planned Behavior model by adding moderating variables and is presented in Figure 3. As support, Appendix A offers detailed definitions of the model constructs.

Figure 3: *Research Model*



Behavioral intention indicates how much effort an individual will exert to perform the behavior and as such, the strength of behavioral intention determines the levels of behavior. Ajzen (1991) describes it as the central factor in the Theory of Planned Behavior as it is the most direct and accurate predictor of behavior (Fishbein & Ajzen, 1975). Behavioral intention toward environmentally responsible behavior acts as a mediator of the three exogenous predictors of behavior, specifically attitude, subjective norm, and perceived behavior control. These three conceptually distinct constructs independently shape behavioral intention leading to environmentally responsible behavior. The comparative contribution each construct makes toward intention varies based on the situation and behavior (Ajzen, 1991). Therefore, it is not uncommon for one, two or all three constructs to have a significant impact on behavioral intention. In the next few sections, each construct will be discussed in terms of its potential role in explaining behavioral intention for environmentally responsible behavior.

2.5.1 Attitude.

Ajzen and Fishbein (1980) define attitude as an individual's evaluation of the favorableness or unfavorableness of an object, person, institution, or event. The Theory of Planned Behavior, which uses this definition, predicts that attitude will positively impact behavioral intention (Ajzen, 1985, 1991). In general, the more favorable a person's attitude toward a target behavior, the more he or she will intend to perform that behavior. Therefore, Ajzen's definition of attitude as it relates to the Theory of Planned Behavior, concerns active appraisal, not simply a passive overall evaluation of an object, person, institution, or event (Ajzen & Fishbein, 1980).

Strong support has been found for the effects of attitude toward behavioral intention based on a summary of multiple meta-analyses developed by Conner and Sparks (2005). Specific to the environmental sustainability domain, a positive relationship between attitude and intention has been demonstrated, including the purchase of green products (Chan & Lau, 2002), wastepaper recycling (Cheung, Chan, & Wong, 1999), and waste reduction (Taylor & Todd, 1995). Considering industrial settings, significant effects were found between pro-environmental attitude and preferences (intentions) to reduce plant pollution (Cordano & Frieze, 2000) and between attitudes toward innovation for cleaner production and willingness (intention) to invest in required technology (Corral, 2003). Consistent with the theoretical and empirical support discussed above, it is reasonable to believe that in the domains of environmental sustainability and environmentally responsible behavior, supply managers attitudes are significantly related to behavioral intention. Consequently, it is expected that the more positive the attitude toward environmentally responsible behavior, the stronger the supply manager's intention to perform the behavior. Thus, from a supply manager's perspective,

H1: The more favorable a supply manager's attitude toward environmental responsibility, the greater the intention to engage in environmentally responsible behavior.

2.5.2 Subjective norm.

Subjective norms are formed based on a) information from important others about what should be done by an individual and b) the individual's willingness to comply with

this information (Conner & Sparks, 2005). In other words, subjective norm refers to assumptions or individual perceptions (not necessarily accurate) of what others believe and to what extent an individual is motivated to adopt these beliefs (Ajzen, 1991). To a certain extent, subjective norms are formed in response to peer pressure and social norms (Ajzen, 1991). Although norms are usually viewed as "socially agreed upon rules" (Ajzen & Fishbein, 1980, p. 57), subjective norm involves perceptions of what others expect and as such, may not reflect reality (Ajzen & Fishbein, 1980).

The Theory of Planned Behavior predicts that subjective norm, like attitude, often leads to positive behavioral intention. Relative to environmental sustainability in supply management, Taylor and Todd (1995) determined that household family members, neighbors, and friends all influenced behavioral intention toward composting. Likewise, Kalafatis, Pollard, East, and Tsogas (1999) found a significant direct effect for subjective norm on intention for UK consumers to buy green products as did Sparks and Shepherd (1992) for consumer intentions to buy environmentally-friendly food products. In an industrial setting, Flannery and May (2000) determined that subjective norm for environmentally responsible behavior positively influenced intention for treating hazardous wastewater. As with attitude, results from these studies indicate a likely relationship between supply managers' subjective norm and behavioral intention. Regardless of the accuracy of the expectations regarding environmental sustainability generated by others, such as top management, suppliers, customers, friends, and family, it is consistent with the Theory of Planned Behavior that high levels of subjective norm will strongly affect behavioral intention toward environmentally responsible behavior. This means that supply managers that value the environmentally-oriented opinions and actions

of people they respect will have greater motivation to pursue activities that support the environment. Drawing on this line of reasoning:

H2: The more favorable a supply manager's subjective norm toward environmental responsibility, the greater the intention to engage in environmentally responsible behavior.

2.5.3 Perceived behavioral control.

Perceived behavioral control reflects an individual's perception of ease or difficulty in performing a behavior (Ajzen, 1985). The Theory of Planned Behavior proposes that the more an individual believes he or she possesses the necessary resources or abilities to enact the behavior, the more likely he or she will intend to and later perform the behavior (Ajzen, 1991). Without sufficient resources or opportunities to act, perceived behavioral control could be low and consequently, overall behavioral intention may not be sufficient to generate environmentally responsible behavior.

In the case of environmentally responsible behavior, perceived behavioral control may be inhibited by such factors as unclear environmental standards and regulations, costs of switching suppliers, and risks of publicly supporting environmental sustainability initiatives (Bansal & Taylor, 2002, Conraud-Koellner & Rivas-Tovar, 2009). Favorable perceived behavioral control influences for environmental sustainability include collaborating with suppliers, capitalizing on learning opportunities, increasing knowledge through an established network of colleagues, working within a supportive corporate culture, and being employed at an organization that is willing to change (Corral, 2003).

Studies generally show a high degree of support regarding perceived behavioral control toward environmentally responsible behavioral intention. For instance, Corral (2003) found a significant correlation for perceived behavioral control toward innovation intention for cleaner production, and Kalafatis et al. (1999) as well as Chan and Lau (2002) found significant direct effects for perceived behavioral control on intention to buy green products. A meta-analysis from Notani (1998) examining thirty six studies reflects widespread support for the influence of perceived behavioral control on behavioral intention. These studies confirm the theoretical role for perceived behavioral control in the Theory of Planned Behavior. Given the wide variety of organization resources that can lead to sufficient levels of perceived behavioral control and also reflecting on the aforementioned research:

H3: As a supply manager's perceived behavioral control toward environmentally responsible behavior increases, intention to engage in environmentally responsible behavior increases.

In addition to having a direct effect toward intention, the Theory of Planned Behavior also proposes a direct effect of perceived behavioral control on actual behavior (Ajzen, 1991). Specifically, if an individual's perceived behavioral control accurately reflects control, perceived behavioral control will have a direct effect on actual behavior (Ajzen, 1991). Verifying such a positive link between perceived behavioral control and behavior in the research will thus imply that supply managers really do have control over environmentally responsible behavior.

Existing literature reveals that perceived behavioral control accounts for significant amounts of variance for actual behavior (Notani 1998). For instance, the link between perceived behavioral control and actual behavior was verified for Internet purchasing (George, 2004). In the environmental sustainability domain, Taylor and Todd (1995) show positive direct effects for perceived behavioral control on household garbage reduction behavior. Ajzen theorizes a direct path from perceived behavioral control to behavior based on ability. To the extent that an individual can truly perform the behavior, perceived behavioral control, now representing actual control, can significantly affect behavior. For the purposes of this dissertation, supply managers with increasing positive degrees of perceived behavioral control can produce greater levels of environmentally responsible behavior. Reflecting on the Theory of Planned Behavior and these above cited studies and considering how perceived behavioral control is theorized as an antecedent for behavior,

H4: As a supply manager's perceived behavioral control toward environmentally responsible behavior increases, environmentally responsible behavior increases.

2.5.4 Behavioral intention.

Behavioral intention, also described as motivation (Ajzen, 1991; Conner & Sparks, 2005), indicates the amount of effort people expect to exert to perform a behavior. Behavioral intention reflects goals, decisions, or action plans (Bosnjak, Tuten, & Wittmann, 2005), described by Triandis (1989) as self-instructions leading to behavior. Although behavioral intention may lead to behavior, the relationship between behavioral

intention and actual behavior is not certain (Ajzen, 1985). In other words, behavioral intention does not guarantee behavior, so the Theory of Planned Behavior proposes both behavioral intention and actual behavior constructs.

The Theory of Planned Behavior predicts that stronger individual intention to perform a behavior will lead to a greater level of actual behavior. Multiple meta-analyses (Armitage & Conner, 2001; Conner & Sparks, 2005; Hagger et al., 2002; Milne, Sheeran, & Orbell, 2000; Sheeran & Orbell, 1998; Sheppard, Hartwick, & Warshaw, 1988; Zint, 2002) provide empirical support for the behavioral intention to actual behavior path. Environmentally-related studies such as wastepaper recycling (Cheung et al., 1999) and household garbage reduction (Taylor & Todd, 1995) reflect high levels of support for intention on environmentally responsible behavior. Theoretically, the role of behavioral intention toward actual behavior is well established in the Theory of Planned Behavior. Since behavioral intention captures the motivational factors that influence behavior, and given the positive contributions of attitude, subjective norm, and perceived behavioral control on intention, it is central in predicting actual behavior (Armitage & Conner, 2001). As shown with the aforementioned studies, particularly the extensive meta-analysis research, and relying on the theoretical relationship between intention and behavior, there is no reason to believe that supply manager intention toward environmentally responsible behavior should not result in actual environmentally responsible behavior, therefore:

H5: As a supply manager's intention to engage in environmentally responsible behavior increases, environmentally responsible behavior increases.

2.5.5 Additional factors to explain environmentally responsible behavior.

As Baker, Al-Gahtani, and Hubona (2007, p. 359) state, "Despite its substantial predictive power, there is a larger proportion of the variance in intention and usage that is not accounted for by the model." To increase its ability to predict behavioral intention and actual behavior, Ajzen (2012) and Herath (2010) support adding more constructs (e.g., exogenous, mediating, and moderating) to the Theory of Planned Behavior when they are theoretically-based, can be examined for causation, are conceptually distinguishable from existing Theory of Planned Behavior constructs and have widespread applicability to a large number of behaviors.

Regarding these points, discussion in later sections demonstrates compliance and thus provides justification for expanding the general Theory of Planned Behavior model. As indicated in earlier sections of this dissertation, identifying the multiple drivers for environmentally responsible behavior is a complex problem (Cetindamar, 2007). Even though the capabilities of the general model toward environmentally-related issues have been discussed earlier in this dissertation (Chan & Lau, 2002; Cheung et al., 1999; Corral, 2003; Kalafatis et al., 1999; Taylor & Todd, 1995), it is worthwhile to consider adding more variables to increase explanation and further understanding of environmentally responsible behavior.

Additions to the Theory of Planned Behavior typically reflect *direct* effects (e.g., independent variables leading to effects on dependent variables) or *moderating* effects (e.g., independent variables altering the relationship between an independent and dependent variable). Results for the direct effects of adding constructs in environmental sustainability studies are mostly favorable as they show increases toward behavioral

intention and actual behavior (Cordano & Frieze, 2000; Kim & Han, 2010; Sparks & Shepherd, 1992; Valle, Rebelo, Reis, & Menezes, 2005). Overall explanatory power has been also been demonstrated for moderating variables in Theory of Planned Behavior environmental sustainability research (Chen & Tung, 2010; Flannery & May, 2000; Kim & Chung, 2011). Given this, two additional constructs will be added in an effort to improve model predictability. Specifically, perceived environmental impact and hyperbolic discounting will now be examined for their potential as moderating variables to clarify the role of supply manager behavioral intention and actual behavior for environmentally responsible behavior. Both constructs are added based on input from practitioners, a review of the literature, and in response to calls to action for additional research (Carter et al., 2007; Ellen et al., 1991; Hall & Fong, 2007; Tan, 2011).

Perceived environmental impact, the first construct, represents an individual's belief-action sequence leading to potential reduction of environmental harm. The second construct, hyperbolic discounting, examines how bias may influence an individual's behavioral intention toward environmentally responsible behavior.

2.5.6 Perceived environmental impact.

Environmentally-related studies based on the Theory of Planned Behavior have generally produced clear results showing a favorable influence of attitude toward behavioral intention. However, despite the presence of strong attitudes, behavioral intention toward environmentally responsible behavior may be altered based on an individual's beliefs of how their actions may not make a favorable change toward the environment (Taylor & Todd, 1995). This is particularly true when an individual believes an environmental problem is too large for any single person to positively impact.

Ellen et al. (1991, p. 103) shed additional light on the potential that personal beliefs can play toward the environment by stating, “If an individual believes that an environmental problem can be solved by a specific activity, then this belief should strongly influence the individual’s willingness to engage in that specific activity.” Consequently, it is possible that individual beliefs and resulting action could be instrumental in creating a solution to environmental problems. This research suggests that adding a construct to the relationship between attitude and behavioral intention represents an opportunity to provide greater explanation in the Theory of Planned Behavior model.

Ellen et al. (1991) addresses this opportunity by identifying how *perceived consumer effectiveness* represents a person's belief that his or her efforts markedly contribute to reducing environmental problems. As the construct name suggests, perceived consumer effectiveness has been studied extensively on the consumer side (Antil, 1984; Berger & Corbin, 1992; Choi & Kim, 2005; Ellen et al., 1991; Kim, 2011; Kim & Han, 2010; Lee & Holden, 1999). Its theoretical background comes from Social Dilemma Theory (Dawes, 1980) as discussed by Wiener and Doescher (1991) and Ellen et al. (1991).

Kinnear, Taylor and Ahmed (1974) were the first researchers to use perceived consumer effectiveness as they operationalized it to measure individual consumers’ beliefs toward pollution reduction. Perceived consumer effectiveness was originally considered part of attitude (Antil, 1984; Webster, 1975) but was later classified as a separate construct (Allen, 1982; Ellen et al., 1991) as it represents an individual’s evaluation of his or her contribution to solving a problem (Berger & Corbin, 1992). It is theorized to work together with attitude, behavioral intention, and actual behavior and

therefore can influence both intention and behavior depending how perceived consumer effectiveness is positioned in a specific research model. Perceived consumer effectiveness has been tested in a variety of attitude, behavioral intention, and actual behavior configurations with generally inconsistent results. Table 5 identifies a sampling of research outcomes.

