Evaluating Psychographic Measures among Undergraduates: Relevance to Marketing of Sustainable Tourism

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Abstract

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Advancing sustainable development goals can be achieved through increasing sustainable behavior and consumption within the global tourism industry. In this work, undergraduate students' sustainability values were investigated in a manner that could inform a marketing approach to directing tourist behavior. A survey was developed by combining existing scales designed to measure values related to sustainable consumption, and was administered to undergraduate students at a large research university in the Pacific Northwest (N=438) from selected disciplines known to have either high or low propensities for consuming sustainable tourism. Using factor analysis, 18 constructs of sustainability and related values were developed; results suggest that there are unexplored sustainability values that tourism marketers can explore further to improve product development and marketing mixes to increase sustainable consumption. Constructs were subsequently assessed with two-way ANOVAs to understand differences in

psychographic characteristics among disciplines and genders, revealing that while psychographic characteristics related to sustainability vary significantly among disciplines, differences between genders are infrequent.

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Chapter 1. Introduction

Efforts to advance more sustainable development around the world have grown since the introduction of the idea in the late 1980's. The meaning of sustainability has evolved over the past few decades, and it has been applied in new fields and industries in an attempt to address emerging global issues – tourism and its impacts being one of these. Understanding how individuals view the ever-changing topic of sustainability has important implications for directing large-scale behavior change through marketing.

This thesis explores a sustainability marketing approach to understanding how a diverse range of individuals views sustainability; establishing new psychographic measures and validating the reliability of other measures developed in previous studies. By testing existing scales designed to assess sustainability values, the first hypothesis in this work generates psychographic measures from different segments known to have a diversity of interest in performing sustainable behaviors: undergraduate students from different academic disciplines. The second hypothesis looks at how students differ in their sustainability values by gender and academic discipline. Finally, as an example of how an expanded understanding of psychographic measures of sustainability can be applied to advance sustainable development goals, results from the previous two hypothesis are compared to traditional marketing approaches in tourism to demonstrate the importance of a sustainability marketing approach to addressing global consumer behavior change.

Chapter 2. Background

2.1 Sustainability

Global discussion of sustainability began with the 1987 Brundtland Report *Our Common Future* which sought to establish a new era of "sustainable" development; global economic development that incorporated considerations of environmental issues (UNCSD, 2007). The United Nations (UN) World Commission on Environment and Development (1987) – known as the Brundtland Commission – defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The Report incorporated concepts of sustainable yield from forestry and fisheries that dominated natural resource management at the time, and promoted a development that did not deplete natural resources.

A series of UN summits and conferences followed the Brundtland Commission and sought to encourage sustainability in all major industries worldwide: many of them increasingly focused on tourism as a sector that could advance global sustainability. The 1992 Earth Summit in Rio de Janeiro continued the work of the Brundtland Commission, establishing the current UN Commission on Sustainable Development. The Rio Summit endorsed a global action plan called Agenda 21 that provided a framework for achieving sustainable development (Mowforth & Munt, 2009). At the 2000 Millennium Summit, the UN Millennium Declaration specifically identified tourism as a key sector that could contribute to the Millennium Development Goals through eradication of poverty, gender equality, environmental sustainability, and global partnerships and development (UNWTO, 2010). The 2002 Johannesburg World Summit on Sustainable Development (WSSD) (also referred to as the Rio+10) formalized a widely-used definition of sustainability as being composed of the three pillars of sustainable development - economic, social,

and environmental. Also at the WSSD, the Agenda 21 plan was reaffirmed, specifically mentioning tourism as a potential approach to bringing sustainable development to communities with fragile environments (Stancliffe, 1995 as cited in Mowforth & Munt, 2009). The 2012 Rio+20 UN Conference on Sustainable Development established the 10-Year Framework of Programmes (10YFP) on Sustainable Consumption and Production Patterns which aim to provide guidance on accelerating sustainability in developed and developing countries. The 10YFP Sustainable Tourism Programme was launched by the UN World Tourism Organization (WTO) in 2014 to contribute to the alignment of tourism with sustainable development.

2.2 Sustainable Tourism

The global tourism industry is one of the world's largest employers and is often the only major service export sector in many developing countries (UNWTO, 2010; Neto, 2003). In the decades after WWII tourism experienced rapid growth and diversification, increasing from 25 million tourist arrivals globally in 1950 to 1,133 million in 2014 (UNWTO, 2015). The UNWTO is a lead supporter of the sector, and defines tourism as the movement of people to countries or places outside their usual environment for personal or business/professional purposes (UNWTO, 2008). Individuals whose trip includes an overnight stay are classified as tourists, and tourism industries are activities that produce tourism products (services or goods consumed during a tourism trip).

Since the 1950's, tourism has seen some of its most rapid growth in developing countries. Many of these destinations lack regulation to control or reduce the negative impacts that rapid tourism growth can bring. Increased visitation to underdeveloped destinations can put large demands on local infrastructure and transportation, damage sensitive habitats and lead to biodiversity loss, and disrupt social systems and lead to loss of cultural heritage (IDS, 2007). During the decades following WWII, the global capitalist system transformed from Fordism – a mode of consumption

which assumes that economies benefit from mass-production and mass-consumption – to post-Fordism – consumption that prefers flexible systems of production and can accommodate rapidly changing and diversifying consumer needs and wants (Mowforth & Munt, 2009). This shift was seen in tourism as well, where demand for individual, flexible, and authentic or real tourism experiences were increasing in demand (Miller, 1993; Turner & Ash, 1975 as cited in Vainikka, 2013; Mowforth & Munt, 2009). Mass-produced tourism was termed "mass tourism" while "alternative tourism" was more individualized; offering tourists more personal choice in travel arrangements. Mowforth and Munt (2009) label alternative tourism as "new tourism", but both refer to tourism that concerns itself with sustainable development and the three pillars of sustainability. With the rise of sustainable development ideals and environmentalism in the 1990s (Vainikka, 2013; Mowforth & Munt, 2009), diversification of the tourism industry focused largely on tourism to natural areas, which became a type of tourism in its own right: ecotourism. Also during the same time, international volunteering grew in demand and voluntourism also became a major market segment.

This initial diversification of the tourism industry focused on sustainability, soon causing mass tourism to become associated with unsustainability (Mowforth & Munt, 2009). In the past couple decades, however, there has been a call to acknowledge sustainability not as a niche product, but as a goal for all tourism (Lück, 2002 as cited in Vainikka, 2013; Mowforth & Munt, 2009; UNEP & UNWTO, 2005). Sustainable tourism is defined by the UNEP and UNWTO (2005) as "tourism that takes full account of its current and future economic, social, and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities." The UNWTO emphasizes that sustainability is applicable to both mass tourism and alternative tourism products. Due to the size and scope of the global tourism industry, improving the sustainability of

tourism in both developed and developing countries can have impacts on all three pillars of sustainable development. Sustainable tourism should conserve natural heritage and biodiversity, respect the socio-cultural authenticity of host communities, and ensure long-term economic benefits to all stakeholders (UNEP & UNWTO, 2005).

Discussed next are two niche segments of alternative tourisms that are commonly associated with the term sustainable tourism: ecotourism and voluntourism. While these segments often strive to embody sustainability goals and encourage sustainable development, it is important to recognize that they are not the only way to increase sustainability in the tourism industry.

2.2.1 Ecotourism. Ecotourism is defined by the UNWTO (2002) as tourism that is nature-based, includes educational opportunities for tourists, is generally organized by smaller operators and businesses, minimizes negative impacts upon the natural and socio-cultural environment, and supports maintenance of natural areas. The term traces back to Hetzer's (1965 as cited in Miller, 1993) conception of an ecological tourism that incorporated culture and education. A widely-used definition of ecotourism is that of a tourism that incorporates preservation-conservation goals and sustainable development ideals (Miller, 1993). Weaver and Lawton (2007) cite a near-consensus definition of ecotourism put forth by Blamey (2001) that ecotourism should be (1) predominately nature-based, (2), be focused on learning or education, and (3) be managed according to ecological, socio-cultural and economic sustainability. This paper uses this last definition when it refers to ecotourism.

Ecotourism is a small but rapidly growing segment (Neto, 2003). Weaver and Lawton (2007) cover the developing controversy surrounding the idea of "mass ecotourism" versus the concept of ecotourism as a type of alternative tourism; the authors attempt to settle the dispute by framing the discussion in relevance with changes in mass tourism. As the entire tourism industry makes

progress towards sustainability and embraces sustainable development goals, it is possible that mass tourism will develop characteristics that initially distinguished ecotourism as a niche market; for example, mass tourism that seeks to preserve the natural places that attract tourists to the destinations fits some definitions of ecotourism. This paper accepts ecotourism as a type of alternative tourism, while acknowledging that mass tourism may be trending towards becoming a more environmentally-conscious industry.

2.2.2 Voluntourism. Wearing (2001) defines volunteer tourism (known colloquially as voluntourism) as tourism where, "Tourists, who, for various reasons, volunteer in an organized way to undertake holidays that might involve aiding or alleviating the material poverty of some group in society, the restoration of certain environments or research into aspects of society or environment." Volunteer tourism has existed since the early 20th century, developing along with a demand for travelling for relief efforts abroad (Tomazos, 2010). Volunteer tourism embraces the ideas of sustainable development (Wearing, 2004).

Volunteer tourism experienced a large boom in the 2000s, and a popular international form of voluntourism is gap-year tourism where students or adults take a year off from school or their job to engage in volunteering activities abroad (Lyons, Hanley, Wearing, & Neil, 2012). Wearing (2001) explicitly defines voluntourism as an alternative tourism.

2.3 Approaches to Increasing Sustainable Tourism

The Broker-Local-Tourist (BLT) Model (Miller, 2008) is a useful construction of tourism systems, and is used in this paper to understand the variety of approaches that can be taken in tourism to advance sustainable development goals. In this model, tourism brokers include those who manage, design, or are otherwise employed to control tourism outcomes, and can be either on-site or off-site brokers. Subcategories of brokers include private sector brokers (travel agents, tour operators),

public sector brokers (government workers), and non-governmental organizations (NGOs) and non-profit organizations. Tourism locals are individuals who reside in the general area of a tourism destination. Tourists are individuals who visit the tourist destination for a temporary amount of time.

Tourism management can be understood as the collective activities performed by brokers to control tourists and other brokers to take specific actions or engage in specific behaviors (Middleton, 1998). Management is a top-down approach to advance sustainable development goals in tourism. Some tourism management questions of improving sustainability are from a regulatory perspective, where policies and enforcement direct tourist and broker behavior in the desired direction. Another approach to tourism management is a marketing perspective, where brokers apply modern marketing techniques to direct tourist and broker behavior. Middleton (1998) argues that a marketing approach is more effective at improving sustainability in tourism because it provides a framework that is effective at influencing consumption and incorporating concerns for the overall business environment (physical, social, and cultural).This paper applies a marketing perspective to the tourism management goal of improving consumption of sustainable tourism.