Table 4: *Results of Perceived Consumer Effectiveness Studies*

Application of Perceived Consumer Effectiveness				
Independent Variable	Moderating Variable	Dependent Variable	Researcher(s)	Result
Perceived consumer effectiveness	Not applicable	Behavior	Albayark et al., 2011; Allen, 1982; Kim, 2011; Choi & Kim, 2005; Kim & Han, 2010; Ritchie et al., 1981; Roberts, 1996(a, b); Straughan & Roberts, 1999; Vermeir & Verbeke, 2008; Webster, 1975	Support is mixed
Attitude	Perceived consumer effectiveness	Intention	Berger & Corbin, 1992; Lee & Holden, 1999	Supported
Attitude	Perceived consumer effectiveness	Intention	Kim, 2011	Not supported
Perceived consumer effectiveness	Not applicable	Attitude	Kim & Han, 2010	Not supported
Perceived consumer effectiveness	Not applicable	Intention	Kim & Han, 2010	Supported

Findings from these studies show that placement of perceived consumer effectiveness in relation to other constructs varies widely, and also, results depend on how it is arranged with attitude, behavioral intention and actual behavior. This variation reflects on the comments of Ellen et al. (1991) who recommend that the positioning of perceived consumer effectiveness in the research model requires more attention. Tan (2011) reinforces Ellen et al. (1991) by providing a call to action to better understand how perceived consumer effectiveness is operationalized by developing a structural research model that includes such constructs (e.g., attitude and behavior) as those found in Theory of Planned Behavior.

Considering the past use of perceived consumer effectiveness and that existing findings are not conclusive, it has the potential to increase the explanatory ability of the Theory of Planned Behavior. Given its use only in a consumer context in previous research, the construct is renamed *perceived environmental impact* for its application in this dissertation. The phrase perceived environmental impact is more descriptive as it pertains specifically to the environment and also has wider applicability for more research settings pertaining to environmental sustainability as it does not include the word “consumer.” In response to the call for additional research, perceived environmental impact is therefore added as an indirect influence to determine its effect on the relationship between attitude and behavioral intention. Given the diverse applications of this construct, extending the dissertation model in this way relies on the highest rate of successful outcomes from prior research (Berger & Corbin, 1992; Lee & Holden, 1999) and thereby operationalizes personal beliefs toward the attitude and behavioral intention path. In keeping with Taylor and Todd (1995) and reflecting on studies where perceived

environmental impact did not strengthen the relationship between attitude and behavioral intention, perceived environmental impact is positioned as a bias in this dissertation. As such, it indicates that an individual's belief that his or her actions do not lead to solutions to environmental problems will weaken the relationship between attitude and behavioral intention. Consequently:

H6: As levels of perceived environmental impact decrease, the relationship between a supply manager's attitude toward environmental responsibility and intention to engage in environmentally responsible behavior is weakened.

2.5.7 Hyperbolic discounting.

A cornerstone of the Theory of Planned Behavior is its assumption of rational decision making (Ajzen, 1985). However, decision biases, ranging from simple, intuitive heuristics to predetermined beliefs (Workman, 2011), represent tendencies to ignore significant facts or consider irrelevant factors that lead to inaccurate inferences (Evans & Over, 2006). Even when provided with factual information and equipped with decision support systems, people rely on intuition and thus form biases and make inaccurate choices (Kahneman & Tversky, 1973; Tversky & Kahneman, 1973; Tversky & Kahneman, 1974). Tokar (2010) describes how systematic judgment deficiencies impair individual's abilities to make decisions that support corporate goals and policies. To these points, Carter et al., (2007) identify the effects of multiple biases specific to supply management and highlight the need for further research.

More specific to this dissertation, Hall and Fong (2007) cite a shortcoming in the Theory of Planned Behavior related to the absence of a construct representing choices between current and future rewards. This implies the identification of a decision bias that addresses this current versus future reward choice in explaining how supply managers transition from behavioral intention to actual behavior. Specifically, organizational initiatives, such as those related to natural resource depletion, energy availability, and pollution reduction, are often of a long-term nature and require a balance between present and future orientation (Nikoloyuk, Burns, & de Man, 2010; Shrivastava, 1995). Supply managers face short and long run predicaments (Krause et al., 2009) and need to effectively strike a balance between the two (Burke & Logsdon, 1996). They need to realize that environmental sustainability requires long range commitments (e.g., entering into a supplier partnership to develop environmental sustainability criteria) although the short-run return on investment (e.g., the cost of forming and sustaining such a partnership) may not be justified (Azzone & Noci, 1998; Menon & Menon, 1997).

Despite the importance of balancing short and long run conditions, decision makers are often myopic, impulsively demonstrating preferences for options that pay off quickly over richer but slower-paying alternatives (DellaVigna, 2009). This phenomenon, defined as *hyperbolic discounting*, is based on the Matching Principle described by Herrnstein (1961) and represents a form of instant gratification. It illustrates individual preference for immediate, less-beneficial payoffs over options that could provide greater future benefits (Laibson et al., 1998; Strotz, 1955). Hyperbolic discounting is a departure from economics core theory as decision makers do not

maximize utility, instead succumbing to systematic biases and exhibiting a general lack of self-control (Ainslie, 2005; Hepburn, Duncan, & Papachristodoulou, 2010).

The predisposition toward hyperbolic discounting has been documented in many experimental studies, almost exclusively in a laboratory setting using scenarios involving choices between lesser current amounts and greater future amounts of money (Angeletos, Laibson, Repetto, Tobacman, & Weinberg, 2001; Chabris, Laibson, Morris, Schuldt, & Taubinsky, 2008; Kirby, 1997; Machado & Sinha, 2007; Meyer, Zhao, & Han, 2008). Only one non-experimental study (non-business) has been identified in the extant literature (Viscusi, Huber, & Bell, 2008). The results from this study, using a vignette and self-report questionnaire, indicate that visitors to lakes and rivers at public park facilities demonstrate hyperbolic discounting as they prefer less beneficial immediate improvements (e.g., wanting immediate park facilities improvements) over greater longer term gains (e.g., being more patient for longer term, more beneficial park facilities).

Sheeran (2002) paves the way for research applying a decision bias such as hyperbolic discounting to the Theory of Planned Behavior by identifying a general gap for behavioral intention and actual behavior. While not using hyperbolic discounting, Hall and Fong (2007) elaborate on this gap and provide more support for adding a decision bias by arguing how habits and past behavior effectively moderate the intention-behavior path. Later, Fulham and Mullan (2011) empirically tested Hall and Fong's premise using a Theory of Planned Behavior application and found significant results.

Adapting the work of these researchers to this dissertation and reflecting on the cited lack of supply manager environmentally responsible behavior, hyperbolic discounting may offer an explanation why supply managers do not follow through with

expected behavior toward corporate environmental objectives despite high behavioral intention for environmentally responsible behavior. Specifically, supply managers may focus on short-term cost or quality gains at the expense of not pursuing longer-term environmental objectives. Following the moderating effects described above:

H7: As levels of hyperbolic discounting increase, the relationship between a supply manager's intention for environmentally responsible behavior and actual environmentally responsible behavior is weakened.

Concluding this section on literature review and hypotheses development, a complete list of hypotheses is presented in Table 6. The next section presents the proposed research methodology.

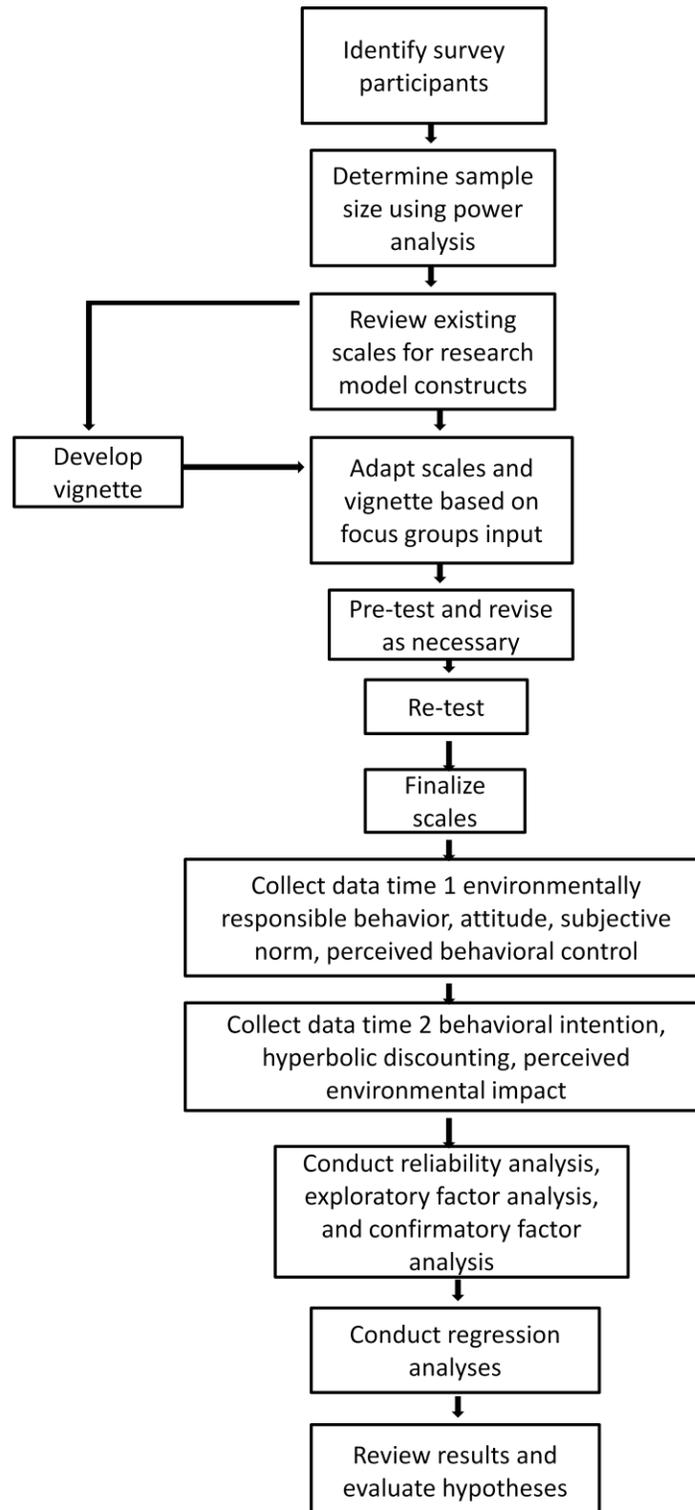
Table 5: *Research Hypotheses*

Research Hypotheses
H1: The more favorable a supply manager's attitude toward environmental responsibility, the greater the intention to engage in environmentally responsible behavior.
H2: The more favorable a supply manager's subjective norm toward environmental responsibility, the greater the intention to engage in environmentally responsible behavior.
H3: As a supply manager's perceived behavioral control toward environmentally responsible behavior increases, intention to engage in environmentally responsible behavior increases.
H4: As a supply manager's perceived behavioral control toward environmentally responsible behavior increases, environmentally responsible behavior increases.
H5: As a supply manager's intention to engage in environmentally responsible behavior increases, environmentally responsible behavior increases.
H6: As levels of perceived environmental impact decrease, the relationship between a supply manager's attitude toward environmental responsibility and intention to engage in environmentally responsible behavior is weakened.
H7: As levels of hyperbolic discounting increase, the relationship between a supply manager's intention for environmentally responsible behavior and actual environmentally responsible behavior is weakened.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Overview of Research Methodology

This section identifies the research process followed to test the hypothesized relationships proposed in Chapter 2. Initially, the process consisted of identifying potential participants, developing measures, and creating data collection procedures. Next, data was collected, examined, and refined, and then, data was analyzed, results were reviewed, and hypotheses were evaluated. The summarized research process is identified in Figure 4.

Figure 4: *Summarized Research Procedure*

3.1.1 Survey participants.

The participants in the study consisted of practicing supply managers who are active members of ISM and employed in diverse organizations (e.g., manufacturing, service, government) in the Southeast and West Coast regions of the United States. These individuals were selected as units of analysis given their corporate authority to purchase materials and services. Given the required minimal sample size identified later in this chapter based on power analysis and observed response rates of 10% that is typical for electronic surveys (Shih and Fan, 2008), the range of surveys needing to be distributed was between 2000 and 2500. The Institute for Supply Management (ISM), the primary industry association for supply management professionals, provided contact information (i.e., membership rosters and e-mail addresses) of survey respondents. The next two sections describe the development of measures used for the data collection instrument.

3.1.2 Direct measures.

Researchers can use either indirect (belief-based) or direct (global) measures for Theory of Planned Behavior constructs. Meta-analyses indicate that direct measures are widely-used and produce strong effects (Armitage & Conner, 2001; Notani, 1998). Also, Ajzen provides support for the direct methods of measuring the Theory of Planned Behavior constructs by stating, "As a general rule, this [direct measures of attitudes, subjective norm, and perceived behavioral control] is preferable to using the belief-based measures because it is consistent with the direct assessment of intentions (Davis, Ajzen, Saunders, & Williams, 2002, p. 814)." In keeping with this research, direct measures were used for Theory of Planned Behavior constructs tested in this dissertation.

Practicing supply managers provided assistance to refine construct scales for direct measures. On-site meetings were held with focus groups from the Atlanta and West Georgia ISM chapters to discuss potential scales and examine questions for face validity (i.e., represented actual job functions). Consequently, the indicator items (see Appendix B) used to directly measure a supply manager's attitude, subjective norm, perceived behavioral control, perceived environmental impact, and behavioral intention toward environmental responsibility reflect existing research scales validated from the literature and practicing supply managers' inputs. Each survey construct included five items and was measured by a seven point Likert scale ranging from "strongly disagree" to "strongly agree" with "neither agree nor disagree" as a neutral midpoint. Examples of scales used for the three exogenous variables included "In my opinion, it is important to protect the environment" (*attitude*), "Most people who are important to me think I should recycle materials" (*subjective norm*), and "I have control over my actions to support the environment" (*perceived behavioral control*). A scale example for the mediating variable (*behavioral intention*) is "I plan to support environmental initiatives in the future," and for the multi-item moderating construct (*perceived environmental impact*), an example is "My individual actions can make a significant impact on the environment."

3.1.3 Indirect measures.

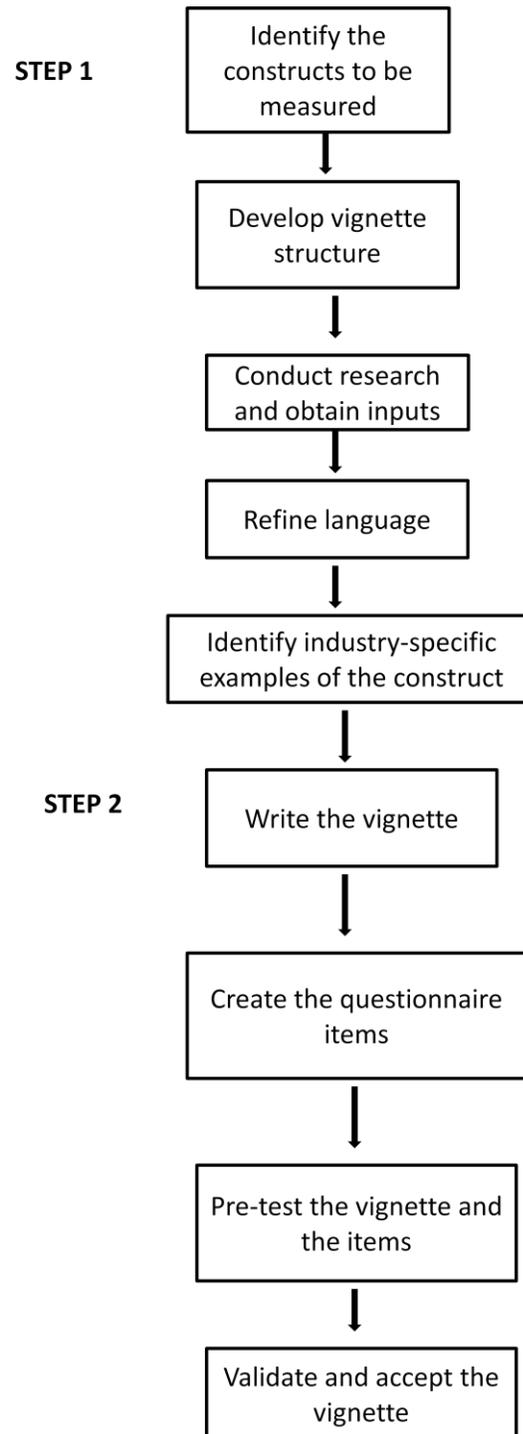
Vignettes were used to measure hyperbolic discounting and environmentally responsible behavior. Vignettes are a commonly-used approach to gain insights into individual's decision making processes through the use of a small case study or scenario. They represent short renditions of hypothetical situations and are designed to place respondents in a reality-based context. The purpose of a vignette is to determine

respondents' possible intended actions, instigated by “What would you do?” or “What should he/she do?” type questions (Hung & Tangpong, 2011). Vignettes have been used to successfully obtain information about ethical decision making in public accounting (Buchan, 2005), locus of control for cross-cultural decision making (Cherry, 2006), supply manager make-or-buy decisions (Mantel, Tatikonda, & Liao, 2006), and environmental sustainability (Flannery & May, 2000).

Finch (1987) describes the benefits of using vignettes over respondent self-reporting as obtaining information for complicated scenarios involving the interaction of multiple forces and influences. Finch goes on to say that vignettes offer a less threatening way to explore sensitive subjects like sustainability. This theoretical reasoning therefore provided support to use vignettes for the hyperbolic discounting and environmentally responsible behavior constructs.

The research of Fredrickson (1986) and Hung and Tangpong (2011) is useful in describing the composition of an effective vignette. Vignettes obtain their realism by creating a short sequence of events and an accompanying list of questions drawn from extant literature, current events, or experiences of researchers or practitioners.

In this dissertation, a two-step vignette construction process was followed. Step one consisted of *information gathering* and included identifying the construct to be measured, developing vignette structure, and conducting interviews. Step two followed with *instrument development* and consisted of refining language issues, identifying industry-specific examples of the construct, writing the vignette, creating the questionnaire items, pre-testing the vignette and the items, and accepting the final instrument. Figure 5 identifies the vignette construction process.

Figure 5: *Vignette Construction Procedure*

Appendices C and D present the vignettes for hyperbolic discounting and environmentally responsible behavior. As with the direct measures, both vignettes reflect inputs from practicing supply managers. Keeping with Lanza (1988) and Randall and Gibson (1990), industry practitioners played a role in the vignette development by reviewing face validity and determining if the combination of vignette variables were realistic. The vignette for hyperbolic discounting is based on a delay discounting instrument developed by Kirby, Petry, and Bickel (1999) and tests for preferences for immediate, less-valued choices versus future, more-valued choices. In this vignette, participants were asked to take part in a potential future survey. They were then presented with a few choices made up of a combination of money and time (e.g., \$10 now, \$18 three weeks from now, on so on) and asked to make a selection. The straightforwardness and brief nature of this vignette was expected to identify the presence of hyperbolic discounting tendencies.

To test for environmentally responsible behavior, respondents were asked to assume the role of a supply manager at a hypothetical corporation. In the vignette, the Vice President of Supply Chain has documented supplier sourcing decisions to support the CEO's actions to integrate environmental objectives throughout the organization. However, the Chief Financial Officer is seeking to improve net income during the next quarter, which may take priority over environmental sustainability initiatives. In light of this situation, respondents were instructed to choose between two new suppliers given cost, delivery reliability, quality, environmental management system (presence or absence of), and emissions control and reduction performance data. The respondent's supplier selection was used to determine their environmentally responsible behavior.

3.1.4 Data collection procedures

The survey was conducted via commercial Internet survey software to maximize data collection efficiency from supply managers. Introductory letters were distributed to the various ISM chapter presidents requesting authorization to survey members (Appendix F). Administrative procedures for the questionnaire are also identified in this appendix, including the method of obtaining survey data and confidentiality and security regarding respondents' information. This assured participants that co-workers, managers, or other ISM members would not have access to their individual responses.

Ten ISM chapters agreed to participate in the survey. The survey cover letter is displayed in Appendix E. Member e-mail addresses were used to deliver the surveys and track the respondents' participation. This process enabled identification and determination of respondents' eligibility for a prize drawing (two \$200 Visa Gift Cards, four \$50 Visa Gift Cards) as appreciation for participating in the survey.

Respondents were pre-qualified to participate in the survey by answering a screening question to determine that they did indeed work in supply management. Data collection complied with all policies and procedures of the Institutional Review Board (IRB) at Kennesaw State University for conducting subject-based research. All researchers associated with this dissertation were IRB-certified and additionally, all instruments (surveys and vignettes), cover letters, and data collection processes were approved by the IRB prior to data collection.

Sample size determination was based on the number of constructs in the proposed research model and procedures provided by Cohen, Cohen, West, and Aiken (2003). Following a conventional choice found in behavioral science and business

research (Mazen, Hemmasi, & Lewis, 1987), a small estimated effect size of .10 was selected. Power analysis calculation for this dissertation yielded a minimum sample size of 188 based on six independent variables in the research model, a significance level of .05, an *a priori* desired power level of .95, and a small estimated effect size of .10 (Rice & Harris, 2005).

Common methods variance (Podsakoff and Organ, 1986) was addressed using a combination of methods. First, data was collected using a staggered schedule (e.g., using Time₁ and Time₂ approaches) (Fogel & Schneider, 2010; Fulham & Mullan, 2011; Henle, Reeve, & Pitts, 2010). This procedure was expected to minimize common methods variance issues associated with respondents providing self-report answers in a single time frame and also increase construct discriminant validity (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

At Time₁, participants responded to the environmentally responsible behavior vignette. First, they made a selection between two suppliers, one emphasizing low cost and the other emphasizing sustainability. Then, they answered 15 Likert-type questions, five each related to the attitude, subjective norm, and perceived behavioral control constructs. One week later at Time₂, participants responded to the hyperbolic discounting vignette and also to 10 Likert-type questions related to the perceived environmental impact and behavioral intention constructs. Additionally, pretesting the questions to improve clarity and minimizing the use of reverse-coded questions further reduced the potential for common methods variance (Pullman, Maloni, & Carter, 2009).

3.1.5 Data analysis.

Data analysis was performed in IBM PASW (SPSS) Statistics and AMOS. A reliability analysis (Cronbach's alpha) was first run to assess the consistency of items used in the entire scale. Then, an exploratory factor analysis (EFA) was used to examine construct item relationships and determine their underlying structure (Hair, Black, Babin, & Anderson, 2010). Next, confirmatory factor analysis (CFA, Hair et al., 2010) was used to test for convergent and discriminant validity. A variety of regression analyses were applied to test hypotheses because of the application of moderating variables (metric and categorical) and the use a categorical (binary) dependent variable in the research model. Consequently, hierarchical moderated regression analysis (Cohen et al., 2003; Pedhazur, 1997), logistic regression (Hair et al., 2010), and mediated logistic regression analysis (Baron & Kenny, 1986) were applied to evaluate the hypothesized path relationships comprised of independent, moderating, and dependent variables.

Specifically, hierarchical moderated regression analysis assessed the influence of the three exogenous variables (attitude, subjective norm, and perceived behavioral control) on behavioral intention (Figure 6) and then examined how the interaction of attitude and perceived environmental impact affected intention to engage in environmentally responsible behavior (Figure 7). Next, hierarchical logistic regression was applied to examine the relationship between behavioral intention and environmentally responsible behavior and also determine how hyperbolic discounting affected the behavioral intention-environmentally responsible behavior path (Figure 8). Finally, mediated logistic regression analysis was used to test the influence of perceived behavioral control and behavioral intention toward environmentally responsible behavior

and assess the presence of full or partial mediation (Figure 9). Results for all statistical tests are reflected in Chapter 4 that follows.