2.4 Marketing in Tourism

The American Marketing Association (AMA) defines marketing as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large" (2013). Marketing identifies the needs and desires of potential tourists to provide brokers with information to attract them to their destinations (ETC & UNWTO, 2007). Additionally, marketing influences how much of a product people consume, and it also in turn determines what types of products consumers demand – this is

important for achieving sustainable development goals in tourism because the amount of potential tourists can be increased with improved and accurate marketing (Tomazos, 2010).

Marketing management is the planning, organizing, implementing, and controlling of marketing programs directed at satisfying consumers' wants and needs and meet organizational objectives (Belz & Peattie, 2012). A broker's application of marketing management to meet organizational goals in the tourism industry seeks to influence tourist behavior and consumption through marketing.

Marketing and tourism literature refers to many similar concepts with different terminology, and this paper uses them interchangeably to develop a discourse that understands both marketing and tourism terms. The *organizations* studied in marketing are the same *brokers* referenced to in the BLT model. Similarly, the *consumers* studied in marketing are the BLT model's *tourists*, and the *product* they consume is *tourism*. In both tourism and marketing literature, tourism is largely considered a service product, although goods, events, experiences, places, properties, organizations, information and ideas are also forms of marketed products in tourism (Kotler & Keller, 2012).

2.5 Modern and Postmodern Marketing. Traditional marketing approaches focus on increasing and shaping demand as well as developing markets for the products of the mass production system. Beginning in the 1950s, modern marketing – a business philosophy and management approach – moved beyond having "selling more products" as its primary objective to understanding customers and their needs and wants, emphasizing the importance of the consumer (Belz & Peattie, 2012).

During the late 1970s and early 1980s, macromarketing developed as a field within postmodern marketing (Belz & Peattie, 2012). This concept of marketing is concerned with the social and

environmental consequences of globalization; applying marketing to meet societal goals and optimize social benefits. Societal and sustainability marketing are both types of post-modern macromarketing approaches (Van Dam & Apeldoorn, 1995 as cited in Belz & Peattie, 2012).

Societal marketing stresses the wellbeing of society (Kotler, 1972; Middleton, 1998) and recognizes that some products can satisfy consumers and serve societal interests. Organizations that engage in societal marketing seek to discourage consumption of unhealthy products while encourage consumption of beneficial products. A similar, newer type of macromarketing is sustainability marketing which embraces sustainable development and the idea that achieving it requires large-scale global behavior change on behalf of brokers and consumers. Sustainable tourism brokers must increasingly embrace societal and sustainability marketing if they desire to find a balance between supply and demand of sustainable tourism products (Middleton, 1998).

While traditional marketing is only concerned with addressing consumers who are most likely to consume the product, post-modern marketing is often also concerned with consumers whose change in behavior is most desired (Commonwealth Dept. of Tourism, 1994 as cited in Blamey & Braithwaite, 1997). This means not only focusing marketing efforts on existing potential tourists, but also expanding the potential market and improving the attractiveness of sustainable tourism to new groups of people.

2.6 Consumer Behavior

Understanding how consumers make their purchasing decisions – their consumer behavior – is a main focus of successful marketing. Knowing how to influence customers to consume the products the broker wants to sell and also how to design products that better satisfy customer wants and needs can be improved with applied consumer behavior studies (Swarbrooke & Horner, 2007). Consumer behavior is a particularly relevant field to tourism where there is constant and ever-

evolving diversification of tourists and the products they seek. Calantone and Mazanec (1991 as cited in Swarbrooke & Horner, 2007) detail the role of consumer behavior in tourism marketing management as a way to influence demand and develop new products.

2.7 Consumer Behavior Models and Approaches

There are many models from various fields used to describe the process of human behavior, including consumer behavior in marketing [(Andreason, 1965; Nicosia, 1966; Howard-Sheth, 1969; all as cited in Swarbrooke & Horner, 2007); Engel et al 1978 as cited in González & Bello, 2002), sustainability behaviors (Stern et al., 1999, Stern, 1999, Gatersleben, Steg, & Vlak, 2002), and broader behavioral theories within psychology (Ajzen & Madden, 1986). Some models have been adapted for tourism [Plog, 1994; Pearce & Lee, 2005; (Middleton & Clark, 2001; Wahab, Crampton, & Rothfield 1976; Mathieson & Wall 1982; Gilbert, 1991; all as cited in Swarbrooke & Horner, 2007)]. In Pearce and Lee's (2005) "travel career ladder" adaptation of Maslow's hierarchy of needs, all tourists are described as having some similar motivations (such as a desire for novelty, escape, or relaxation) as well as some motivations that change over time (attributed to changes in tourist age, education, occupation, and stage of life) (Blamey & Braithwaite, 1997). Models in consumer behavior fall short in describing the complexity of factors that influence consumers, but in tourist consumer behavior models generally agree that there is a feedback loop, whereby the marketing programs that a broker organizes both determine and are determined by the consumption behavior of tourists. For the purposes of this paper, Pearce and Lee's (2005) model of tourist behavior will be used as a general framework for understanding sustainability marketing in tourism.

Swarbrooke and Horner (2007) describe three different approaches to consumer behavior in marketing: (1) a rational or economic explanation where consumers act rationally and their

behavior follows predictable patterns and their willingness to pay can easily be assessed, (2) a sociological explanation where the influence of social norms and cultural habits largely determine consumptive behavior, and (3) a psychological explanation where attitudes and beliefs are thought to be what influences consumptive behavior. While these approaches are not mutually exclusive, they each are fields of study in their own right; this paper focuses on the psychology approach to consumer behavior because it is currently thought to be one of the most accurate approaches to influencing real consumption patterns (Stern, Kalof, Dietz, & Guagnano, 1995 in Sirakaya-Turk, Baloglu, & Mercado, 2014) in tourists (González & Bello, 2002) as well as sustainability (Belz & Peattie, 2012). This approach often relies on psychographics – rather than demographics – to understand the influences that determine consumer choice. Psychographics consist of beliefs, values, attitudes, motives, needs, desires, and other psychological factors that make up an individual's lifestyle (Beane & Ennis, 1984 in Blamey & Braithwaite, 1997). Psychographics in sustainability marketing seek to understand what consumers value in sustainable products, what they believe about sustainability in general, how they relate sustainability to their own lifestyles and incorporate this into a sense of responsibility, if they believe that they can be effective consumers, and how society views their patterns of consumption (Belz & Peattie, 2012). These are issues that tourism managers needs to be able to answer to better understand how tourists value sustainability of tourism products.

Consumer behavior in tourism traditionally was composed of discussion on motivations (Dann, 1977). Tourists were understood to have push and pull factors influencing their consumption choices. Push factors increased the desire to travel, while pull factors led a tourist to the specific destination they finally visited. There are many similarities between this approach in the tourism literature and the marketing approach to consumer behavior from an applied psychology

viewpoint, but generally, the motivations of tourism are understood to be more temporary (which makes them applicable to adaptive marketing campaigns) while lifestyles are more enduring (making them applicable to a longer-term marketing approach to increasing sustainability in the tourism industry) (Bem, 1970). Psychographics is an increasingly popular topic in marketing, and this has spread to its application in both tourism and sustainability.

2.8 Psychographics in Tourism and Sustainability

Psychographics in tourism and sustainability frequently focus on understanding consumer values. Values have been shown to have improved accuracy over demographic data to determine consumption of products that have a social good component – such as sustainable tourism (Blamey & Braithwaite, 1997). Values are core beliefs that guide actions and behaviors, and are studied to understand enduring characteristics of individuals (Braithwaite & Scott, 1991, Bem, 1970). Values have been shown to have strong links to behavior for marketing purposes (Stern et al, 1995; Madragal & Kahle, 1994; both cited in Sirakaya-Turk et al., 2014).

The majority of the psychology literature of values applies survey research to develop value scales (Blamey & Braithwaite, 1994). Survey questionnaires designed for values have been critiqued as a methodology because they are often very long (leading to fatigue in participants) and are frequently self-administered (so that participants cannot ask for clarification of confusing questions) (González & Bello, 2002). Bulky data subsequently requires multiple analyses, meaning data eventually undergoes successive transformation, and often factor analysis of principal components leads to large amounts of unused data (González & Bello, 2002). Despite such critiques, survey research remains the dominant methodology in psychological measurements of values.

Pizam and Calantone (1987) are the main proponents of a values-based approach to understanding human behavior in tourism, employing Rokeach's (1968) Value Survey and other value profiles to create a general measure of psychographics that could not only predict vacation patterns, but also other types of consumer behavior.

Social values in particular are applied in understanding consumption of sustainable forms of tourism (Blamey & Braithwaite, 1997) because they have a well-developed literature in association with sustainability behavior and actions including recycling (Dunlap, Grieneeks, & Rokeach, 1983 as cited in Blamey & Braithwaite, 1997), energy conservation (Neuman, 1986 as cited in Blamey & Braithwaite, 1997), and sustainability literacy (Murray & Murray, 2007; Braun, 2011). The UN General Assembly adopted a set of fundamental values essential for advancing the Millennium Development sustainability goals, including freedom, solidarity, tolerance, respect for nature, and shared responsibility (Leiserowitz, 2006; Kates, Parris, & Leiserowitz, 2005). Sustainability values such as these are highly effective at predicting travelers' behavior and choices for sustainable hospitality (Sirakaya-Turk et al., 2014). Environmental values have also been shown to be an important characteristics of sustainable tourists (Bundeanu, 2007; Zografos & Allcroft, 2007; Dolnicar & Leisch, 2008; Wood, 2002).

Postmaterialist values are also often used to predict consumption of sustainable tourism, including values of development and control, equality and harmony, and individual rights (Inglehart, 1977 as cited in Blamey & Braithwaite, 1997), professional identity, global citizenship, and social justice (Smith & Laurie, 2011; Morais & Ogden, 2011; Leiserowitz, 2006; Lyons et al., 2012; Wearing, 2001), and altruism and empathy (Brown & Lehto, 2005 as cited in Tomazos, 2010; Wearing, 2004; McGehee, 2002; McGehee & Santos, 2005).

There are critiques that measuring environmental or sustainability values often does not accurately predict consumption (Bundeanu, 2007). However, psychology-based consumer behavior should not only concern itself with measuring whether or not customers value the product, but also what types of products can be developed to address the values that the customer does have. This resonates with a sustainability marketing approach where brokers seek to understand values of current customers and to broaden the scope of their potential customers by making sustainable products more aligned with consumer values. Understanding which characteristics and values are shared by which groups of people is known as segmentation.