Figure 6: Hierarchical Moderated Regression Analysis Step 1

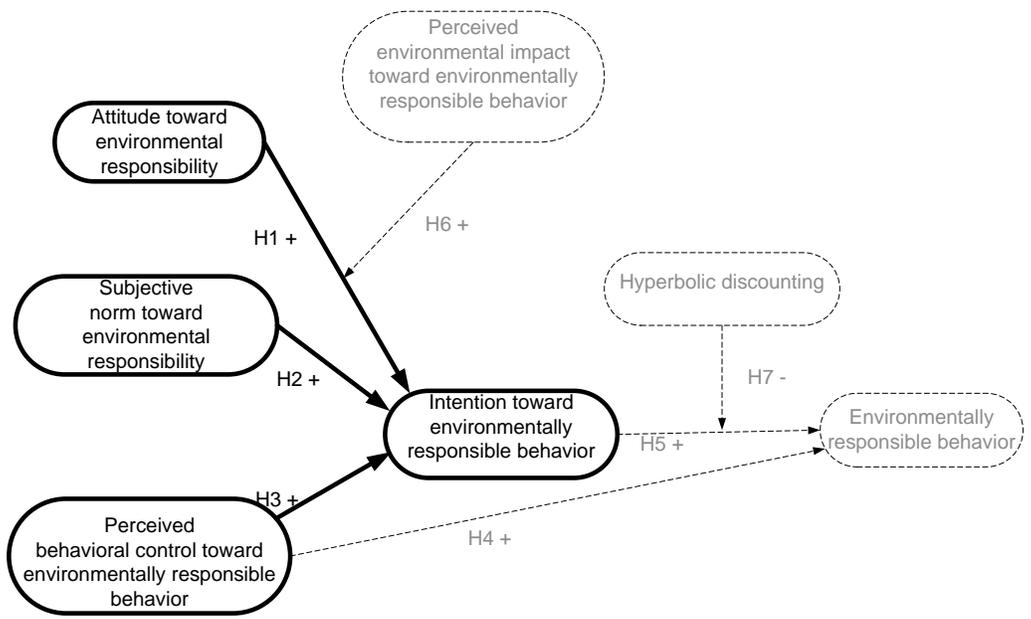


Figure 7: Hierarchical Moderated Regression Analysis Step 2

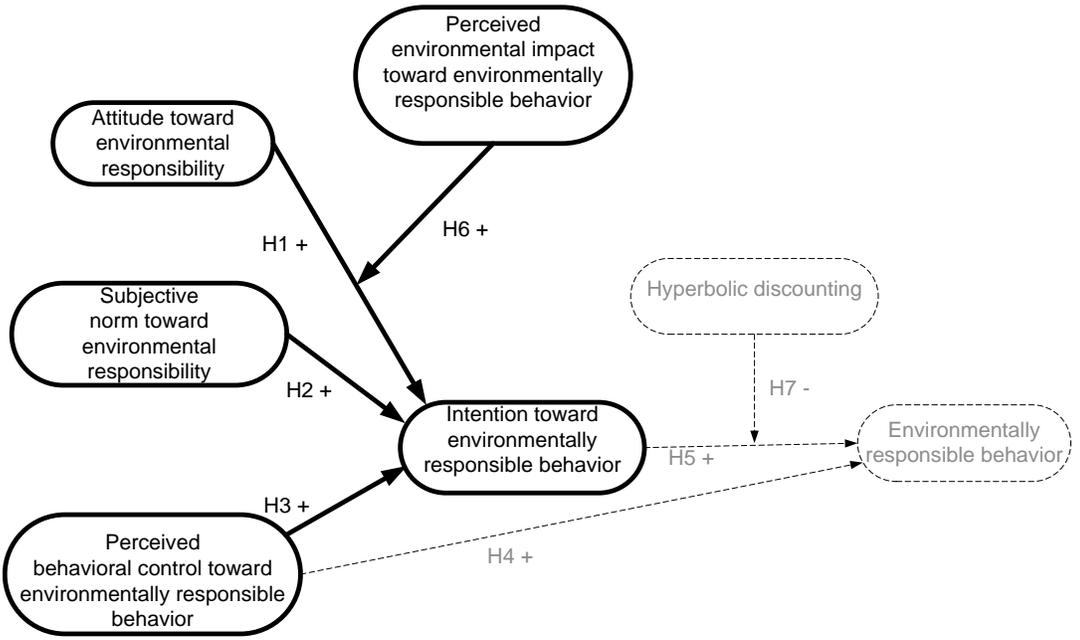


Figure 8: *Moderated Logistic Regression Analysis*

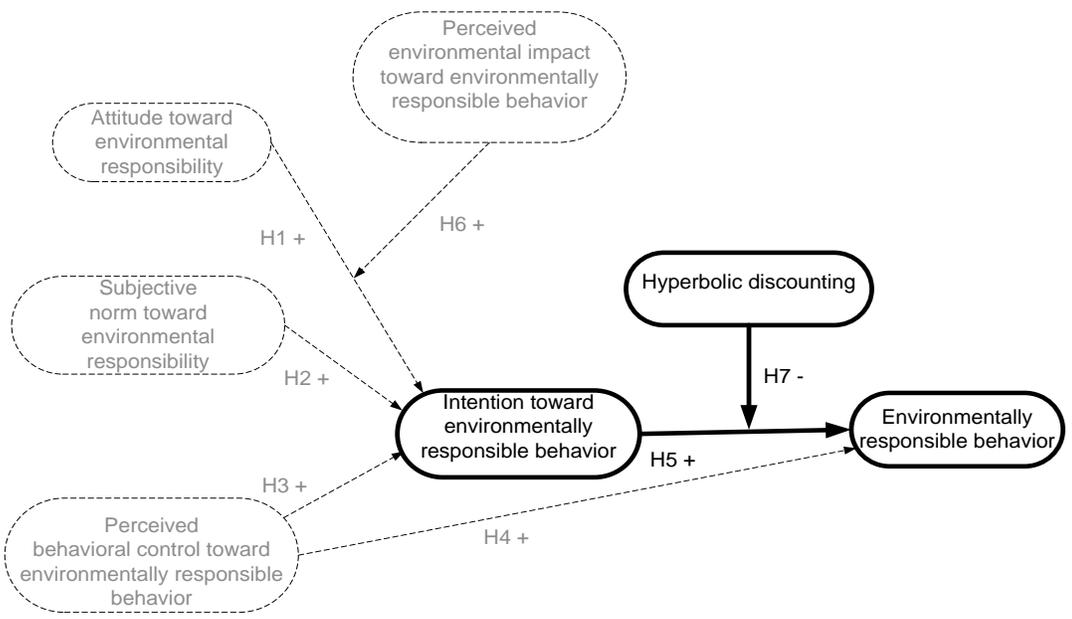
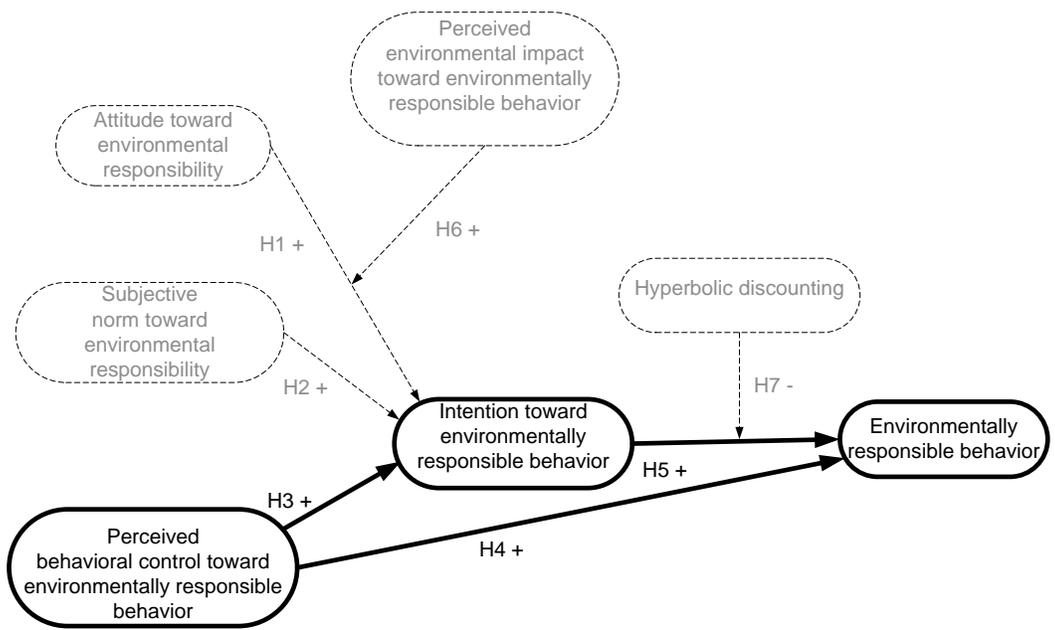


Figure 9: *Mediated Logistic Regression Analysis*



CHAPTER 4 RESEARCH RESULTS

4.1 Data Examination, Refinement, and Validation

There were 2,163 questionnaires distributed to the supply managers. 358 usable part one survey responses (16.6%) were received and of these, 271 part two completed surveys were returned (76.6%). This represents a total usable response rate of 12.5%. The number of survey respondents completing both parts of the survey indicates a high level of interest in the research topic and reflects favorably on the survey's psychometric properties (Nunnally, 1967). Combining data from supply managers in the Southeast and West Coast regions of the United States was determined to be acceptable after analysis of variance (ANOVA) testing showed no significant difference for the five multi-item constructs between these two regions (See Appendix G). Significance levels for all constructs were greater than .05 and F-test statistics were 2.43 for attitude, .01 for subjective norm, .45 for perceived behavioral control, .32 for behavioral intention, and 1.89 for perceived environmental impact. Demographic data was collected for respondent number of years as a supply manager, the size of their organization (measured in annual sales revenue), and industry type. Table 6 reflects this data.

Table 6: *Supply Manager Demographic Data*

	Years in Supply Mgmt	Annual Revenue	Industry
Mean	17.4		
SD	10.1		
< \$50k		1.6%	
\$50k-\$100k		0.4%	
\$100k-\$500k		1.9%	
\$500k-\$1M		0.8%	
\$1M-\$5M		3.9%	
\$5M-\$20M		6.6%	
\$20M-\$50M		7.8%	
\$50M-\$100M		8.2%	
>\$100M		52.1%	
Public Company		12.1%	
N/A		4.6%	
Agric/Mining			1.6%
Construction			3.1%
Finance/Insur/RE			5.9%
Government			7.4%
Health Care			7.8%
Information Tech			3.1%
Manufacturing			37.1%
Not-for-profit			1.2%
Retail/Wholesale			3.5%
Service			8.2%
Transportation			3.5%
Utility			4.7%
Other			12.9%

The 271 responses were examined for missing data, completeness, and outliers. 11.4% (31 responses) had one missing response, 2.2% (six responses) had two, and 0.4% (one response) had three. Little's MCAR test (Hair et al., 2010), using the missing data analysis procedure in SPSS, reflected a missing-at-random condition. Consequently, values were imputed for items with missing values using the expectation maximization (EM) model-based method (Hair et al., 2010). Eight of the 271 responses were discarded due to non-response to the single-item hyperbolic discounting construct, rendering them unusable in testing hypothesis seven, resulting in a sample size of 263.

Bivariate profiling using boxplots testing in SPSS (Hair et al., 2010) revealed six additional responses as outliers due to the presence of statistically significant differences. Inspection of data response patterns for these responses identified inconsistencies and confirmed the results of the boxplot testing, subsequently leading to the deletion of the six responses. This reduced the usable sample size to 257.

A reliability analysis was then run to assess the consistency of items used in the entire scale. Given the Cronbach's alpha scores for behavioral intention and perceived behavioral control, this analysis identified opportunities to strengthen overall reliability of the scale. Specifically, the two reverse-coded items for these constructs (I4R, "I do NOT expect to support environmentally sustainable activities in the future" [behavioral intention] and PB3R, "It is difficult for me to perform environmental sustainability activities" [perceived behavioral control]), suggested improvement opportunities in overall reliability if deleted.

Table 7 reports coefficient alphas as an estimate of reliability for each of the scales without these two items. Inspection of this table indicates that each scale exceeded

the minimal standard of .70 for this measure of internal consistency (Pedhazur and Schmelkin, 1991).

Table 7: *Reliability Results, N=257*

Summary of Self-Report Measures

Measure	α	# of Items
Attitude	.91	5
Subjective norm	.95	5
Perceived behavioral control	.87	4
Behavioral intention	.90	4
Perceived environmental impact	.83	5

An exploratory factor analysis (EFA) was run next to assess the underlying variable structure of the five self-reported perceptual measures. This was necessary due to introducing the newly-developed perceived environmental impact construct. Hair et al. (2010) describe the usefulness of EFA in searching for structure among a set of variables when prior theoretical support is absent, which is the case for the perceived environmental impact construct. The sample was investigated to assess variables' relationships. The 25 items believed to represent the five multi-item constructs were subjected to a principle component extraction (Pearson, 1901), which summarized the interrelationships between the variables and explained total variance (Lackey, Sullivan, and Pett, 2003). A varimax rotation, described as the definitive orthogonal solution (Nunnally and Bernstein, 1994), was applied due to its ability to maximize the likelihood

of a variable loading on a single factor (Hair et al., 2010). Reflecting on the sample size for the EFA analysis and relying on guidelines from Hair et al. (2010), a rotated component matrix was created by suppressing coefficients below 0.35 (meeting minimal levels of significance). The rotated matrix redistributed data from the original unrotated matrix, enabling improved overall data interpretation as factors accounted for a greater percentage of variance (Hair et al., 2010). The results of the analysis for the rotated component matrix for the five research model constructs with multi-items are shown in Table 8. Five factors were identified with Eigenvalues greater than one, accounting for 38.1%, 12.1%, 8.2%, 8.1%, and 4.5% of the total variance.

Table 8: *Exploratory Factor Analysis (items with loadings < .35 deleted)*

Rotated Component Matrix					
	1	2	3	4	5
I2	.851				
I3	.828				
I1	.801				
I5	.768				
PE4	.739				
PE1	.710				
PE5	.571				.478
I4R	.422				
S3		.882			
S4		.871			
S5		.871			
S1		.854			
S2		.834			
A2			.894		
A1			.861		
A5			.784		
A3			.756		
A4			.693		
PB4				.846	
PB5				.838	
PB2				.798	
PB1				.700	
PB3R				.375	
PE3R					.836
PE2R					.772

The two items (I4R and PB3R) suggesting possible deletion based on the reliability analysis were also identified as problematic in the exploratory factor analysis. This was due to communalities less than .50 and low factor loadings (Hair et al., 2010). Consequently, I4R and PB3R were removed from the dataset. Two additional items PE1 ("I can play a role in reducing harm to the environment") and PE4 ("It is important to be environmentally responsible because every little bit helps") loaded on factor one along with items for behavioral intention. Further, one item, PE5 ("My individual actions can make a significant impact on the environment"), exhibited cross-loading between the perceived environmental impact and intention items. The location of PE1 in the survey (placed immediately after the five behavioral intention questions) suggested an explanation of its loading with the intention items in the factor analysis. Also, additional review of the wording for PE4 seemed to indicate that it was more associated with intention than with an individual's belief of his or her own perceived environmental impact. Subsequently, PE1 and PE4 were tentatively considered for removal.

To assess the feasibility of removing PE1 and PE4, the reliability analysis was re-run with just three items in the perceived environmental impact scale PE2R ("It does not make any difference what I do about the environment since one person cannot have a significant effect"), PE3R ("It is important to be environmentally responsible because every little bit helps"), and PE5. The Cronbach's alpha decreased from .831 to .759 yet was still above the .70 threshold. The exploratory factor analysis was next regenerated without I4R, PB3R, PE1, and PE4 to determine possible improvement. Five factors accounted for 40.4%, 12.2%, 9.7%, 9.1%, and 5.3% of the total variance, similar to results from the initial EFA. Loadings were much improved as all remaining 21 items

loaded on separate factors at between .707 and .901 except for PE5, which still cross-loaded with the behavioral intention and perceived environmental impact items.

While item cross-loadings are frequently used to determine whether items are deleted or retained (specifically referring to the PE5 item), other aspects should be considered to avoid an under-identified model (i.e., a model represented by a two-item construct) (Costello & Osborne, 2005; Hair et al., 2010). Worthington and Whitaker (2006) advise placing a cross-loading item with the factor it most closely resembles conceptually while Lackey et al. (2003) propose using Cronbach's alphas to identify placement of an item with strong loadings on more than one factor. Given this information and subsequent testing, PE5 was retained as part of the perceived environmental impact construct.

Summated scales were created by averaging retained items (Hair et al., 2011) and used to develop descriptive statistics for the research model (Table 9). Item means for all constructs were greater than their median values and the single sample means tests showed $p < .001$ for all variables except hyperbolic discounting at $p < .10$ (Hair, Celsi, Money, Samouel, & Page, 2011). Attitude and perceived environmental impact reflected the largest mean values at 6.18 and 5.72, respectively. All but one of the correlations (ranging from .13 to .57) were positive (as expected) except for the significant negative relationship between hyperbolic discounting and environmentally responsible behavior (also as expected). In general, correlations were in the .3 to .4 range, reflecting small to medium effects (Hair et al., 2010). No significant multicollinearity was detected as tolerances ranged from .56 to .94 and variance inflation factors (VIFs) range from 1.01 to 1.78, well within acceptable guidelines (Hair et al., 2010).

Table 9: *Descriptive Statistics*

	Mean	t-value	SD	1	2	3	4	5	6	Tol	VIF
1. Attitude	6.18 ^a	49.04	.71							.64	1.55
2. Subjective norm	5.14 ^a	14.09	1.23	.47 ^{***}						.71	1.41
3. Perceived behavioral control	5.39 ^a	21.67	1.02	.38 ^{***}	.38 ^{***}					.74	1.35
4. Behavioral intention	5.66 ^a	26.33	1.00	.47 ^{***}	.39 ^{***}	.40 ^{***}				.56	1.78
5. Perceived environmental impact	5.72 ^a	26.58	1.05	.40 ^{***}	.27 ^{***}	.32 ^{***}	.57 ^{***}			.64	1.58
6. Hyperbolic discounting	2.62 ^b	1.72	1.14	.04	-.08	-.09	-.02	.10		.94	1.07
7. Environmentally responsible behavior	1.64 ^c	4.74	.48	.15 ^{**}	.13 [*]	.22 ^{***}	.20 ^{***}	.18 ^{**}	-.16 ^{**}	.91	1.01

^ascale 1-7, $p < .001$; ^bscale 1-4, $p < .10$; ^cscale 1-2, $p < .001$; * $p < .05$. ** $p < .01$, *** $p < .001$

Confirmatory factor analysis was next run to determine if survey items intended for hypothesis testing indeed measured the underlying latent constructs with the required levels of reliability and validity (see Table 10). Applying guidelines from Hair et al. (2010), convergent validity was established by all factor loadings exceeding 0.65 and also by two-thirds of the loadings exceeding 0.80. Additionally, average variance extracted (AVE) scores for all constructs exceeded .50, an indicator of convergent validity. Also, construct reliability for variables, a measure of internal consistency of the measured variables representing a latent construct, achieved an acceptable value of .70 for all constructs except perceived environmental impact (.583). Construct reliability values as low as .60 may be acceptable in the presence of other indicators of construct validity. In the case of perceived environmental impact, AVE greater than .50 as well as Cronbach's alphas greater than .70 established these other construct validity indicators. Nomological

validity, a test of validity that examines correlations between constructs, was supported with significant positive inter-construct co-variances for all constructs. Discriminant validity was demonstrated as AVEs were larger than the corresponding squared interconstruct correlation estimates (SIC) for all construct pairs (See Table 11). The overall confirmatory factor analysis fit indices demonstrated a strong match between the data and model: $X^2/df = 2.08$, CFI = 0.94, TLI = 0.93, RMSEA = 0.065.

Table 10: *Confirmatory Factor Analysis*

Construct	Item		Factor Loadings	Construct Reliability	AVE
Attitude	<i>A1</i>	Important to protect the environment	0.93	0.92	0.69
	<i>A2</i>	Important to reduce pollution	0.94		
	<i>A3</i>	Important to conserve natural resources	0.73		
	<i>A4</i>	I am concerned about long-term of environment	0.73		
	<i>A5</i>	I care about reducing harm to the environment	0.81		
Subjective Norm	<i>S1</i>	People important to me think I should buy sustainable products	0.87	0.95	0.78
	<i>S2</i>	People important to me think I should recycle	0.83		
	<i>S3</i>	People important to me think I should reduce waste	0.86		
	<i>S4</i>	People important to me think I should support the environment	0.93		
	<i>S5</i>	People important to me think I should conserve resources	0.91		
Perceived Behavioral Control	<i>PB1</i>	I have control over performing sustainability activities	0.66	0.80	0.63
	<i>PB2</i>	I can perform environmental sustainability activities	0.73		
	<i>PB4</i>	I have control over my actions to support the environment	0.87		
	<i>PB5</i>	I have the ability to carry out sustainability activities	0.89		
Behavioral Intention	<i>I1</i>	I plan to pursue environmental activities	0.85	0.84	0.70
	<i>I2</i>	I plan to support environmental initiatives.	0.91		
	<i>I3</i>	I intend to seek out ways to support the environment	0.81		
	<i>I5</i>	I plan to play a role in reducing harm to the environment	0.77		
Perceived Environmental Impact	<i>PE2R</i>	It DOES NOT make any difference what I do about the environment because my efforts do not matter	0.65	0.58	0.53
	<i>PE3R</i>	There is NOT much any one person can do about the environment	0.80		
	<i>PE5</i>	My individual actions can make an impact on the environment	0.73		

Table 11: *Discriminant Validity*

	Attitude	Subjective norm	Perceived behavioral control	Behavioral intention	Perceived environmental impact
Average Variance Extracted (AVE)	.69	.78	.63	.70	.53
Correlation Values Squared					
Attitude	1				
Subjective norm	.22	1			
Perceived behavioral control	.16	.16	1		
Behavioral intention	.19	.17	.19	1	
Perceived environmental impact	.16	.09	.12	.43	1

Now that the supply manager data has been examined and refined, and sufficient reliability and validity has been established, hypothesized relationships will be investigated. Four hypotheses (H1, H2, H3, H6) will be tested using hierarchical moderated regression, two (H5, H7) will be tested using hierarchical moderated logistic regression, and one (H4) will be tested using mediated logistic regression. Effects related to hypotheses will be tested and interpreted according to procedures developed by Cohen and Cohen (1983), Hair et al. (2010), and Baron and Kenny (1986).

4.2 Hypotheses Testing H1, H2, H3, H6: Hierarchical Moderated Regression

Hypotheses 1, 2, and 3 predicted that intention to engage in environmentally responsible behavior would increase as a function of more favorable attitude (H1), more

favorable subjective norm (H2), and increased levels of perceived behavioral control (H3). Also, hypothesis 6 predicted that as levels of perceived environmental impact decrease, the relationship between attitude toward environmentally responsible behavior and the intention to engage in environmentally responsible behavior would be weakened. The significant and positive correlation between the three exogenous variables (attitude, subjective norm, and perceived behavioral control) and behavioral intention in Table 10 suggested the presence of the hypothesized relationships.

To examine the main effects of attitude, subjective norm, and perceived behavioral control and the proposed moderating factor, hierarchical moderated regression was applied according to the procedures outlined by Cohen and Cohen (1983). First, the three exogenous variables (attitude, subjective norm, and perceived behavioral control) were entered into the regression as step one/model one. Next, to control for a potential direct effect, the moderating variable (perceived environmental impact) was added in step two/model two. Then in step three/model three, the interactive term (attitude x perceived environmental impact) was introduced. The results of this analysis are found in Table 12.

Table 12: *Hierarchical Moderated Regression*

	Model 1	Model 2	Model 3
	B	β	B
Step 1			
Attitude	.32 ^{***}		
Subjective norm	.15 [*]		
Perceived behavioral control	.22 ^{***}		
Step 2			
Perceived environmental impact		.41 ^{***}	
Step 3			
Attitude x Perceived environmental impact			-.81
Total R ²	.297	.433	.439
Adjusted R ²	.289	.424	.428
Full Model F	35.70 ^{***}	48.09 ^{***}	39.26 ^{***}
df	253	252	251
Change R ²	.297 ^{***}	.135 ^{***}	.006

* p < .05, ** p < .01, *** p < .001

The relationship between attitude, subjective norm, and perceived behavioral control was considered in the step one/model one of the hierarchical regression. Results indicated an overall significant model ($F = 35.70, p < .001$) and predicted 29.7% of the variance for behavioral intention. Although no hypothesis was developed for a direct effect of perceived environmental impact and intention to engage in environmentally responsible behavior, it was necessary to control for a main effect before examining the potential moderating effect of perceived environmental impact. Step two/model two of Table 12 showed a significant direct influence of perceived environmental impact ($\beta = .41, p < .001$) toward behavioral intention. Also, there was a significant change in R^2 , from .135 to .433, and the overall model remained significant ($F = 48.09, p < .001$). This result suggested that as individuals believe (or do not believe) their efforts can make an impact to reduce environmental harm, their intention to engage in environmentally responsible behavior increases (or decreases). The interaction term for attitude and perceived environmental impact was added in step three/model three. While the overall model remains significant ($F = 39.26, p < .001$), no significant variance was explained and the interaction term was not significant.

In summary, there is support for H1 ($\beta = .32, p < .001$) that the more favorable the attitude toward environmental responsibility, the greater the intention to engage in environmentally responsible behavior. There is also support for H2 ($\beta = .15, p < .05$) that the more favorable the subjective norm toward environmental responsibility, the greater the intention to engage in environmentally responsible behavior. Additionally, H3 is supported ($\beta = .22, p < .001$) as it was demonstrated that as perceived behavioral control

toward environmentally responsible behavior increases, intention to engage in environmentally responsible behavior also increases. There is lack of support for H6 as evidence is not shown that as levels of perceived environmental impact decrease, the relationship between attitude toward environmentally responsible behavior and the intention to engage in environmentally responsible behavior is weakened. Although unpredicted, as indicated in step two/model two of Table 12, a significant main effect ($\beta = .41, p < .001$) was found for the relationship of perceived environmental impact on behavioral intention.

4.3 Hypotheses Testing H5 and H7: Hierarchical Moderated Logistic Regression

Hypothesis 5 predicted that as intention to engage in environmentally responsible behavior increases, actual environmentally responsible behavior increases. Also, hypothesis 7 predicted that as levels of hyperbolic discounting increase, the relationship between intention for environmentally responsible behavior and actual environmentally responsible behavior is weakened. Initial evidence supporting H5 was found in the significant and positive correlation between behavioral intention and environmentally responsible behavior in Table 9.

Hierarchical logistic regression involves a metric independent variable (behavioral intention), a categorical (dichotomous) dependent variable (environmentally responsible behavior), and a categorical moderating variable (hyperbolic discounting). It is operationalized using procedures outlined by Hair et al. (2010). First, behavioral intention was entered to examine the main effect on environmentally responsible behavior (step one/model one). Next, the moderating variable, hyperbolic discounting,

was included to control for a potential direct effect (step two/model two). Finally, the interactive term representing behavioral intention and hyperbolic discounting was added (step three/model three). The results of this analysis can be found in Table 13.

Table 13: *Hierarchical Moderated Logistic Regression*

	Model 1	Model 2	Model 3
	β	β	β
Step 1			
Behavioral intention	.43**		
Step 2			
Hyperbolic discounting		-.31*	
Step 3			
Behavioral intention x Hyperbolic discounting			-.20
Total R ²	.055	.088	.101
Chi Square Full Model	10.44***	17.09***	19.74***
df	255	254	253
Change R ²	.055***	.033***	.013

* p < .05, ** p < .01, *** p < .001

The relationship between behavioral intention and environmentally responsible behavior was first considered (step one/model one). Results indicate the overall model is significant (Chi-square = 10.44, p < .01), predicting 5.5% of the variance for behavioral

intention and a significant positive relationship for behavioral intention and environmentally responsible behavior related ($\beta = .43, p < .01$). Therefore, support is provided for H5.

It was necessary to control for a potential main effect of hyperbolic discounting on environmentally responsible behavior before examining the potential moderating effect of hyperbolic discounting. Step two/model two of Table 13 shows a significant negative influence of hyperbolic discounting ($\beta = -.31, p < .05$) toward behavioral intention. Also, change in R^2 of .033 (from .055 to .088; $p < .001$) indicates the overall model remains significant (Chi-square = 17.09, $p < .001$). This result suggests that as individuals increase their preferences for short-term rewards, the likelihood they will actually engage in environmentally responsible behavior decreases. The interaction term for behavioral intention and hyperbolic discounting was added in step three/model three. While the overall model remains significant (Chi-square = 19.74, $p < .001$), little explanatory variance is added.

In summary, support is provided for H5 ($\beta = .43, p < .01$) as it was demonstrated that as intention to engage in environmentally responsible behavior increases, environmentally responsible behavior increases. H7 lacks support as it was not demonstrated that as levels of hyperbolic discounting increase, the relationship between intention for environmentally responsible behavior and actual environmentally responsible behavior is weakened. However, there is an unhypothesized main effect shown for a direct relationship between hyperbolic discounting and environmentally responsible behavior ($\beta = -.31, p < .05$).

4.4 Hypothesis Testing H4: Mediated Logistic Regression

Hypothesis 4 predicted that as perceived behavioral control toward environmentally responsible behavior increases, actual environmentally responsible behavior increases. Initial evidence supporting H4 was found in the significant and positive correlation between perceived behavioral control and environmentally responsible behavior in Table 9. As perceived behavioral control also follows an indirect path to environmentally responsible behavior through behavioral intention, it is necessary to apply mediated logistic regression to test for a potential mediated relationship using the procedures identified by Baron and Kenny (1986). Necessary conditions to test for mediation include significant predictions of the (a) independent variable (perceived behavioral control) for the mediating variable (behavioral intention), (b) mediating variable for the dependent variable (environmentally responsible behavior), and (c) independent variable for the dependent variable. Prior support for H5 satisfies condition (b) where the mediating variable significantly predicts the dependent variable. Consequently, conditions (a) and (c) must be evaluated.

First, standard regression was used to assess the relationship of perceived behavioral control and behavioral intention as step one/model one. Next, previous test results between behavioral intention and environmentally responsible behavior were reported as step two/model two. Then, the relationship between perceived behavioral control and environmentally responsible behavior was examined using logistic regression as step three/model three. Finally, both perceived behavioral control and behavioral intention were added simultaneously in the logistic regression to determine the effect of

the inclusion of behavioral intention on the significance level of perceived behavioral control as step four/model four. The results of this analysis can be found in Table 14.