2.9 Segmentation

The field of tourism studies approaches segmentation through tourist typologies which can be adapted for marketing purposes. Swarbrooke & Horner (2007) provide a comprehensive summary of major typologies produced in the literature, including Cohen's (1972) sociology-based categories of institutionalized and non-institutionalized tourists and Smith's (1989) anthropology-based individualized and mass tourists. These typologies currently face criticism for being simplistic and static; they ignore a developing maturity of tourist needs and lack a strong connection between measured preferences and actual behavior (Swarbrooke & Horner, 2007). These typologies were are not specifically developed for marketing, but when applied are typically only useful for promotion - one of the "4 P's" of the Marketing Mix (Kotler, 1994).

Market segmentation is defined as "The process of dividing a total market into groups of people with relatively similar product needs, for the purpose of designing a marketing mix that precisely matches the needs of individuals in a segment" (Dibb, Simkin, Pride, & Ferrell, 2001). This approach to market segmentation is designed for marketing and applied to tourism. There are four

ways to segment markets based on tourist characteristics (Swarbrooke & Horner, 2007; Kotler & Keller, 2012; ETC & UNWTO, 2007):

1. Geographical segmentation – based on where tourists live
2. Socio-demographic segmentation – based on factors such as age, income, sex, ethnicity
3. Psychographic/Lifestyle Segmentation – based on lifestyle, attitudes, opinions, and values
4. Behavioral Segmentation – based on behavioral responses to a product, such as perceived benefits or how the product is used

There are additionally segmentation approaches that are often used in tourism, including motivation segmentation, purpose of travel, and trip characteristics (ETC & UNWTO, 2007), and many types of segmentation are often applied simultaneously. Because tourism is an ever-diversifying market, market segmentation is important for understanding new tourist wants and needs and developing innovative tourist products. Psychographic segmentation is currently a popular marketing approach in tourism and sustainability (Swarbrooke & Horner, 2007; Belz & Peattie, 2012; González & Bello, 2002; Zografos & Allcroft, 2007). Psychographic market segmentation incorporates a psychology approach to understanding consumer behavior in market management. Psychographic segmentation based on values is more likely to reveal segments that align with true consumption patterns and behaviors.

Traditional marketing segmentation concerns itself only with individuals who are most likely to consume the product, but sustainability market segmentation seeks understand the breadth of values that could be marketed in sustainable tourism. In other words, it is important to understand values of sustainability that are held by both those who are most likely to consume and those who are most likely not to consume sustainable tourism products so that new sustainable tourism products can be developed to attract more tourists, thereby increasing the global consumption of sustainable tourism.

2.10 Socio-demographic Segmentation of Ecotourists and Voluntourists

The concept of tourism propensity is that some segments of people have a higher likelihood to travel (ETC & UNWTO, 2007). Known demographic profiles of ecotourists and voluntourists can be applied to other segmentation types (such as psychographic) to further understand the characteristics of market segments.

There is considerable research on distinguishing who ecotourists are, but the large majority of this focuses on typologies or tourism-specific segmentation (such as destination and activity segmentation). Socio-demographic profiles of ecotourists reveal varied results because they frequently focus on tourists traveling from the same geographic area or all tourists that have travelled to the same destination. Poupineau and Pouzadoux (2013) suggest that the predisposition in the literature to profile ecotourists as mostly female may be incorrect. While many studies show that ecotourists are mostly female (Wight, 2001, Weaver & Lawton, 2002; Weaver & Lawton, 2007; Swain & Swain, 2004), this may be an assumption carried over from environmental behavior studies that show women are more concerned about environmental issues. Studies largely agree on age and educational profiles of ecotourists: they are more likely to have higher levels of education (Eagles & Cascagnette, 1995; Wight, 2001; Wight, 1996) and are dominantly in the age group of 35-54 years old, with the second largest age group being between 17-34 years old (Poupineau & Pozadoux, 2013; Diamantis, 1999; Wight, 1996). Poupineau and Pouzadoux (2013) studied a group of ecotourists where 48% were managers in companies or worked in public service and 7% were students, and Backman and Potts (1993) also found in a different population of ecotourists that 35% were professionals or managers. Finally, many studies have looked at the relationship between environmental values and consuming sustainable tourism; individuals who

have higher environmental values have been shown to be more likely to consume ecotourism (Zografos & Allcroft, 2007; Dolnicar & Leisch, 2008).

Volunteer tourist profiles also suggest they are predominantly female (Kirillova, 2012) but a younger demographic mostly in the 18-24 year old age group (Dolnicar & Randle, 2007; Kirillova, 2012). This difference is likely due to the fact that a large international segment of voluntourism is gap year tourism that is performed by students or professionals (Lyons et al., 2012). Kirillova (2012) profiles volunteer tourists as mostly single people with no children and high levels of education. Most of the study's population were students, but 10% were professionals in education (the largest segment out of the professionals) and 3% in engineering (one of the smallest segments of the professionals).

Chapter 3. Research Methods

3.1 Research Setting

Quantitative methods will be used to explore the psychographic influences of human behaviors, as expressed in self-reported perceptions of sustainable practice, social responsibility, global citizenship, and related items. The goal of this study is to understand how these psychographic characteristics emerge from a wide range of sustainability-based survey items at a single institution across a wide variety of majors. The institution involved in this study is a RU/VH, as classified by the Carnegie Foundation system (2010) and is a large research institution and flagship university in the Pacific Northwest which serves over 92,000 students and confers over 12,000 degrees annually. This institution offers ten different engineering and computer science undergraduate degrees, seven unique undergraduate degrees in environmental science, one undergraduate degree in business administration with eight areas of focus, and one undergraduate degree in education.

The student's undergraduate experience is characterized by large classes in the first and second years (100-500) and smaller classes in the third (40-80 students) and fourth years (15-40 students). Classes are commonly supported by multiple teaching assistants and contact with faculty is infrequent during the early years of study. Students are competitively admitted to many engineering majors, the business major, and the education major after their second year.

3.2 Contextual Framework

This research is part of a larger multiple-year study funded by the National Science Foundation invested in developing curriculum tools to teach sustainability more effectively as an integrated part of coursework from sophomore to senior year in engineering and other science majors. This larger study is currently in its second year and operates on the principle that certain majors/professions or groups of majors/professions have unique psychographic characteristics that influence the manner in which they engage in sustainability topics. The contextual framework for this aspect of the study is shown graphically in Figure 1.

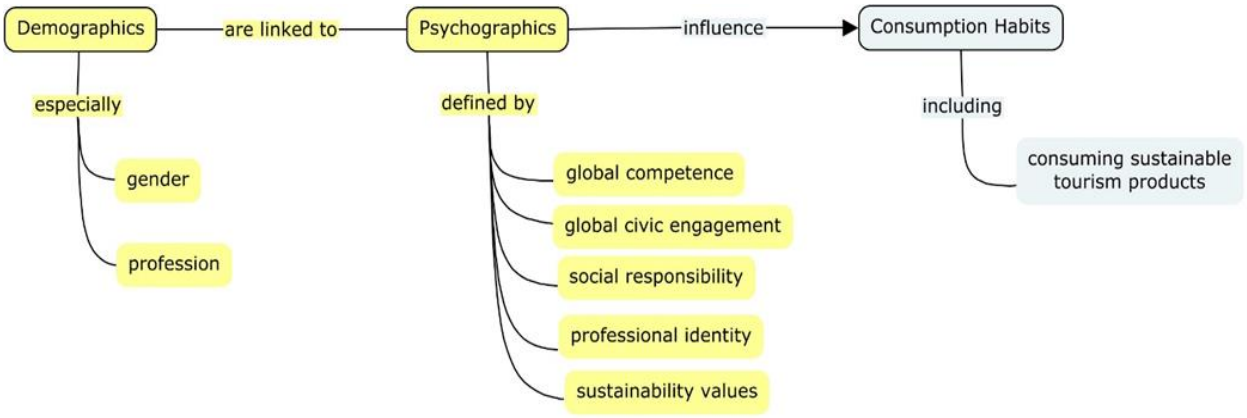


Figure 1: Research Context & Conceptual Framework

Highlighted concepts in Figure 1 are those being investigated in this study, while concepts in grey are supported by other research. Psychographics measure beliefs, opinions, and interests of consumers by measuring psychological characteristics of consumers. Segmentation based on psychographics sorts consumers into groups based on personality variables and lifestyle preferences that influence consumption choices. Segmenting university students will serve to provide information to brokers for how products related to the values described above should be designed and to whom they should be marketed (Zografos & Allcroft, 2007). A combined understanding of psychographic characteristics unique to different demographic segmentations will allow for a holistic understanding of consumptive behavior of sustainable tourism. While segmentation based solely on values has been critiqued as inadequate for predicting actual consumptive behavior in tourism (Bundeanu, 2007; Garvill, Marell, & Nordlund, 2003), this study seeks to better understand tourists' potential consumptive patterns by combining psychographic characteristics that emerge from this research with demographic characteristics known in the literature (Dolnicar & Leisch, 2008).

3.3 Hypotheses

This research was guided by three hypotheses.

3.3.1 Research Hypothesis #1. *Distinct psychographic measures will emerge among university students from survey items designed to measure values known to relate to sustainable tourism consumption.*

Existing scales designed to measure psychographic characteristics related to sustainable tourism consumption were identified. Considerable research connects global citizenship values, altruism, professionalism, and support for activism (Sing, 2014; Lyons et al., 2012; McGehee & Santos,

2005; Smith & Laurie, 2011) with international volunteering and volunteer tourism. Similarly, values such as freedom and democracy, capitalism and globalization, equality, and social justice have been shown to be related to sustainable consumption and ecotourism behaviors (Leiserowitz, 2006; Blamey & Braithwaite, 1997). Survey items from 3 scales designed to evaluate global citizenship (Morais & Ogden, 2011), professional identity (Chachra, Kilgore, Loshbaugh, McCain, & Chen, 2008), and sustainability (Braun, 2011) were combined into one questionnaire administered to undergraduate students; results were then analyzed with factor analysis to develop psychographic measures relevant to a population of university students. Survey items that were not retained in the factor analysis were analyzed to better understand differences between the populations the scales were designed for and the population used by this study.

3.3.2 Research Hypothesis #2. *These psychographic measures will differ amongst academic disciplines and between genders.*

To further an understanding of the relevance of the psychographic measures collected in Hypothesis 1 to sustainable tourism consumption, they will need to be compared between socio-demographic groups that have known sustainable tourism consumption patterns. Based on the performed literature review, gender and profession are well-identified demographics used to characterize tourists by their consumption patterns. This paper takes a sustainability marketing approach to segmentation, so genders and disciplines known for both low and high propensity of eco- and voluntourism were identified to be analyzed for this hypothesis (summarized in Table 1). A two-way ANOVA between gender and discipline was performed for each psychographic measure obtained from the analysis in Hypothesis 1 in order to ascertain if differences did exist between disciplines and genders.

Table 1

Demographic Groups Relevant to Sustainability Marketing in Tourism

Demographic	Propensity	Sources
Gender		
Male	Low	
Female	High	Kirillova, 2012; Poupineau & Pozadoux, 2013
Discipline		
Engineering	Low	Kirillova, 2012
Environment	High	Zografos & Allcroft, 2007; Dolnicar & Leisch, 2008
Education	High - Voluntourism	Kirillova, 2012
Business	High - Voluntourism and Ecotourism	Backman & Potts, 1993; Poupineau & Pozadoux, 2013
Math & Science	Unknown	

3.3.3 Research Hypothesis #3. *The psychographic measures established in this research will vary among university demographics in a manner predicted by existing tourism studies.*

Previous studies that survey tourists at the destination were used to predict socio-demographic groups' sustainability values. Final results of the 2-way ANOVA compared with predicted results will either confirm or fail to confirm this hypothesis. Demographic groups with high consumption of ecotourism and voluntourism, including females, education majors (Kirillova, 2012), and business majors (Backman & Potts, 1993; Poupineau & Pouzadoux, 2013), are hypothesized to have higher scores for the psychographic measures generated from the Global Citizenship Scale (Morais & Ogden, 2011), Professional Identity Scale (Chachra et al., 2008), and the Sustainability Scale (Braun, 2011). Similarly, demographic groups with low consumption of these products, such as male students and engineering majors (Kirillova, 2012) should have lower scores on measures resulting from these scales. The confirmation of this hypothesis will reveal that segmentation on psychographics alone has just as much predictive capacity for tourism consumption as segmentation that combines socio-demographics and psychographics.

3.4 Subjects and Procedures

Convenience sampling was used to recruit and survey 438 undergraduate students for this study. Participants completed a survey which allowed self-report of perceptions of social responsibility, global competence, global civic engagement, consumer responsibility, sustainability, and professional identity as well as multiple demographic items. In addition to the primary measures just listed, the survey also included affective indicators including self-efficacy, task value, belonging, and job values that may mediate or otherwise influence the way in which the primary indicators grow and evolve over the undergraduate years. Characteristics of the study population are detailed in Table 1. Across majors, 53.9% of participants were from engineering, 8.7% from environment, 19.4% from business, 9.4% from education, 2.3% from math and science majors (including Physics and Biology) and 6.4% from miscellaneous majors including art, psychology, Japanese, and others. Within engineering, the majors most represented in this population were electrical engineering (58.9%) and mechanical engineering (31.6%), which together made up 35% (Yoder, 2014) of the total engineering degrees granted in the United States and thus make a valid representation of engineering as a field of study and as a profession. The ethnic composition of the sample was 41.3% White, 41.8% Asian, 1.6% Black, and 15.3% other, including Latino/a, Pacific Islander and Native American, and others. 56.4% of the population was male and 39% was female. No attempt to oversample women or minorities was made in collecting this sample. Participants from all majors were combined into a single sample population for this analysis to understand whether a single general model could be applied to understand the psychographic measures that emerge from how students view sustainability, social responsibility, and global citizenship and to understand whether distinct psychographic characteristics emerged by gender and major.

Table 2

Characteristics of Study Population

Demographic	Characteristics
Major	236 Engineering and Computer Science (53.9%)
	38 Environment (8.7%)
	85 Business (19.4%)
	41 Education (Major or Minor) (9.4%)
	10 Math & Science (2.3%)
	28 Other/Unknown (6.4%)
Year	9 Freshmen (2.1%)
	34 Sophomores (7.8%)
	181 Juniors (41.3%)
	152 Seniors (34.7%)
	19 5th Year Seniors (4.3%)
	23 Post-Bachelor's or Other (5.3%)
Gender	247 Male (56.4%)
	171 Female (39.0%)
Ethnicity	183 Asian (41.8%)
	181 White (41.3%)
	7 Black (1.6%)
	20 Latino (4.6%)
	47 Other/Not identified (10.7%)
Mean Age	21.95 years
Mean GPA	3.5
Parent's Education	254 Mother completed a 4-yr degree or higher (58.0%)
	264 Father completed a 4-yr degree or higher (60.3%)
US Citizenship	314 U.S. Citizens (71.7%)
	124 Other (28.3%)

Survey participants were recruited during the Spring and Fall Quarters of 2014, as well as Spring, Summer, and Fall Quarters of 2015. In engineering, participants were recruited from core junior and senior level classes and incentivized by providing extra credit at the beginning of the quarter.

Outside of engineering in other majors, participants were randomly recruited by e-mail from department or college list serves and offered an Amazon gift card for completing the survey. Participation in the study was voluntary, and students were assured that their survey responses would remain confidential. All students completed the survey in electronic form, on-line. Surveys were collected with identifying information so that duplicate surveys could be removed before aggregating data for analysis. All results were cross-sectional.

3.5 Instruments

Quantitative survey data was used to address the three research hypotheses associated with this study. Items analyzed in this study were chosen to represent various subscales of global citizenship (Morais & Ogden, 2011), fundamental principles of sustainability (Braun, 2011), professional identity (Chachra et al., 2008) and new Consumer Responsibility items designed for this study to measure consumer responsibility. These items were evaluated on a 5 point Likert scale and are described by category in Table 3.

Morais and Ogden's (2011) Global Citizenship Scale is itself a combination of scales from many studies that seek to measure outcomes of student study abroad trips: the authors tested their scale to develop a reliable measure of global citizenship for undergraduates. The 2011 study surveyed two groups of Penn State students; students enrolled in faculty-led study abroad programs and students enrolled in similar courses that did not have international travel components. The subsequent factor analysis performed by Morais and Ogden assessed whether student responses aligned with theoretical subdimensions of global citizenship.

Table 3

Sustainability and Related Values Scales from Previous Studies

Dimension Scale	Subscale Items	Description
Social Responsibility (Morais and Ogden, 2011 Global Citizenship Scale)	Global justice and disparity	Ability to evaluate social issues and identify examples of global injustice and disparity.
	Altruism and empathy	Examination and respect of diverse perspectives and possessing an ethic of social service.
	Global interconnectedness and personal responsibility	Understanding the interconnectedness between local behaviors and global consequences.
Global Competence (Morais and Ogden, 2011 Global Citizenship Scale)	Self-awareness	Recognition of personal limitations and ability to engage in intercultural encounters.
	Intercultural communication	Demonstration of an array of intercultural communication skills and ability to engage successfully in intercultural encounters.
	Global knowledge	Interest and knowledge about world issues and events.
Global Civic Engagement (Morais and Ogden, 2011 Global Citizenship Scale)	Involvement in civic organizations	Engagement in or contributions to volunteer work or assistance in global civic organizations.
	Political voice	Constructing a political voice by synthesizing global knowledge and experiences in the public domain.
	Glocal civic activism	Engagement in purposeful local behaviors that advance global agendas.
Professional Identity (Chachra et al., 2008)	Centrality	Extent to which individual defines themselves as a member of their profession.
	Private Regard	Extent to which individual feels positively or negatively about professionals in their career.
	Public Regard	Extent to which individual perceives others feel positively or negatively about professionals in their career.
	Group Identification	Value individuals place on being a professional in their career.
Consumer Responsibility	Attentiveness	Belief in current global sustainability topics.
	Competence	Familiarity and knowledge about current global sustainability topics.
	Responsibility in Career	Sense of responsibility to affect current global sustainability issues through acting as a professional in the career field.
	Responsibility as Consumer	Sense of responsibility to affect current global sustainability issues through personal consumption habits.
Sustainability (Braun, 2011)	Sustainability	Knowledge of sustainability definitions and their realistic applicability to individuals' lifestyles and careers.

Chachra et al. (2008) similarly designed their own scale from items tested in other studies on personal identity; items were altered slightly in order to directly refer to career identity for undergraduate engineering students. Students from four institutions were surveyed by Chachra et al.: a Technical Public Institution, an Urban Private University in the mid-Atlantic, a Large Public University in the Northwest, and a Suburban Private University on the west coast. Results from the surveys were used to understand differences between academic year and gender of engineering undergraduates.

Braun's (2011) study assessed undergraduate Cal Poly engineering students' abilities to articulate multiple definitions of sustainability and relate technology applications to sustainability issues using survey items developed from theoretical approaches to sustainability in engineering. Students from different classes receiving different curriculum and instruction styles (laboratory versus lecture) were compared to assess which approaches to introducing sustainability topics led to increased scores and more clearly articulated definitions. Consumer Responsibility items that were developed for this work were based on Braun's (2011) study where students were assessed on their ability to relate classroom projects to current sustainability topics. Belief in and knowledge about sustainability as well as an individual's perception of their ability to affect change through consumption and their career is an important aspect of marketing sustainability to consumers (Belz & Peattie, 2012); the items used in this work were designed address these different measures of sustainability values.

Collectively, these scales seek to measure psychological characteristics that influence tourists' choices to consume or not consume sustainable tourism products. While other studies have focused on environmental values (Zografos & Allcroft, 2007) or economic motivators (Bundeanu, 2007), these scales focus more on the social aspect of sustainability; this is the less-investigated aspect of

beliefs and values that influence the tourist choice, and this study contributes new social values to the tourism literature.

3.6 Data Analysis

All statistical analyses were conducted using SPSS 19. To address Hypothesis 1, the first set of analyses examined the structure of the scale items and the internal reliability of the resulting scales. In investigating the first research hypothesis, it was necessary to factor analyze the scale items to determine if the scales had uni-dimensional or multi-dimensional structures. Because of the sample size in this population ($N = 438$), items were organized into units informed by the different domains of the conceptual framework and the number of scale items to maintain a 15:1 N:p ratio (Field, 2000, Stevens, 2002), resulting in 7 factor analyses for the following units:

1. ***Social Responsibility (SR):*** addressed 3 subscale items of *global justice and disparities, altruism and empathy, and global interconnectedness and personal responsibility*. Included items such as "The world is generally a fair place" (*global justice and disparities*), "The needs of the worlds' most fragile people are more pressing than my own" (*altruism and empathy*), or "Developed nations have the obligation to make incomes around the world as equitable as possible" (*global interconnectedness and personal responsibility*).

2. ***Global Competence (GC):*** addressed 3 subscale items of *self-awareness, intercultural communication,* and *global knowledge*. Includes items such as "I know several ways in which I can make a difference on some of this world's most worrisome problems" (*self-awareness*), "I welcome working with people who have different cultural values from me" (*intercultural communication*), and "I am informed of current issues that impact international relationships" (*global knowledge*).