Table 14: *Mediated Logistic Regression*

	Model 1	Model 2	Model 3	Model 4
	β	β	β	β
Step 1				
IV: Perceived behavioral control	.40 ^{***}			
DV: Behavioral intention				
Step 2				
IV: Behavioral intention		.43 ^{**}		
DV: Environmentally responsible behavior				
Step 3				
IV: Perceived behavioral control			.45 ^{***}	
DV: Environmentally responsible behavior				
Step 4				
IV: Behavioral intention				.30 [*]
IV: Perceived behavioral control				.34 [*]
DV: Environmentally responsible behavior				
Total R ²	N/A ^a	.055	.063	.084
Chi Square Full Model	N/A ^a	10.434 ^{***}	12.004 ^{***}	16.299 ^{***}
df	255	255	255	254
Change R ²	N/A ^a	.055 ^{***}	.008 ^{***}	.021 ^{***}

* p < .05, ** p < .01, *** p < .001, ^a not measured (scale difference due to use of OLS regression)

Step one/model one reflected a positive and significant relationship between perceived behavioral control and behavioral intention ($\beta = .40, p < .001$). Next, in step two/model two, a positive and significant relationship between behavioral intention and environmentally responsible behavior ($\beta = .43, p < .001$) is noted, as previously reported in Table 13. Then, the relationship between perceived behavioral control and environmentally responsible behavior is positive and significant ($\beta = .45, p < .001$) (step three/model three). This result provides support for H4. When the results were analyzed with both perceived behavioral control and behavioral intention simultaneously entered as predictors of environmentally responsible behavior (step four/model four), the relationship between perceived behavioral control and environmentally responsible behavior, while still positive and statistically significant, is now weakened ($\beta = .34, p < .05$). Consequently, in addition the support previously cited for H4 ($\beta = .45, p < .001$), regression testing suggest a condition of partial mediation. Confirmation for mediation is provided by the Sobel test (Sobel, 1982; Soper, 2013) (Sobel test statistic 2.89; $p = .004$).

4.5 Summary of Findings

A summary of all findings is presented in below Table 15. Support was found for five of seven hypotheses. The results of the two hypotheses not supported, predicting moderating effects, revealed main effects on their target variable. Chapter 5 includes a discussion of the implications of these findings and present the conclusions that can be drawn based on these results. Study limitations and directions for future research in the area will also be provided.

Table 15: *Hypotheses Results*

Summary of Findings			
	Predictor Variable	Dependent Variable	Findings
H1	Attitude	Behavioral intention	Supported ^{***}
H2	Subjective norm	Behavioral intention	Supported [*]
H3	Perceived behavioral control	Behavioral intention	Supported ^{***}
H4	Perceived behavioral control	Environmentally responsible behavior	Supported ^{***}
H5	Behavioral intention	Environmentally responsible behavior	Supported ^{**}
H6	Perceived environmental impact	Behavioral intention	Not supported ^a
H7	Hyperbolic discounting	Environmentally responsible behavior	Not supported ^b

* $p < .05$, ** $p < .01$, *** $p < .001$, ^aMain effect support $p < .001$, ^bMain effect support $p < .05$,

CHAPTER 5 IMPLICATIONS, LIMITATIONS, AND FUTURE RESEARCH

5.1 Overview

Previous research has argued that “generating ecologically sustainable outcomes can be regarded as a key component of organizational effectiveness, just as are profitability and employee satisfaction” (Rands & Starik, 2009, p. 299). A specific sustainable outcome measured in this dissertation was the level of supply manager environmentally responsible behavior. This behavior was defined and operationalized as *following corporate environmental sustainability objectives while also purchasing materials and services that meet cost, delivery, quality, and other requirements*. This measure was chosen as a key ecologically sustainable outcome because of its importance in contributing to overall corporate initiatives. Despite a desire for environmentally responsible behavior, varying personal views on this subject can represent substantial barriers to attaining corporate sustainability goals (Kearins & Springett, 2003). Consequently, it is difficult for organizations to attain a thorough understanding of the influences that lead to achieving corporate environmental sustainability objectives without clearly comprehending the underlying constituents of individual orientation concerning sustainability.

The intent of this dissertation was to develop a strong theoretically-based research model (based on the Theory of Planned Behavior) to test behavioral influences on

supply managers' personal views toward sustainability. Specifically, the study was designed to examine these primary research questions:

- What factors influence supply managers' intention toward environmentally responsible behavior?
- What is the relationship between supply managers' intention to support environmentally responsible behavior and actual environmentally responsible behavior?
- Are there other factors such as personal decision making biases that influence the relationship between supply manager intention toward environmentally responsible behavior and actual environmentally responsible behavior?

The idea for this research project was instigated by such comments as, "Organizations are struggling on how to motivate their employees to become engaged in environmental activities" (Cantor et al., 2012, p. 45), "What is critically missing in the literature is an identification of individual-level factors that will contribute to environmental leadership behavior among corporate executives and managers" (Ng & Burke, 2010, p. 603) and more specifically, "The true drivers that induce firms to adopt green purchasing remain an unresolved issue" (ElTayeb et al., 2010, p. 207). Results from the preceding analysis described in Chapter 4 offer insights into why these personal views matter in driving behavioral intention and as such, provide a strong starting point to understand supply manager sustainability intention and behavior. The outcomes of this research project verify multiple influences on supply manager intention to practice environmental sustainability which in turn, affects actual environmental sustainability behavior in the workplace.

The direct effects found for all hypothesized research model relationships create a strong foundation for better understanding significant factors which can lead to achieving corporate sustainability. Despite a lack of support for two hypotheses concerning the roles moderating variables might play, findings (including unpredicted direct effects for perceived environmental impact and hyperbolic discounting) are noteworthy. These findings provide answers to important research questions in terms of identifying influences for supply managers' intentions to engage in environmentally responsible behavior, understanding the relationship between behavioral intention and actual environmentally responsible behavior, and also considering personal decision making biases that could play a role toward behavior intention and actual behavior.

The findings in the current research are also notable given the past lack of success (relying on external influences) in identifying reasons for low supply manager environmentally responsible behavior and support for corporate environmentally sustainable initiatives. This evidence is encouraging for corporations as it both creates a context and provides a path forward to better understand the drivers of (a) intention to engage in environmentally responsible behavior and more importantly, (b) performing job duties that result in outcomes leading to increased levels of environmental sustainability. In short, the results from this study potentially increase levels of awareness of the factors leading to supply managers and other employees embedding environmental goals and making sustainability and support of corporate objectives a part of their core job duties.

5.2 Key Findings and Implications

As illustrated in Table 15, support was found for all five hypotheses expecting a direct relationship between the respective independent and dependent variables. Although interactive effects were not supported for the two hypotheses proposing a moderating role for personal decision making biases—perceived environmental impact and hyperbolic discounting—main effects were observed regarding their relationships on the target variable. To specifically explain how the study results relate to increased supply manager environmental sustainability orientation, the next section of this chapter will elaborate on each of the hypothesized relationships identified in the research model and discuss the findings.

5.2.1 Attitude –behavioral intention.

A great deal of prior research, particularly in the fields of psychology and organizational behavior, has provided strong levels of support for the effect of an individual's attitudes toward their behavioral intention (Conner & Sparks, 2005). For the current research, it was expected that more positive attitudes toward environmentally responsible behavior would lead to greater intention to engage in environmentally responsible behavior. High mean values, medium correlation levels, and a highly significant beta score supported this expectation and provided evidence for H1, reflecting strong attitudes in favor of activities aimed to reduce harm to environment. Comparatively, the beta score established attitude as the greatest predictor among the three hypothesized direct effects on behavioral intention. These results reveal that supply manager attitudes are critical to generating desired levels of behavioral intention toward environmental sustainability. Consequently, it is important for top management to assess

supply managers' attitudes about the environment to determine the likelihood of supporting sustainability objectives and to identify where attitudinal change is needed.

Attitude change is described as a process of identification or internalization (Kelman, 1958). Identification pertains to adopting another person's attitude because of an existing or desired relationship, and internalization is related to an individual's values or beliefs as related to attitude change. Costa and De Matos (2002) operationalized the identification and internalization paths by showing how managers, as credible sources of information, effected attitude change by using a two-step communication process. These researchers identified how managers first appealed to respected employees who then exerted influence toward attitudinal change of other employees.

A critical task in generating the desired level of attitude change is to realize that the greater the degree of one's commitment to their attitude, the more difficult it is to modify that attitude (Sherif, Sherif, & Nebergall, 1981). Also, attitudes based on complex beliefs are less embedded and thus more changeable (Linville & Jones, 1980). Because sustainability is a relatively new topic and individual commitment may not likely be deeply rooted, future research can help determine if attitudinal change can be successful by using the aforementioned methods.

Pedagogical literature provides resources that organizations and specifically corporate training can apply to gain greater insights into supply managers' attitudes. For example, supply managers' can trace the supply chains of materials and services they are currently involved with, extending their understanding of the true origins of influences affecting sustainability (Kearins & Springett 2003; Schwering 2011). Additionally, a review and valuation of local sustainability issues (Schwering 2011) and regional

resource availability (Viswanathan 2012) can bring about more personalized environmental concerns and initiate self-reflection, potentially shaping attitudes toward sustainability. Ultimately, by applying theoretical attitude change methods and practices from pedagogical research, corporate leaders can help supply managers increase their levels of environmental self-awareness.

5.2.2 Subjective norm –behavioral intention.

As with attitude, previous studies applying the Theory of Planned Behavior have consistently found support for a positive and significant relationship between subjective norm and behavior intention (Armitage & Conner, 2001). Consistent with expectations, a high mean value, a highly significant correlation, and a relatively significant beta score provided support for H2. These results indicate a high willingness for supply managers to conform to environmental influences of those they considered important although it was by comparison, of a lower extent than their attitude toward sustainability. Given the relationship between subjective norm and intention to engage in environmentally responsible behavior, corporate management needs to identify and assess the levels of influence on supply managers' willingness to conform. Specifically, top management must determine who supply managers consider as primary influences and even more importantly, who they are most likely to follow. Also, organizations must understand how corporate leadership can be installed as a key subjective norm referent.

A focused approach can be applied where specific influence and degrees of acceptance are assessed by an organization regarding the roles family/friends, co-workers, top management, suppliers, customers, and business leaders play in shaping views and intentions leading to development of subjective norms. As a caveat, Moore

(2005) along with Rands and Starik (2009), argue that statements from important others need to be perceived as unbiased, otherwise, the message may be perceived as unreliable, alienating the decision maker and ultimately being rejected. Another way to assess and influence levels of subjective norm is to use cross-functional team-based project work on environmental objectives (e.g., new product development relying on supplier informational as well as material inputs) (Hind, Wilson, & Lenssen, 2009; Pesonen 2003; Stubbs & Cocklin, 2008) and use a debriefing sessions to discuss how the opinions and actions of others played a role in determining supply managers' behavioral intention.

5.2.3 Perceived behavioral control –behavioral intention, environmentally responsible behavior.

As discussed in Chapter 2, prior studies have shown a high degree of support regarding the predicted path between perceived behavioral control and behavioral intention. In addition to a relationship with behavioral intention, the Theory of Planned Behavior also suggests a main effect of perceived behavioral control toward environmentally responsible behavior when perceived behavioral control is strong. This prediction means as supply managers' perceived behavioral control increases, environmentally responsible behavior may also increase.

A high mean value as well as highly significant positive correlations and beta scores provided support for H3. These results indicate that increased levels of perceived behavioral control toward environmentally responsible behavior leads to an increased intention to engage in this type of behavior. It also suggests that high levels of perceived behavioral control and support an individual's belief of possessing sufficient resources or having abilities to enact environmentally-oriented behavior. Also, support was found for

H4 given a highly significant positive beta value. These results identify a direct relationship between perceived behavioral control and environmentally responsible behavior. Further, intention to engage in environmentally responsible behavior was found to partially mediate the path between perceived behavioral control and environmentally responsible behavior. In summary, these outcomes indicate that perceived behavioral control plays both a direct and partially mediated role because it influences both intention to engage in environmentally responsible behavior and actual environmentally responsible behavior.

The conclusions drawn from testing these two hypotheses are important regarding supply managers and their sustainability involvement. As key decision makers awarding purchase orders to suppliers, identifying and selecting suppliers, and initiating environmental sustainability projects, supply managers must believe in their personal capabilities to enact environmentally-oriented behavior. Firms can assess levels of supply manager beliefs in their personal capabilities and thus determine degrees of perceived behavior control by involving and observing supply managers in a wide variety of organizational activities. To increase levels of perceived behavioral control, organizations need to understand problems and facilitate solutions to help supply managers overcome barriers such as unclear environmental standards and regulations and costs of switching suppliers (Bansal & Taylor, 2002, Conraud-Koellner & Rivas-Tovar, 2009). Similarly, customer and supplier site visits (Kearins & Springett, 2003) and participating on corporate environmental projects (Pesonen, 2003) afford supply managers the opportunity to experience and focus on requirements and success factors related to organizational sustainability. On a more personal level, corporate training in

terms of identifying employee best practices as well as presentations during meetings can help reinforce levels of employee perceived behavioral control (Rands and Starik, 2009). Further, actual sustainability practices in the office (e.g., managing power usage, minimizing paper use and general waste) (Kearins & Springett 2003) could effectively demonstrate applications of environmental sustainability behavior for supply managers.

5.2.4 Behavioral intention - environmentally responsible behavior.

The findings for a significant path from intention to engage in environmentally responsible behavior to actual environmentally responsible behavior represent a critical part of the dissertation. These results demonstrate how supply managers' expectations and plans lead to environmental behavior. This relationship is not unexpected given the past support identified in seven separate meta-analyses described in Chapter 2. A high mean value and very significant and positive beta value provided support for H5, suggesting a high probability of supply managers' planning to exert effort toward environmentally responsible behavior.

Behavioral intention plays a critical role in the Theory of Planned Behavior as it is theorized to occur based on direct effects from the three exogenous variables; attitude, subjective norm, and perceived behavioral control. As such, behavioral intention represents a culmination of supply managers' dispositions toward sustainability, their willingness to conform to the inputs of important others, and their beliefs of being able to enact the desired behavior. These relationships emphasize the relevance and importance of general environmental training throughout the corporation, thereby affecting supply manager environmental sustainability decision making and action plans (Bosnjak et al., 2005).

The contribution of the three exogenous variables toward explaining the variance of intention to engage in environmentally responsible behavior was strong at 29.7%. Because of their simultaneous yet independent positive and significant effect on behavioral intention, organizations assessments and actions initiated to influence attitudes, subjective norm, and perceived behavioral control will likely result in an increase of supply managers' orientation toward sustainability. This orientation therefore enhances the likelihood that supply managers will engage in environmentally responsible behavior.