3. ***Global Civic Engagement – involvement in civic organizations (GCE1):*** addressed 1 subscale item - *involvement in civic organizations* - with items such as "During my undergraduate career, I have done or will do volunteer work to help individuals and communities abroad."

4. ***Global Civic Engagement – political voice and glocal civic activism (GCE2)***: addressed 2 subscale items (*glocal civic activism* and *political voice*), and included items such as "If at all possible, I will buy fair-trade or locally grown products and brands" (*glocal civic activism*), or "Before I graduate, I will contact or visit someone in government to seek public action on global issues and concerns" (*political voice*).

5. ***Professional Identity (PI):*** addressed one large scale item of satisfaction with career field of choice, and included items such as "I fit in well with other professionals in my chosen field" or "I identify with professionals in my field".

6. ***Consumer Responsibility (CR):*** addressed 4 subscale items of *attentiveness, competence, responsibility in the field*, and *responsibility as a consumer*. Included such items as "I believe that resource scarcity impacts global sustainability" (*attentiveness*), "I know a great deal about sustainable energy" (*competence*), "As a future career professional in my field, I feel responsible for improving global connectivity in my work/career" (*responsibility in the field*), and "As a consumer, I feel responsible for improving access to education" (*responsibility as a consumer*).

7. ***Sustainability (SS):*** addressed one large scale item of comfort and familiarity of the premises behind *sustainability*, and included items such as "Everything must go somewhere" and "Professionals in my field should minimize depletion of natural resources."

Within each unit, a correlation matrix was obtained, and a Bartlett's test of Sphericity and a Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy performed. The correlation matrix was analyzed for values greater than .9 to identify variables with high correlations that were removed from analyses (Field, 2000). KMO values greater than .5 (Field, 2000) and non-significant ($p < .001$) Bartlett's test results indicated that it was appropriate for the unit to be analyzed for factor reduction.

A principal component analysis (PCA) was first performed on all items using no rotation with eigenvalues set to 1. Communalities were examined to identify problematic variables, and those variables with a communality less than 0.40 were dropped from the analysis (Stevens, 1992). Once these variables were removed, the principal component analysis was repeated until all communalities were greater than 0.40. The results of the scree plot (Field, 2000), the number of eigenvalues greater than 1 (Guttman-Kaiser), and the percent of variance accounted for by the number of components (at least 60% with up to 70% if possible) were all used to determine the number of factors to be used in the subsequent factor analysis (Field, 2000).

Subsequent factor analyses in each unit used a Promax rotation and a number of factors equal to the factors determined in the previous PCA. An oblique rotation was used due to the fact that the items in the scale were assumed to be correlated. Results from factor analyses that had no significant cross-loadings, and had clean factor structures with item loadings > ± .258 (for $N \geq 400$) or > ± .298 ($400 > N \geq 300$) (Stevens 2002) were analyzed. Factor loadings were used to determine the specific items included in each construct. Items that failed to significantly load on any factor or that had significant cross-loadings were dropped (Costello & Osborne, 2005). After the identified items were dropped, another iteration of factor analysis was completed using the same criteria mentioned above.

Factor loadings were compared to Stevens' (2002) guidelines for reliable constructs. If a construct has three or more items with loadings at .80 of higher, four or more items with loadings at .60 or higher, or 10 or more items at .40 or higher, it is considered to be a reliable construct according to this criteria. Cronbach's alpha levels were also be obtained for constructs with 2 or more items as a reliability check for its use in further analyses. Cronbach's alpha levels greater than .7 are considered good, and levels greater than .6 are acceptable for exploratory studies (Fornell & Larcker, 1981 as cited in No & Kim, 2015). Using the criteria above, constructs were identified as substantial enough to use in further analysis: these constructs are psychographic measures that were predicted in Hypothesis 1. Items that were eliminated through this analysis were investigated to understand how the population used in this study differs from the populations used to construct the original scales from which the items were taken.

To address Hypothesis 2, descriptive statistics for the resulting constructs were analyzed for non-normal data, and then each was subsequently analyzed with a 2-way ANOVA by discipline and gender. Gender was dichotomous (male, female) and academic major was split among 5 groups

(business, engineering, education, environmental studies, and math and science). Undergraduates were divided in this way in order to identify differences in groups that were known to consume or not consume sustainable tourism products. Estimated marginal means were calculated for each analysis for the interaction between gender and undergraduate major. Significance levels were evaluated at $p = 0.05$.

Finally, Hypothesis 3 was tested with a comparison of which socio-demographic groups were predicted to have high or low values and whether these groups had higher scores on the constructs evaluated.

Chapter 4. Results

4.1 Hypothesis 1

Eighteen total constructs were identified from the seven subscale units analyzed with factor analysis. Results of each factor analysis performed are discussed below. Appendix A contains the survey given to participants and lists the items that each item code refers to.

Item codes that are followed by "R" indicate that this item was negatively worded in the administered survey, and was reverse coded prior to analysis.

4.1.1 Social Responsibility. The exploratory factor analysis revealed four distinct constructs within social responsibility. With N=411, a critical value of $r_{\alpha=.01,\ 2\ tailed} = \pm.258$ was used to determine which loadings were significantly different from zero (see Table 4 for factor loadings). Seventeen items based on the original scale designed by Morais and Ogden (2011) were used in this survey. Seven items were not retained:

- SR12R: It is OK if some people in the world have more opportunities than others.
- SR14R In times of scarcity, it is sometimes necessary to use force against others to get what you need.
- SR18R: In general, science and technology have increased opportunities for one country or group of people to dominate or exploit others.
- SR23: I respect and am concerned with the rights of all people, globally.
- SR31: Developed nations have the obligation to make incomes around the world as equitable as possible.
- SR33R: I do not feel responsible for the world's inequities and problems.
- SR34: I think in terms of giving back to the global society.

The first construct – Social Justice – had three positively loaded items from the *global justice and disparities* subscale and one positively loaded from the *altruism and empathy* subscale. This construct was labelled Social Justice because the items retained focused largely on dissatisfaction of unequal distribution of wealth and opportunities globally. The second construct – Technology as an Equalizer – contained three positively and significantly loaded items from the *global justice and disparities* subscale that focused on the ability of science and technology to bring justice and equality around the world. The third construct – Common but Differentiated Responsibilities – had one positively loaded item from each subscale. The name of this construct comes from the sustainable development literature to refer to the responsibilities of developed countries to aid the developing world in an idealized altruistic and non-exploitative manner; a cohesive concept brought together by the item questions that referred to exploitation, American responsibilities, and addressing needs of other people. The fourth construct of Global Interconnectedness and Personal Responsibility was not retained for further analysis with 2 items and a Cronbach's alpha coefficient of 0.488.

Although the total variance of all three constructs accounted for only 42.3% and only one construct (Social Justice) could be considered reliable according to Stevens (2002), high loadings and no

significant cross-loadings signified the appropriateness of the remaining three constructs to be considered in further analysis. While reviewing individual items, SR18R's negative score was judged to be theoretically unaligned with any of the constructs, and was removed from further analysis.

Table 4

Exploratory Factor Analysis of Social Responsibility Subscale Unit

	Constructs			
Subscale Item	Social Justice*	Technology as an Equalizer	Common but Differentiated Responsibilities	Global Interconnected-ness and Personal Responsibility
SR13R	0.905			
SR11R	0.807			
SR22R	0.659			
SR15R	0.656			
SR17		0.726		
SR19		0.678		
SR110		0.644		
SR32			0.66	
SR18R			-0.422	
SR16			0.583	
SR21			0.48	
SR33R				0.65
SR34				0.476
Eigenvalues	2.613	1.788	1.088	0.413
% of Variance	20.1	13.8	8.4	3.2
Cronbach's Alpha	0.845	0.727	0.607	0.488
KMO			0.808	
N			411	

*indicates a reliable factor (Stevens, 2002)

4.1.2 Global Competence. The exploratory factor analysis revealed two constructs within global competence. With *N*=419, a critical value of $r_{\alpha=.01,\ 2\ tailed} = \pm.258$ was used to determine which loadings were significantly different from zero (see Table 5 for factor loadings). Fourteen items based on the original scale designed by Morais and Ogden (2011) were used in this survey; six items were not retained:

- GC11: I am confident that I can thrive in any culture or country.
- GC21: I unconsciously adapt my behavior and mannerisms when I am acting with people of other cultures.
- GC24: I am fluent in more than one language.
- GC25: I welcome working with people who have different cultural values from me.
- GC31: I am informed of current issues that impact international relationships.
- GC32: I feel comfortable expressing my views regarding a pressing global problem in front of a group of people.

Table 5

Exploratory Factor Analysis of Global Competence Subscale Unit

	Constructs	
Subscale Item	Confidence in Addressing Global Problems	Intercultural Communication & Interaction
GC12	0.941	
GC13	0.675	
GC34	0.571	
GC14	0.51	
GC23		0.804
GC26		0.716
GC22		0.589
GC27		0.529
Eigenvalues	3.368	0.682
% of Variance	42.1	8.5
Cronbach's Alpha	0.81	0.769
KMO	0.89	
N	419	

The construct of Confidence in Addressing Global Problems had three significantly positively loaded items from the *self-awareness* subscale and one significantly positively loaded item from the *global knowledge* subscale. These items all addressed students' perceptions of their own abilities to initiate action to solve global problems. The second construct of Intercultural Communication & Interaction contained four positively and significantly loaded items from the *intercultural communication* subscale that expressed ability to communicate and interact in culturally sensitive ways.

While neither of these constructs were considered reliable according to Stevens (2002), with over half (50.6%) of the variance explained, high to moderate loadings, and no significant cross-loadings, these two constructs were considered appropriate for use in further analysis.

4.1.3 Global Civic Engagement – involvement in civic organizations. Exploratory factor analysis revealed two distinct constructs. With N=404, a critical value of $r_{\alpha=.01,\ 2\ \text{tailed}} = \pm.258$ was used to determine which loadings were significantly different from zero (see Table 6 for factor loadings). Sixteen items based on the original scale designed by Morais and Ogden (2011) were used in this survey. Four items were not retained:

- GCE15: During my undergraduate career, I have volunteered or will volunteer my time working to help individuals or communities abroad.
- GCE17: During my undergraduate career, I have been or plan to get involved with a global humanitarian organization or project.
- GCE18: After I graduate, I plan to get involved with a global humanitarian organization or project.
- GCE19: During my undergraduate career, I have helped or plan to help international people who are in difficulty.

The Involvement in Civic Organizations construct had eight significantly positively loaded items from the one subscale used in this unit (*involvement in civic organizations*). These items represented more passive or informal engagement in civic organizations – especially those

addressing environmental issues. The second construct – Volunteer Work Abroad - contained four positively and significantly loaded items that explicitly referenced going abroad in the future tense to engage in international volunteer work. The Involvement in Civic Organizations construct was considered reliable according to Stevens (2002) and over half (56.8%) of the variance was explained by these two factors, indicating that these two constructs were appropriate for use in further analysis.

Table 6

Exploratory Factor Analysis of Global Civic Engagement - involvement in civic organizations Subscale Unit

	Constructs	
Subscale Item	Involvement in Civic Organizations*	Volunteer Work Abroad
GCE111	0.873	
GCE113	0.872	
GCE114	0.715	
GCE112	0.71	
GCE115	0.633	
GCE13	0.542	
GCE14	0.487	
GCE116	0.437	
GCE12		0.986
GCE16		0.844
GCE11		0.611
GCE110		0.541
Eigenvalues	6.024	0.821
% of Variance	50.2	6.6
Cronbach's Alpha	0.895	0.876
KMO	0.91	
N	404	

* indicates a reliable factor (Stevens, 2002)

4.1.4 Global Civic Engagement – political voice and glocal civic activism. Exploratory factor analysis revealed two constructs. With *N*=410, a critical value of $r_{\alpha=.01,\ 2\ tailed} = \pm.258$ was used to determine which loadings were significantly different from zero (see factor loadings in Table 7). Fifteen items based on the original scale designed by Morais and Ogden (2011) were used in this survey.

Table 7

Exploratory Factor Analysis of Global Civic Engagement - political voice and glocal civic activism Subscale Unit

	Constructs	
Subscale Item	Political Voice*	Glocal Civic Activism
GCE21	0.986	
GCE22	0.954	
GCE27	0.857	
GCE28	0.758	
GCE211	0.635	
GCE212	0.605	
GCE24	0.534	
GCE26		0.946
GCE25		0.881
GCE32		0.506
GCE31		0.5
GCE33		0.457
Eigenvalues	6.003	1.108
% of Variance	50	9.2
Cronbach's Alpha	0.929	0.838
KMO	0.873	
N	410	

* indicates a reliable factor (Stevens, 2002)

One item (GCE23) was removed for a high correlation over .9 with a similarly worded question (GCE24) that was used to represent both questions in the subsequent analysis. This item and two others were not retained:

- GCE23: Before I graduate, I will express my views about international politics on a website, blog, or chat room.
- GCE29: Before I graduate, I will display and/or wear badges/stickers/signs that promote a more just and equitable world.
- GCE210: After I graduate, I will display and/or wear badges/stickers/signs that promote a more just and equitable world.

Political Voice had seven significantly positively loaded items from the *political voice* subscale. Glocal Civic Activism retained two significantly positively loaded items from the *political voice* concept and three items from the *glocal civic activism*. The construct of Political Voice was considered reliable according to Stevens (2002) and over half (59.2%) of the variance was explained by these two factors, indicating that these two constructs were appropriate for use in further analysis.

4.1.5 Professional Identity. Three constructs were revealed through factor analysis. With N=409, a critical value of $r_{\alpha=.01,\ 2\ \text{tailed}} = \pm.258$ was used to determine which loadings were significantly different from zero (see factor loadings in Table 8). Seventeen items based on the original scale designed by Morais and Ogden (2011) were used in this survey. Four items were not retained:

- PI31: I am happy that I am going to be a professional in (your chosen occupation).
- PI42R: Professionals in (your chosen occupation) are not respected by the broader society.
- PI51: I think students in my major work well together.
- PI52R: I feel uneasy around other professionals in (your chosen occupation) or students in my major.

The first construct of Group Identification & Centrality had two significantly positively loaded items from three different original subscales including *centrality*, *group identification*, and *private regard*. The second construct – Public Regard - retained four significantly positively loaded items from the original *public regard* subscale. The final construct – Private Regard – had two positively significantly loaded items from the original *private regard* subscale and one item from the *centrality* subscale.

Table 8

Exploratory Factor Analysis of Professional Identity Subscale Unit

	Constructs		
Subscale Item	Group Identification & Centrality*	Public Regard	Private Regard
PI22	0.843		
PI53	0.821		
PI54	0.777		
PI13	0.757		
PI23	0.565		
PI11	0.411		
PI41		0.94	
PI43		0.844	
PI44		0.752	
PI33		0.598	
PI32R			0.867
PI12R			0.825
PR21R			0.418
Eigenvalues	5.091	1.386	1.076
% of Variance	39.1	10.7	8.3
Cronbach's Alpha	0.873	0.861	0.659
KMO		0.886	
N		409	

* indicates a reliable factor (Stevens, 2002)

Career Community Identity was considered reliable according to Stevens (2002) and over half (58.1%) of the variance was explained by these two factors, indicating that these three constructs were appropriate for use in further analysis.

4.1.6 Consumer Responsibility. Four constructs were revealed through factor analysis. With *N*=397, a critical value of $r_{\alpha=.01,\ 2\ tailed} = \pm.298$ was used to determine which loadings were significantly different from zero (see factor loadings in Table 9). Twenty-four items based on the original scale designed by Morais and Ogden (2011) were used in this survey. Five items were not retained:

- CR24: I know a great deal about access to education around the world today.
- CR34: As an undergraduate in my major, I feel responsible for improving access to education in my future work/career.
- CR35: As an undergraduate in my major, I feel responsible for improving global connectivity in my future work/career.
- CR41: As a consumer, I feel responsible for addressing global resource scarcity.
- CR42: As a consumer, I feel responsible for improving the sustainability of energy.

The first construct – Attentiveness - had all six of the original subscale (*attentiveness*) items with significant and positive factor loadings. Responsibility in Career was the second construct which retained four significantly positively loaded items from the *responsibility in career* subscale and two items from the *responsibility as consumer* subscale. The third construct of Competence retained almost all of the original subscale items from the *competence* subscale. The fourth construct of Responsibility as Consumer only had two significant positive factor loadings from the *consumer responsibility* subscale. Three constructs (Attentiveness, Responsibility in Career, and Competence) in this analysis were considered reliable according to Stevens (2002) and over half (58.2%) of the variance was explained by these four factors, indicating that all constructs were appropriate for use in further analysis.

Table 9

Exploratory Factor Analysis of Consumer Responsibility Subscale Unit

	Constructs			
Subscale Item	Attentiveness*	Respon-sibility in Career*	Competence*	Respon-sibility as Consumer*
CR13	0.831			
CR14	0.784			
CR11	0.742			
CR15	0.736			
CR16	0.68			
CR12	0.578			
CR32		1.032		
CR31		0.77		
CR36		0.736		
CR33		0.649		
CR46		0.393		
CR43		0.325		
CR21			0.803	
CR26			0.759	
CR25			0.733	
CR22			0.7	
CR23			0.699	
CR45				0.942
CR44				0.748
Eigenvalues	6.447	2.384	1.104	1.138
% of Variance	33.9	12.5	5.8	6
Cronbach's Alpha	0.861	0.883	0.853	0.847
KMO		0.903		
N		397		

* indicates a reliable factor (Stevens, 2002)

4.1.7 Sustainability. Two distinct constructs were revealed through factor analysis. With *N*=406, a critical value of $r_{\alpha=.01,\ 2\ \text{tailed}} = \pm.258$ was used to determine which loadings were significantly different from zero (see factor loadings in Table 10). Ten items based on the original scale designed by Morais and Ogden (2011) were used in this survey. One item was not retained:

(SS4) There is no such thing as a free lunch. The first construct – Career Role in Sustainability - had seven significantly positively loaded items from the original scale used in this factor analysis. These items all demonstrated an incorporation of sustainability values into students' future careers. The second construct – Consumption Worldview - retained three significantly positively loaded items that referenced simplified sayings of the impacts of consumption.

Career Role in Sustainability was considered reliable according to Stevens (2002) and over half (62.3%) of the variance was explained by these two factors, indicating that these constructs were appropriate for use in further analysis.

Table 10

Exploratory Factor Analysis of Sustainability Subscale Unit

	Constructs	
Subscale Item	Career Role in Sustainability*	Consumption Worldview
SS7	0.888	
SS6	0.853	
SS9	0.84	
SS8	0.824	
SS10	0.803	
SS5	0.794	
SS11	0.704	
SS2		1.009
SS3		0.436
SS1		0.378
Eigenvalues	5.617	1.274
% of Variance	44.5	17.8
Cronbach's Alpha	0.937	0.662
KMO	0.911	
N	406	

* indicates a reliable factor (Stevens, 2002)

4.2 Hypothesis 2

After psychographic measures were identified as relevant to Hypothesis 1, these measures were used to understand patterns of values that differed among demographic groups of interest. A 5 (academic major; fixed, between-subjects) x 2 (gender; fixed, between-subjects) factorial ANOVA on sustainability values showed that academic major and its interaction with gender were significant for 8 constructs (see marginal means in Table 11; significant effects in bold). Results showed that most differences in these psychographic measures was by discipline (major) with only one interaction between major and gender and no significant main effects of gender (see effects in Table 12; significant effects in bold). Post-hoc contrasts were performed to better understand significant differences between majors using the Tukey-Kramer procedure to control experimentwise Type I error at .05 for unequal sample sizes, for a total of 10 contrasts for each construct with a significant ANOVA.

4.2.1 Social Responsibility. Results of a 2-way ANOVA for the three constructs of social responsibility showed that there is a main effect of Major on Technology as an Equalizer and a main effect of Major on Common but Differentiated Responsibilities (see Table 12; *p*s < .05). Both had moderately small effect sizes by Cohen's (1988) standards. There were no significant main effects or interaction effects for the construct of Social Justice (see Table 12; *p*s > .05).

Post-hoc contrasts failed to reveal significant differences between majors for Technology as an Equalizer, but did reveal differences between majors for Common but Differentiated Responsibilities: engineering majors (M = 11.09, SD = 2.17) had lower scores than the environment students (M = 12.61, SD = 2.08), Tukey-Kramer $q(348) = 0.15$, $p = .010$, $d = 0.63$, as well as the education students (M = 12.63, SD = 1.61), Tukey-Kramer $q(348) = 17.68$, $p < .001$, $d = 0.43$.