5.2.5 Perceived environmental impact –behavioral intention.

Perceived environmental impact was added to the Theory of Planned Behavior in the current study in an attempt to explain more variance toward intention to engage in environmentally responsible behavior and further explain the process by which attitudes can influence such behavioral intention. More specifically, it was included in the dissertation research model to determine how an individual's perceptions of his or her sustainable actions for making a favorable (or unfavorable) change toward the environment might alter the attitude-behavioral intention path. Consequently, H6 was added as one of two personal decision making biases to the research model and predicted that decreased levels of perceived environmental impact would weaken the relationship between attitude toward environmentally responsible behavior and intention to engage in environmentally responsible behavior.

Despite the presence of a highly significant mean value for perceived environmental impact, reflecting an overall favorable supply manager orientation regarding their belief that their personal sustainability efforts result in a desirable impact

on the environment, there was a lack of support for an interaction effect between attitude and perceived environmental impact, consequently, H6 was not supported. However, it should be noted that a near-significant p value of .104 (significant for a one-tailed test) for the hypothesized interaction suggests a need for additional research to further examine this possible relationship.

Given that perceived environmental impact is a relatively new construct and that its relationship has not been tested within the Theory of Planned Behavior model may explain the lack of support for the moderating effect. Furthermore, reflecting on the ways perceived environmental impact have been tested in the past (as perceived consumer effectiveness in Table 4 from Chapter 2), support for a hypothesized direct effect for perceived consumer effectiveness on behavioral intention was previously found in a study involving an expanded version of the Theory of Planned Behavior (Kim & Han, 2010). Consequently, although support for H6 was not found, the results of this research do generate evidence for a perceived environmental impact-behavioral intention relationship.

It is noteworthy that of all the variables in the study, the correlation between perceived environmental impact and behavioral intention was the largest (.57, $p < .001$), suggesting a significant and positive relationship. This observation was confirmed in the hierarchical moderated regression testing of the potential interaction between attitude and perceived environmental impact toward behavioral intention. Also, there was a very strong and significant unhypothesized direct effect of perceived environmental impact on intention ($\beta = .41$, $p < .001$). In fact, this direct effect appears to be stronger than any of the other three exogenous variables (attitude, subjective norm, and perceived behavior),

such that change in R^2 was .135 and was very significant at $p < .001$, increasing the total variance explained for behavioral intention from 29.7% to 43.3%. This evidence adds to the Theory of Planned Behavior as well as the sustainability literature, and directly responds to a call to action by Ellen et al. (1991) to better understand how perceived environmental impact can be operationalized in a research model.

The findings for including perceived environmental impact with the Theory of Planned Behavior suggest a number of opportunities and potential benefits for organizations. From a corporate policy perspective, it would appear that an initial step toward actualizing perceived environmental impact is to determine individual supply managers' eco-IQ by investigating personal sustainability positions (Kearins & Springer, 2003; Rands & Starik, 2009). Such determinations could be achieved by using a survey. Alternatively, firms can gauge supply manager responses to organizational communications, for example, posters adjacent to a department recycling bin showing how one individual's actions (e.g., reducing plastic water bottle use) can reduce environmental harm (Ellen et al., 1991). Further, messages that position perceived environmental impact in a manageable framework (e.g., "think globally, act locally") can create a practical context for supply managers to help them discover how their job duties actually affect the environment (Fine, 1990).

5.2.6 Hyperbolic discounting –environmentally responsible behavior.

As with perceived environmental impact, hyperbolic discounting was added to the Theory of Planned Behavior in the current study in an attempt to explain more variance for actual engagement in environmentally responsible behavior. More specifically, it was included in the research model to reflect an individual's preference for a lesser valued,

more immediate reward (e.g., cost savings) over a greater valued, deferred reward (specifically, an environmentally sustainable outcome). As a result, H7 was developed as the second of two personal decision making biases in the research model and predicted that increased levels of hyperbolic discounting would weaken the relationship between intention to engage in environmentally responsible behavior and actual environmentally responsible behavior. Use of hyperbolic discounting in this manner responded to calls to action (Carter et al., 2007; Hall & Fong, 2007; Sheeran, 2002) to examine and operationalize decision making structures that are not purely rational.

The vignette used to measure hyperbolic discounting levels reflected a centered mean value (on a scale of one to four- one representing high levels of hyperbolic discounting inclination and four representing low levels) yet with a relatively high standard deviation, indicating a wide amount of response dispersion. Correlations with research model variables, expect for environmentally responsible behavior, were not significant, and also the hypothesized interaction effect between behavioral intention and hyperbolic discounting was not found.

Similar to the case for perceived environmental impact, results for a lack of interactive effect between hyperbolic discounting and behavioral intention may be related to its use as a new construct in the Theory of Planned Behavior. However, as with perceived environmental impact, it should be noted that a near-significant p value of .109, (one-tailed test) for the hypothesized interaction between hyperbolic discounting and behavioral intention suggests a need for further study. Hyperbolic discounting had not been tested as a business decision making construct in the past, therefore, the prediction of its role in this dissertation represents the breaking of new ground. Hyperbolic

discounting's potential as an moderating bias of the intention to engage in environmentally sustainable behavior-actual environmentally responsible behavior path was based on an intention-behavior gap suggested by existing research. Specifically, the application for hyperbolic discounting followed the work of Sheeran (2002) as well as Hall and Fong (2007) who posited personal habits as a moderator for the behavioral intention and actual behavior relationship.

Although support was not provided for H7 for an interaction between behavioral intention and hyperbolic discounting, evidence was produced for hyperbolic discounting as a main effect on environmentally responsible behavior. Similar results for the use of a personal decision making bias were reported by Fulham and Mullan (2011), who found support for personal habits as a direct (not moderating) bias predicting behavior. The findings pertaining to hyperbolic discounting lay a foundation for its role as an influence on supply manager environmentally responsible behavior. The results reflect the presence of a countervailing force that independently yet simultaneously works side by side with intention to engage in environmentally sustainable behavior.

Perhaps the discovery of how increased levels of hyperbolic discounting leads to reduced levels of environmentally responsible behavior may shed new light and explain why supply managers do not support corporate sustainability initiatives to the desired extent. To this point, organizations need to first assess the degree of hyperbolic discounting present among supply managers and then second, determine appropriate interventions to reduce the propensity toward high hyperbolic discounting levels. These interventions will need to involve striking the right balance between (a) expediting late

deliveries and focusing on price reductions and (b) working on corporate strategic plans like sustainability (Burt et al., 2004; Handfield et al., 2002)

Corporations can apply the hyperbolic discounting diagnostic instrument (vignette) in this study to understand employee high orientation for short term rather than long term rewards. Alternatively, lab experiments involving scenario manipulation and alternative premises and conditions could be useful. Turning to method of intervention, a wide variety of choices are available. Goal Setting Theory (Locke, 1968) and management by objectives (Drucker, 1954), where top management and employees collaborate and agree on employees' role in supporting corporate objectives, represent two options. Such objectives must be prioritized to create employee incentives that result in a balance of short-term and long-term rewards. Also, organizations need to communicate a "big picture" to employees and involve them in strategic planning (Taylor, 1997). Firms need to make sure that messages regarding sustainability are clear and priorities are ranked properly. This can create an understanding of the value of future corporate undertakings and enable employees to use this information to prioritize their daily decision making activities. Finally, corporate training programs can be developed and delivered to reduce supply manager impulsive decision making/hyperbolic discounting, and instead, rely on critical thinking practices rooted in logic and objectivity (Gupta & Thomas, 2001).

5.2.7 Summary of findings and implications.

Bendoly et al. (2006, p. 738) describe a context for the findings of this dissertation as they state, "When it comes to implementation, the success of operations management tools and techniques, and the accuracy of its theories, relies heavily on our

understanding of human behavior." The aforementioned hypothesized and unhypothesized results add to the growing body of blended operations management and organizational behavior knowledge (Gino & Pisano, 2007; Tokar, 2010). Evidence from this study creates a path forward concerning supply managers' intention to engage in environmentally sustainable behavior and actual environmentally responsible behavior, leading to increased levels of support for corporate sustainability initiatives. Also, findings from this research allow top management, as well as employees, to identify, evaluate, and understand the intrinsic forces that act as enablers or barriers regarding personal sustainability decision making.

5.3 Limitations and Future Research

Despite the contributions of the current study, it is not without limitations. To start, there are two potential limitations related to the use of a vignette. While Finch (1987) describes the benefits of using vignettes over respondent self-reporting, there may be more effective methods to obtain insights regarding environmentally responsible behavior and hyperbolic discounting. One alternative approach could consist of capturing respondent intention prior to a sustainability program implementation and then determining actual environmentally responsible behavior post-program implementation. A specific example is asking employees to create logs or journals describing their actions, collecting data from bosses or co-workers, or directly observing supply managers to determine their behavior (Blatchford, Edmonds, & Martin, 2003; Donaldson & Grant-Vallone, 2002; Kearins & Springett, 2003). Another approach involves the use of

experiments. Both processes could assist in determining supply managers' actions and their impact (both favorable and unfavorable) on the environment.

The second limitation is related to the environmentally responsible behavior vignette and its brevity. The research instrument was used in a very straightforward way so as to minimize respondent fatigue and confusion, and to create survey parsimony and maximize user response rate. Despite this design for the vignette, there may be drawbacks regarding this procedure. Representing a realistic scenario involving selecting a new supplier in a brief period of time can be difficult. Consequently, there is an opportunity to perhaps improve the vignette by further developing scales or investigating other measures.

Another limitation related to the study pertained to validating scale items through the use of a separate sample for exploratory factor analysis testing (Hurley et al., 1997). Because of timing issues with collecting additional data, it was not feasible to run this analysis using an additional separate sample representing responses from at least 150 supply managers. Attempts to validate the scale for perceived environmental impact by running the exploratory factor analysis (EFA) with a proxy dataset (graduate business students and/or undergraduate business students) were unsuccessful. Consequently, the scale for perceived environmental impact was validated by running an EFA with the actual research model dataset. To supplement the results of this EFA and in keeping with Hurley et al. (1997), additional sampling of supply managers will be done in the future as a post hoc study to run the separate EFA and more rigorously evaluate the perceived environmental impact construct scale.

Significant efforts were made and controls were used to minimize the impact of common methods variance including two types of research instruments (self-report items and vignette), Time₁ and Time₂ staggered time deliveries of the survey, and minimal use of reverse coded questions. However, the sequencing of the self-report behavioral intention and perceived environmental impact items in the Time₂ survey may have generated common methods variance and hence represents another potential limitation. More specifically, low factor scores and cross-loading for two of five perceived environmental impact construct items necessitated their elimination, resulting in a three-item factor measuring construct reliability. More optimal sequencing, for example, placing behavioral intention items in the Time₁ study and the perceived environmental impact items in the Time₂ study may have improved the results of the project.

An additional limitation in the study pertains to generalizability of the findings. This also represents a future research opportunity. Since the surveyed supply managers were drawn from organizations in the Southeast and West Coast regions of the United States, it is uncertain if the research results are applicable to other regions of the United States and other countries. It will be important for future research to normalize the survey by recognizing the need for and making adjustments for cultural differences in these geographic areas. As an example, Cheung et al. (1999), in a Theory of Planned Behavior study on wastepaper recycling, found an asymmetric condition between China and the United States. Because of a collectivist (group) orientation in China rather than a typical individualistic position found in the United States, Chinese subjective norm played a stronger role than Chinese attitude on behavioral intention to recycle. Also,

perceived behavioral control affected intention more strongly in the United States than China due to greater perceived beliefs of empowerment and control.

The final limitation, which also represents an opportunity for future research, concerns the two moderating variables, perceived environmental impact and hyperbolic discounting. These variables were included in the research model based on the anticipated importance as reflected in the literature (e.g., calls to action) as well as inputs from practitioner focus group participants. Nevertheless, there are always challenge in introducing new variables to a research project. Because perceived environmental impact and hyperbolic discounting lacked prior testing in the business literature, it was necessary to create new research instruments (i.e., self-report survey items and a vignette). While both instruments were assessed and accepted through establishing face validity and pre-testing, the potential for scale refinement exists by reviewing and discussing the results of this study as well as applying the constructs in future research projects.

Continuing with future research, additional salient variables may help explain greater levels of model variance for supply managers' intention to engage in environmentally sustainable behavior and actual environmentally responsible behavior. Flannery & May (2000) advocate including personal moral obligation (e.g., an individual's commitment to exercising ethical behavior) and perceived magnitude of consequences (e.g., perception of anticipated results produced from actions taken). These same authors also cite the influence of corporate ethical climate (e.g., existence of ethical code of conduct, top management modeling ethical behavior, etc.) and perceptions of financial costs on behavioral intention. Other factors to consider include previous involvement with environmental sustainability (Cordano & Frieze, 2000), attitude toward

organizational change (Ashford, 1993), and personality (Gattiker & Carter, 2010). Also, moderating variables that have been shown to interact with independent variables, such as the respondent's years of work experience, company sales revenue, and nature of industry, might further explicate the behavioral intention-actual behavior path.

Adding belief-based measures for subjective norm and perceived behavioral control (Ajzen, 1991) to direct measures in future studies could shed light on the specific beliefs underlying these constructs. Belief-based measures provide greater levels of detail as they are expressed as a composite index of levels as well as revealing underlying specific beliefs. For example, it could be possible to identify members of specific referent groups such as family and friends, co-workers, suppliers, customers, and top management to help corporate leadership better position itself as a key referent.

A further research opportunity pertains to Ashforth and Kreiner's (1999) research on "dirty work." They identify how the nature of some types of work is stigmatized by society or even by an individual. Paarlberg and Lavigna (2010) add to this by indicating how job duties might be deemed as socially unacceptable. Consequently, a potential research area concerns the perception of corporate environmentally responsible behavior. Research could be initiated by management determining the various perceptions of sustainability by supply managers and then initiating actions to elevate its esteem should sustainability be perceived as a "dirty job" (undesirable work).

Incorporating additional theory with the Theory of Planned Behavior represents another future research opportunity. To this point, Gattiker and Carter (2010) describe the potential for influence tactics (Yukl & Tracey, 1992), in particular, rational persuasion and inspirational appeals. The theoretical underpinnings for research into

influence behavior are rich, borrowing from theories of power, leadership, motivation, and conflict (Mowday, 1978; Perreault & Miles, 1978). As an example, Gattiker and Carter (2010) indicate how influence tactics might inspire an individual to increase their level of commitment (intention) for an environmental sustainability project. More specifically, influence tactics represents a wider range of appeals (e.g., eight-item Profiles of Organizational Influence Strategies [POIS]) (Kipnis, Schmidt, & Wilkinson, 1980) that could potentially increase subjective norm toward behavioral intention.

Perhaps the most encouraging potential theory to be considered to be used with the Theory of Planned Behavior is Goal Setting Theory (Locke, 1968). When managers fail to clearly define expectations, such as the importance for corporate sustainability initiatives, employees' actions toward organizational goal achievement are often ineffective due to inadequate firm-employee alignment (Locke, Latham, & Erez, 1988; Locke & Latham, 2006). Goal Setting Theory aims to reduce these shortcomings by determining overall levels of firm-employee goal alignment (Locke, Shaw, Saari, & Latham, 1981; Locke & Latham, 2006).

Goal Setting Theory and the Theory of Planned Behavior are similar as they are based in rational thought (Ajzen, 1985, 1991; Locke, 1968). Locke and Latham (1990, 2002) discuss this shared rationality and also contrast how Goal Setting Theory applies to organizational tasks. It appears that Goal Setting Theory is principally concerned with establishing goals but does not identify specific actions to accomplish goals. Conversely, the Theory of Planned Behavior focuses on individual characteristics employed to develop intention and actual behavior leading to goal attainment but does not address top down transmission of goals from management. Consequently, the potential to apply both

theories to increase support for corporate sustainability initiatives is promising. Goal Setting Theory may help overcome the difficulty of "pushing down" a macro level concept, such as sustainability, to a personal, micro level (Carter & Rogers, 2008). A way to begin could be to assess supply managers' perceptions of their organizations' commitment to sustainability goals and how well these goals are articulated and transmitted down through the organization as corporate initiatives. An interesting outcome of this assessment could be identification of a situation where corporate goals for sustainability are not well communicated or perhaps do not exist, yet supply manager support for environmental sustainability is high.

Another future research area represents adaptation of the dissertation research model and applying it for other organizational job positions (even those not related to sustainability). This research opportunity could perhaps represent another way to blend Goal Setting Theory and the Theory of Planned Behavior. An adapted model of this type may provide insights into any situation requiring employee commitment for corporate goals.

Finally, developing a conceptual model that integrates past variables used to test for supply manager orientation for sustainability with the constructs identified in the research model represents an opportunity for future research. Such an integrated model would combine a base model reflecting past external attempts to understand and influence supply manager orientation toward sustainability (Carter & Carter, 1998; Drumwright, 1994; Min & Galle, 2001) described in Chapter 2 with the updated Theory of Planned Behavior-based dissertation research model. This integrated model could

have additional application for any situation involving external and internal influences on behavioral intention and environmentally responsible behavior.

5.4 Conclusion

The purpose of the research described in this dissertation was to directly address a long-standing issue of low levels of supply manager support for environmental sustainability. The results of this study identify the roles that attitude, subjective norm, perceived behavioral control, perceived environmental impact, and hyperbolic discounting play in influencing intention to engage in environmentally responsible behavior and actual environmentally responsible behavior. This information should assist firms in developing a deeper understanding of the requirements to achieve greater levels of environmentally responsible behavior among their employees, specifically those employees required to support corporate sustainability initiatives.

The expected contributions of this dissertation were to (a) provide insights for researchers and practitioners into lack of supply manager support to adopt environmentally sustainable buying, (b) apply a behavioral-based model (i.e., the Theory of Planned Behavior) to study supply manager behavior and (c) extend the applicability of the Theory of Planned Behavior by adding two moderating variables believed to represent decision making biases. Discussion of hypothesized results addressed all items. Additionally, strategies were developed to assist corporations in increasing their knowledge of the research model constructs and how they might be operationalized to reach desired sustainability levels.

In conclusion, corporate environmental sustainability can only be achieved through effective employee participation. In addition to this project, it is hoped that additional research is initiated to further examine the influences of supply managers' intention to engage in environmentally sustainable behavior and actual environmentally responsible behavior and to raise levels of understanding. Ultimately, this understanding can lead to a more healthy and sustainable natural environment.

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APPENDIX A

RESEARCH CONSTRUCT DEFINITIONS

Appendix A: Research Construct Definitions

Construct	Definition	Author(s)
<i>Attitude</i>	Individual's evaluation of the favorableness or unfavorableness of an object, person, institution, or event.	Ajzen and Fishbein, 1980; Ryan and Bonfield, 1975
<i>Behavioral intention</i>	Reflects the amount of effort people expect to exert to perform a behavior. Also described as motivation.	Ajzen, 1991; Conner and Sparks, 2005
<i>Environmentally responsible behavior</i>	Balancing corporate environmental sustainability objectives with cost, delivery, service, and quality supply requirements.	Based on Bowen et al., 2001; Carter et al., 2000; Handfield et al., 2002; Min and Galle, 1997
<i>Hyperbolic discounting</i>	The preference of individuals for immediate, less-beneficial payoffs over options they could pursue now that later provide greater benefits.	Laibson et al., 1998; Strotz, 1955
<i>Perceived behavioral control</i>	Assesses the degree to which people believe they have control over enacting the behavior of interest. It reflects an individual's perception of ease or difficulty in performing the behavior.	Ajzen, 1985
<i>Perceived environmental impact</i>	Belief that personal involvement and actions can contribute to reducing environmental problems.	Ellen et al., 1991
<i>Subjective norm</i>	Approval or disapproval of a particular behavior by an important person or group.	Ajzen, 1991

APPENDIX B

QUESTIONNAIRE ITEMS

Appendix B: (Questionnaire Items; Seven Point Likert-type Scale)

Attitude (Adapted from Chen and Chai, 2010; Valle et al., 2005)

1. In my opinion, it is important to protect the environment.
2. It is important to reduce levels of pollution.
3. In my opinion, it is important to conserve natural resources.
4. I am concerned about the long term future of the environment.
5. I care about reducing harm to the environment.

Subjective Norm (Adapted from Chan and Lau, 2001; Cheung, Chan and Wong, 1999; Taylor and Todd, 1995)

6. Most people who are important to me think I should purchase environmentally sustainable products.
7. Most people who are important to me think I should recycle materials.
8. Most people who are important to me think I should reduce waste (e.g., garbage, trash, etc.).
9. Most people who are important to me think I should support the environment.
10. Most people who are important to me think I should conserve natural resources.

Perceived Behavioral Control (Adapted from Chan and Lau, 2001; Cheung, Chan and Wong, 1999; Taylor and Todd, 1995)

11. I have control over performing environmental sustainability activities.
12. I can perform environmentally sustainable activities (e.g., energy conservation, recycling).
13. It is difficult for me to perform environmental sustainability activities (R).
14. I have control over my actions to support the environment.
15. I have the ability to carry out environmental sustainability activities.

Perceived Environmental Impact (Adapted from Ellen et al., 1991; Grunert and Rhome, 1992; Kim and Han, 2010)

16. I can play a role in reducing harm to the environment.
17. It does NOT make any difference what I do about the environment since one person cannot have a significant effect (R).
18. There is NOT much that any one individual can do about the environment (R).
19. It is important to be environmentally responsible because every little bit helps.
20. My individual actions can make a significant impact on the environment.

Behavioral Intention (Adapted from Chan and Lau, 2001; Taylor and Todd, 1995)

21. I plan to pursue environmentally sustainable activities (e.g., energy conservation, recycling) in the future.
22. I plan to support environmental initiatives in the future.
23. In the future, I intend to seek out ways to support the environment.
24. I do NOT expect to support environmentally sustainable activities in the future (R).
25. I plan to play a part in reducing harm to the environment in the future.

APPENDIX C

VIGNETTE

Hyperbolic Discounting

Appendix C: Vignette Hyperbolic Discounting (based on the delay-discounting instrument developed by Kirby, Petry, and Bickel (1999) and discount rates obtained from Angeletos et al. (2001), Laibson, Repetto, and Tobackman (2007), Scharff (2009) and Streich and Levy (2007)).

By taking this survey, you are eligible to participate in a drawing to win a prize. We appreciate your inputs and request your assistance in helping us develop a future survey. Please review the following information and make a selection.

For future research, our university will receive payment based on the number of responses received from survey participants. This means that the amount of money survey participants will receive for taking part in a 10-15 minute survey is the following.

A. Immediately at the completion of the survey	\$10.00
B. Three weeks after you complete the survey	\$18.00
C. Six weeks after you complete the survey	\$20.00
D. Nine weeks after you complete the survey	\$22.00

Which of the following dollar amounts would you personally prefer to receive for your participation?

A ___

B ___

C ___

D ___

APPENDIX D

VIGNETTE

Environmentally Responsible Behavior

Appendix D: Vignette Environmentally Responsible Behavior

You are a **supply manager** for Timeglo, Inc. Over the past year, your **CEO** has emphasized the importance of **integrating environmental objectives** throughout the organization. In response, the **Vice President of Supply Chain** has started a whiteboard in the break room to **list substantial environmental improvements** achieved in recent sourcing decisions.

Yesterday, the **Chief Financial Officer** sent a company-wide e-mail expressing **concern** over meeting **earnings estimates**. The **CFO** is seeking initiatives to **improve** net income during the **next quarter**.

You are currently finalizing a supplier sourcing decision representing approximately **5% of Timeglo's annual purchases**. You have narrowed the decision to two suppliers (**A and B**). **Neither** of these firms have served Timeglo in the past. Performance data (as measured by their existing customers) of Supplier B relative to Supplier A is as follows:

	Supplier A	Supplier B
1. Total landed cost	-	10% higher than supplier A
2. Delivery reliability	-	Same as supplier A
3. Quality	-	Same as supplier A
4. Environmental Management System (ISO 14000 certification)	None, no plans to pursue	Certified
5. Emissions control and reduction	Not measuring	9% reduction in last 12 months

Given Timeglo's corporate objectives, which supplier would you select if you could only choose one?

Select Supplier A ___

Select Supplier B ___

APPENDIX E

QUESTIONNAIRE INSTRUCTIONS

Appendix E: Questionnaire Instructions

Kennesaw State University

Survey of Sustainability in Supply Management

This electronic survey is part of a research project to assess sustainable practices in the supply management area and is conducted by the Management and Entrepreneurship Department in the Coles College of Business at Kennesaw State University. Individual responses will be kept **strictly confidential** and will not be identified in any report.

Because this survey predominantly focuses on supply management (purchasing/procurement) practices as they relate to sustainability, we suggest that the person(s) most responsible for making decisions and taking actions (sourcing suppliers, establishing supply contracts, placing purchase orders) regarding obtaining materials and services respond to the survey items.

The term “**sustainability**” in a supply management context refers to but is not limited to the following areas:

- Considering **waste reduction, energy and water conservation, pollution prevention, and environmental impact** when
 - Selecting suppliers, awarding purchasing orders, and forming supplier partnerships
 - Following company policies and promoting activities for current and potential suppliers
 - Collaborating with company co-workers to design and develop raw materials and services that are purchased

The term “**sustainable organization**” refers to a firm that makes the above sustainable practices a priority and uses such practices to drive organizational objectives.

APPENDIX F

COVER LETTER FOR ISM SURVEY

Appendix F: Cover Letter for ISM Survey

Environmental Sustainability Practices in Supply Management

James Anthony Swaim

Coles College of Business, Kennesaw State University

Overview

Many organizations are expanding their pursuit of **environmental sustainability** (e.g., pollution prevention, waste reduction, resource conservation, etc.). In turn, **supply managers** may be tasked with incorporating environmental criteria in selecting and managing suppliers. Given this trend, the proposed research seeks to assess:

- the **extent** to which supply managers are integrating environmental criteria in dealing with suppliers
- the **challenges** that supply managers encounter when doing so

Ultimately, the research seeks to help organizations improve the effectiveness of environmental sustainability initiatives in the supply chain. ISM-based publications, including *Inside Supply Management* and the *Journal of Supply Chain Management*, would be the target outlets for publishing the results.

Research Methodology

The research methodology will include **confidential, voluntary** interactions with supply management professionals to understand industry practice during

- *Fall, 2012* - Internet-based **anonymous survey** taking approximately 10-15 minutes to complete (sample question below)

<i>Please select one response for each question</i>	<i>Strongly</i>	<i>Neither Agree</i>	<i>Strongly</i>				
	<i>Disagree</i>	<i>Nor Disagree</i>	<i>Agree</i>				
Environmental sustainability is an important consideration in my supply management activities.	①	②	③	④	⑤	⑥	⑦

APPENDIX G
ANALYSIS OF VARIANCE

*One-way ANOVA***Attitude**

	N	Mean		Sum of Squares	df	Mean Square	F	Sig.
Southeast	201	6.14	Between Groups	1.228	1	1.228	2.432	.120
West Coast	56	6.31	Within Groups	128.747	255	.505		
Total	257	6.18	Total	129.975	256			

Subjective Norm

	N	Mean		Sum of Squares	df	Mean Square	F	Sig.
Southeast	201	5.15	Between Groups	.022	1	.022	.014	.905
West Coast	56	5.13	Within Groups	386.486	255	1.516		
Total	257	5.14	Total	386.508	256			

Perceived Behavioral Control

	N	Mean		Sum of Squares	df	Mean Square	F	Sig.
Southeast	201	5.36	Between Groups	.477	1	.477	.451	.502
West Coast	56	5.47	Within Groups	269.251	255	1.056		
Total	257	5.39	Total	269.728	256			

Behavioral Intention

	N	Mean		Sum of Squares	df	Mean Square	F	Sig.
Southeast	201	5.64	Between Groups	.327	1	.327	.327	.568
West Coast	56	5.72	Within Groups	254.947	255	1.000		
Total	257	5.66	Total	255.274	256			

Perceived Environmental Impact

	N	Mean		Sum of Squares	df	Mean Square	F	Sig.
Southeast	201	5.67	Between Groups	2.061	1	2.061	1.891	.170
West Coast	56	5.89	Within Groups	277.837	255	1.090		
Total	257	5.72	Total	279.898	256			