Table 11

Academic Major and Gender Marginal Means by Construct

	Engineering			Environment			Business			Education			Math & Science		
Construct	*N*	*M*	*(SD)*	*N*	*M*	*(SD)*	*N*	*M*	*(SD)*	*N*	*M*	*(SD)*	*N*	*M*	*(SD)*
Social Justice (Max Score = 20)															
Male	176	14.78	(3.49)	7	16.57	(4.16)	26	15.04	(3.55)	4	18.00	(2.83)	6	16.33	(3.39)
Female	40	15.13	(2.99)	26	16.04	(2.68)	42	15.33	(2.89)	26	15.38	(3.34)	4	17.75	(2.63)
Technology as an Equalizer* (Max Score = 15)															
Male	**179**	**10.65**	**(2.27)**	**7**	**9.00**	**(2.45)**	**26**	**11.50**	**(2.06)**	**4**	**9.25**	**(2.22)**	**6**	**10.17**	**(2.64)**
Female	**42**	**10.6**	**(1.77)**	**24**	**10.29**	**(1.97)**	**42**	**10.50**	**(1.95)**	**26**	**10.00**	**(1.83)**	**4**	**7.50**	**(3.00)**
Common but Differentiated Responsibilities* (Max Score = 15)															
Male	**177**	**11.01**	**(2.15)**	**6**	**12.50**	**(2.07)**	**25**	**11.40**	**(2.38)**	**4**	**13.25**	**(1.71)**	**6**	**12.33**	**(1.21)**
Female	**42**	**11.43**	**(2.25)**	**25**	**12.64**	**(2.12)**	**43**	**11.91**	**(1.54)**	**26**	**12.54**	**(1.61)**	**4**	**12.25**	**(1.89)**
Confidence in Addressing Global Problems (Max Score = 20)															
Male	176	12.47	(2.93)	7	12.71	(2.81)	26	13.15	(2.46)	4	14.25	(3.30)	6	12.50	(1.05)
Female	42	12.69	(2.54)	24	13.13	(2.98)	41	11.83	(3.62)	25	12.28	(2.84)	4	10.50	(3.42)
Intercultural Communication & Interaction* (Max Score = 20)															
Male	**179**	**14.23**	**(2.78)**	**7**	**11.43**	**(4.47)**	**26**	**15.35**	**(2.53)**	**4**	**16.00**	**(3.74)**	**6**	**13.33**	**(3.78)**
Female	**41**	**14.73**	**(2.57)**	**25**	**14.80**	**(2.77)**	**42**	**14.86**	**(2.52)**	**26**	**14.73**	**(2.38)**	**4**	**13.00**	**(2.00)**
Involvement in Civic Organizations (Max Score = 40)															
Male	176	20.88	(6.65)	7	22.86	(3.44)	25	21.52	(6.29)	4	23.50	(2.38)	6	19.50	(7.04)
Female	41	23.76	(5.17)	24	23.50	(5.98)	39	21.23	(5.77)	26	20.81	(6.82)	4	20.50	(7.72)
Volunteer Work Abroad (Max Score = 20)															
Male	177	11.12	(3.29)	7	10.57	(2.99)	26	12.77	(3.22)	4	13.00	(4.24)	6	11.83	(4.54)
Female	42	13.45	(2.86)	26	13.19	(3.38)	41	12.44	(2.81)	26	13.62	(2.87)	4	11.50	(3.87)
Political Voice (Max Score = 35)															
Male	176	15.01	(6.16)	7	19.86	(5.58)	25	14.64	(6.14)	4	16.25	(7.54)	5	14.00	(6.12)
Female	42	15.43	(5.32)	25	16.08	(5.42)	39	14.15	(6.34)	24	15.5	(7.06)	4	15.00	(6.68)
Global Civic Activism* (Max Score = 25)															
Male	**178**	**14.08**	**(3.93)**	**7**	**19.14**	**(3.85)**	**25**	**14.20**	**(4.45)**	**4**	**14.75**	**(4.03)**	**5**	**13.40**	**(3.29)**
Female	**41**	**15.59**	**(3.48)**	**25**	**17.24**	**(4.05)**	**40**	**14.00**	**(4.19)**	**24**	**15.13**	**(4.92)**	**4**	**15.75**	**(2.22)**
Group Identification & Centrality (Max Score = 30)															
Male	178	22.33	(4.06)	7	22.71	(2.81)	25	22.00	(4.21)	4	23.50	(1.29)	6	22.17	(2.40)
Female	41	22.88	(3.76)	25	22.72	(3.47)	40	21.83	(4.51)	24	22.92	(3.17)	4	22.00	(2.45)
Public Regard* (Max Score = 20)															
Male	**178**	**16.55**	**(2.74)**	**7**	**15.00**	**(2.71)**	**25**	**13.84**	**(2.69)**	**3**	**14.00**	**(5.29)**	**6**	**14.33**	**(2.88)**
Female	**41**	**16.61**	**(2.21)**	**25**	**15.80**	**(2.45)**	**40**	**14.93**	**(3.02)**	**26**	**15.88**	**(2.67)**	**4**	**12.25**	**(2.87)**
Private Regard (Max Score = 15)															
Male	179	11.54	(2.16)	7	11.71	(3.40)	25	11.12	(2.17)	4	11.00	(2.16)	6	11.17	(2.56)
Female	42	11.64	(1.92)	25	11.68	(2.32)	42	11.24	(2.38)	26	11.85	(2.33)	4	10.00	(2.83)
Attentiveness (Max Score = 30)															
Male	178	24.07	(3.77)	7	25.86	(3.08)	26	25.58	(3.81)	4	27.75	(1.71)	6	24.00	(2.37)
Female	41	25.20	(3.90)	26	26.96	(2.36)	40	25.03	(3.64)	26	24.77	(3.58)	4	25.00	(1.41)
Responsibility in Career* (Max Score = 30)															
Male	**174**	**20.89**	**(4.54)**	**7**	**23.57**	**(3.31)**	**26**	**21.08**	**(4.17)**	**4**	**19.50**	**(4.12)**	**6**	**19.50**	**(2.74)**
Female	**39**	**23.59**	**(3.70)**	**23**	**23.57**	**(3.57)**	**43**	**19.28**	**(4.92)**	**26**	**19.73**	**(4.20)**	**4**	**18.50**	**(1.00)**
Competence (Max Score = 25)															
Male	177	14.46	(3.53)	7	14.86	(4.98)	24	14.38	(2.98)	4	15.00	(2.16)	6	15.50	(3.51)
Female	42	14.90	(3.37)	26	16.12	(3.18)	43	13.44	(4.05)	26	13.37	(3.57)	4	13.50	(1.91)
Responsibility as Consumer (Max Score = 10)															
Male	178	6.43	(1.77)	6	7.33	(1.75)	26	6.50	(1.86)	4	8.25	(1.26)	6	6.50	(2.51)
Female	41	7.29	(1.44)	25	6.88	(1.81)	41	6.41	(1.52)	26	7.19	(1.52)	4	5.75	(1.26)
Career Role in Sustainability* (Max Score = 35)															
Male	**171**	**27.47**	**(4.66)**	**7**	**30.00**	**(4.9)**	**25**	**27.16**	**(4.76)**	**3**	**26.67**	**(6.51)**	**6**	**26.67**	**(4.68)**
Female	**40**	**28.40**	**(4.66)**	**24**	**32.33**	**(3.00)**	**42**	**27.86**	**(5.28)**	**26**	**25.77**	**(4.78)**	**4**	**22.50**	**(1.91)**
Consumption Worldview* (Max Score = 15)															
Male	**173**	**10.75**	**(2.26)**	**7**	**12.00**	**(1.63)**	**26**	**10.61**	**(2.00)**	**4**	**10.00**	**(2.58)**	**6**	**12.50**	**(2.81)**
Female	**41**	**11.51**	**(2.01)**	**24**	**13.38**	**(1.5)**	**43**	**11.21**	**(2.24)**	**26**	**11.39**	**(2.1)**	**4**	**11.50**	**(0.58)**

***Significant 2-way ANOVA**

Table 12

Main Effect and Interaction Results of 2-way ANOVA

	Major				**Gender**				**Major*Gender**			
Construct	*F*	*(df)*	*p*	ω^2	*F*	*(df)*	*p*	ω^2	*F*	*(df)*	*p*	ω^2
Social Justice	2.16	(4,347)	.074		0.11	(1,347)	.738		0.78	(4,347)	.536	
Technology as an Equalizer	**3.92**	**(4,350)**	**.004**	**0.03**	**0.64**	**(1,350)**	**.426**	**0.00**	**2.24**	**(4,350)**	**.065**	**0.01**
Common but Differentiated Responsibilities	**3.86**	**(4,348)**	**.004**	**0.03**	**0.02**	**(1,348)**	**.896**	**0.00**	**0.30**	**(4,348)**	**.878**	**-0.01**
Confidence in Addressing Global Problems	0.60	(4,345)	.662		2.58	(1,345)	.109		1.30	(4,345)	.268	
Intercultural Communication & Interaction	**3.08**	**(4,350)**	**.016**	**0.02**	**0.43**	**(1,350)**	**.514**	**0.00**	**2.4**	**(4,350)**	**.050**	**0.02**
Involvement in Civic Organizations	0.67	(4,342)	.615		0.06	(1,342)	.806		1.12	(4,342)	.346	
Volunteer Work Abroad	0.65	(4,349)	.627		2.40	(1,349)	.122		2.31	(4,349)	.058	
Political Voice	1.45	(4,341)	.218		0.34	(1,341)	.561		0.59	(4,341)	.668	
Global Civic Activism	**4.30**	**(4,343)**	**.002**	**0.04**	**0.28**	**(1,343)**	**.600**	**0.00**	**1.20**	**(4,343)**	**.309**	**0.00**
Career Community Identity	0.51	(4,344)	.727		0.01	(1,344)	.924		0.14	(4,344)	.966	
Career Esteem	**9.28**	**(4,345)**	**<.001**	**0.08**	**0.39**	**(1,345)**	**.534**	**0.00**	**1.11**	**(4,345)**	**.353**	**0.00**
Career Choice Satisfaction	0.80	(4,350)	.524		0.00	(1,350)	.951		0.30	(4,350)	.880	
Sustainability Literacy	1.73	(4,348)	.142		0.01	(1,348)	.932		1.42	(4,348)	.225	
Product Sustainability in Career	**5.11**	**(4,342)**	**.001**	**0.04**	**0.00**	**(1,342)**	**.976**	**0.00**	**3.15**	**(4,342)**	**.015**	**0.02**
Competence in Sustainability Topics	0.98	(4,349)	.419		0.68	(1,349)	.411		0.96	(4,349)	.430	
Consumer Approaches to Social Development	2.24	(4,347)	.065		0.75	(1, 347)	.386		2.14	(4,347)	.076	
Career Role in Sustainability	**4.33**	**(4,338)**	**.002**	**0.04**	**0.05**	**(1,338)**	**.819**	**0.00**	**19.98**	**(4,338)**	**.454**	**0.00**
Consumption Worldview	**3.45**	**(4,344)**	**.009**	**0.03**	**2.15**	**(1,344)**	**.143**	**0.00**	**0.61**	**(4,344)**	**.655**	**0.00**

4.2.2 Global Competence. The two constructs of global competence were assessed with a 2-way ANOVA, revealing that there is a main effect of Major on Intercultural Communication & Interaction (see Table 12; *p*s < .05). This was a moderate effect size by Cohen's (1988) standards. There were no significant main effects or interaction effects for the construct of Confidence in Addressing Global Problems (see Table 12; *p*s > .05).

Post-hoc contrasts failed to reveal the significant differences between majors for Intercultural Communication & Interaction.

4.2.3 Global Civic Engagement. A 2-way ANOVA did not reveal any significant results for the constructs of Involvement in Civic Organizations, Volunteer Work Abroad, and Political Voice (see Table 12; *p*s > .05). Results did show there a main effect of Major on Glocal Civic Activism (see Table 12; *p*s < .05). This is a large effect size by Cohen's (1988) standards.

Post-hoc contrasts revealed significant differences between majors for Glocal Civic Activism: engineering majors (M = 14.36, SD = 3.89) had lower scores than the environment students (M = 17.66, SD = 4.03), Tukey-Kramer $q(343) = 5.80$, $p < .001$, $d = 0.83$. Business students (M = 14.08, SD = 4.26) also had lower scores than the environment students (M = 17.66, SD = 4.03), Tukey-Kramer $q(343) = 5.32$, $p = .001$, $d = 0.88$.

4.2.4 Professional Identity. Analysis of the three Professional Identity constructs with a 2-way ANOVA revealed a main effect of Major on Public Regard (see Table 12, $p < .05$). This is a very large effect size by Cohen's (1988) standards. There were no significant main effects or interaction effects for the constructs of Group Identification & Centrality and Private Regard (see Table 12; *p*s > .05).

Post-hoc contrasts revealed differences between majors for Common but Differentiated Responsibilities: engineering majors (M = 16.56, SD = 2.65) had higher scores than the business students (M = 14.51, SD = 2.93), Tukey-Kramer $q(386) = 8.34$, $p < .001$, $d = 0.77$, as well as the math and science students (M = 13.50, SD = 2.92), Tukey-Kramer $q(386) = 4.86$, $p = .006$, d = 1.11.

4.2.5 Consumer Responsibility. Results of a 2-way ANOVA for the four constructs of Consumer Responsibility showed a main effect of Major and an interaction Major and Gender on Responsibility in Career (see Table 12, ps < .05). Major has a large effect size and the interaction has a moderate effect size by Cohen's (1988) standards. There were no significant main effects or interaction effects for the constructs of Attentiveness, Competence, and Responsibility as Consumer (see Table 12; ps > .05).

Post-hoc contrasts revealed differences between majors for Responsibility in Career: environment majors (M = 23.57, SD = 3.45) had significantly higher scores than all the other disciplines: engineering students (M = 21.38, SD = 4.51), Tukey-Kramer $q(342) = 3.67$, $p = .045$, $d = 0.54$, business students (M = 19.96, SD = 4.70), Tukey-Kramer $q(342) = 5.17$, $p = .001$, $d = 0.86$, education students (M = 19.70, SD = 4.12), Tukey-Kramer $q(342) = 4.72$, $p = .002$, $d = 0.96$, and math and science students (M = 19.10, SD = 2.18), Tukey-Kramer $q(342) = 3.94$, $p = .039$, d = 1.04.

4.2.6 Sustainability. Results of a 2-way ANOVA for the two constructs of Sustainability show that there is a main effect of Major on both Career Role in Sustainability and Consumption Worldview (see Table 12, ps < .05). The effect size of Major on Career Role in Sustainability is

large by Cohen's (1988) standards, and the effect size of Major on Consumption Worldview is moderately large.

Post-hoc contrasts revealed differences between majors for Career Role in Sustainability: environment majors (M = 31.81, SD = 3.56) had significantly higher scores than all the other disciplines: engineering students (M = 27.64, SD = 4.67), Tukey-Kramer $q(338) = 6.32$, $p < .001$, d = 0.92, business students (M = 27.60, SD = 5.07), Tukey-Kramer $q(338) = 6.04$, $p < .001$, d = 1.01, education students (M = 25.86, SD = 4.85), Tukey-Kramer $q(338) = 6.56$, $p < .001$, d = 1.34, and math and science students (M = 25.00, SD = 4.24), Tukey-Kramer $q(338) = 5.60$, $p = .001$, d = 1.47.

Post-hoc contrasts revealed differences between majors for Consumption Worldview: environment majors (M = 13.06, SD = 1.61) had significantly higher scores than all engineering students (M = 10.89, SD = 2.23), Tukey-Kramer $q(344) = 7.17$, $p < .001$, d = 1.04, business students (M = 10.99, SD = 2.16), Tukey-Kramer $q(344) = 6.07$, $p < .001$, d = 0.99, and education students (M = 11.20, SD = 2.17), Tukey-Kramer $q(344) = 4.97$, $p = .001$, d = 1.01.

4.3 Hypothesis 3

Results of the 2-way ANOVAs show that while psychographic characteristics related to sustainability vary significantly among disciplines, differences between genders are infrequent. Hypothesis 3 predicted that females would have higher scores on all subscale items based on past literature that suggests females are higher consumers of sustainable tourisms such as ecotourism and volunteer tourism, but this prediction is not confirmed with the results of the analysis completed in the last section.

Table 13

Comparison of Predicted and Actual Scores

	Construct							
Discipline	Tech. as an Equalizer	Common but Dif. Resp.	Intercult. Com. & Interaction	Glocal Civic Activism	Public Regard	Resp. in Career	Career Role in Sust.	Cons. Worldview
Engineering								
Predicted	Low	Low	Low	Low	Low	Low	Low	Low
Actual	High	Low	Moderate	Low	High	Moderate	Moderate	Low
Environment								
Predicted	High	High	High	High	High	High	High	High
Actual	Moderate	High	Moderate	High	Moderate	High	High	High
Education								
Predicted	High	High	High	High	High	High	High	High
Actual	Moderate	High	High	Moderate	Moderate	Low	Low	Moderate
Business								
Predicted	High	High	High	High	High	High	High	High
Actual	High	Moderate	High	Low	Low	Moderate	Moderate	Low

The other prediction of Hypothesis 3 stated that education, business, and environment majors should similarly have higher scores for all subscale items based on the literature review, while engineering majors should have low scores comparatively. Summarized in Table 13 is a comparison between predicted low and high scores for the constructs with significant results by major; due to low *n* in math and science students, they were not used to test this hypothesis. Results show that this aspect of Hypothesis 3 also cannot be confirmed.

Chapter 5. Discussion of Results

5.1 Discussion of Hypothesis 1

This hypothesis sought to improve upon existing studies and their scales of measuring sustainability values and related psychographic measures. A comparison of the alignment of retained items with the theoretical subscales they were anticipated to represent reveals the

reliability of these scales and their appropriateness to assess sustainability values of diverse populations. New constructs that were not originally theorized suggest that the undergraduates students surveyed in this work have unique concepts of sustainability. An analysis of which items were not retained for the students surveyed in this work can suggest concepts of sustainability that need to be developed within this population.

5.1.1 Social Responsibility. Morais and Ogden's (2011) testing of the social responsibility subscale revealed four distinct constructs, with the theoretical subscale of *global justice and disparities* being the only subscale with most items aligning. Similarly, while applying this same subscale in this study, the *global justice and disparities* subscale retained the most original items, while *altruism and empathy* and *global interconnectedness and personal responsibility* were greatly transformed from their original subscales. Morais and Ogden concluded with post-testing interviews that social responsibility seemed to be a difficult concept even for the students who had completed international travel; the authors finally concluded that social responsibility could be condensed into one construct due to low Cronbach's Alpha levels for other constructs. Four of the six items of this singular construct in the authors' study were the same four items retained in this study's Social Justice construct, suggesting that students from both these studies may have had a similarly limited concept of social responsibility. However, students in this study had two other constructs with Cronbach's Alpha levels above 0.60, suggesting that students surveyed in this study may have a broader understanding of social responsibility than those in Morais and Ogden's study.

Items that were not retained centered around students' sense of responsibility and obligation to address social justice issues globally, suggesting that students surveyed may lack an understanding of how they can engage in solving global inequality. Many similar items were also not retained in

Morais and Ogden's (2011) study; however, one exception was that the Penn State students surveyed in the 2011 study retained SR12R and SR14R, while these were items not retained in this present work. This suggests that students in Morais and Ogden's study were better able to conceive of the duality of the need to address global inequities and the acknowledgment that resolving global problems can be difficult.

5.1.2 Global Competence. In Morais and Ogden's (2011) study, *global knowledge* and *intercultural communication* subscales retained most of their original items, while *self-awareness* retained enough items be considered a reliable subscale as well. In the present study, Confidence in Addressing Global Problems retained similar items as Morais and Ogden's self-awareness construct and Intercultural Communication & Interaction retained similar items to Morais and Ogden's intercultural communication construct. The similarity of these items suggests that these dimensions of global competence are strong dimensions for students in both studies. However, the subscale of *global knowledge* was not a strong concept for students surveyed in this study.

Aside from the *global knowledge* items, many items were not retained by both studies; most having to do with actively seeking out opportunities to engage in other cultures. This suggests that while students in these different populations may feel ready to handle intercultural interactions when they take place, they do not actively seek them out.

5.1.3 Global Civic Engagement. Global civic engagement had the least transformed subscales in both this study and Morais and Ogden's study (2011). All three theoretical subscales of *involvement in civic organizations*, *political voice*, and *glocal civic activism* retained most of their original items in both studies, suggesting that these are strong concepts for students in both studies. This study revealed a fourth unique construct of Volunteer Work Abroad, which suggests

that students surveyed in this study perceived international volunteer work to be a separate construct from involvement in civic organizations.

Items that were not retained in this study were retained in Morais and Ogden's analysis, suggesting that there is a difference in student populations of involvement in civic organizations and political voice. Students surveyed in this work do not have a strong concept of volunteering to provide global humanitarian aid as a part of engaging as a global citizen.

5.1.4 Professional Identity. In Chachra et al.'s (2008) study of undergraduate engineering students, the professional identity scale was not assessed with exploratory factor analysis and cannot be compared to the exploratory factor analysis performed in this present study. However, the subscale of *centrality* did not retain many items, and instead was aligned with items from *group identification* under one construct, suggesting that for students surveyed in this study, centrality and group identity are intertwined concepts. These two subscales developed by Chachra et al. were modified from scales in two different studies; because they are not tested by Chachra et al. for correlation, the results from this present work might suggest that centrality and group identification are similar concepts for students in other populations.

Items not retained were a mix from each subscale, and did not suggest any complete concepts that students surveyed are lacking. This suggests that this scale might need to be tested on more populations to reduce items and increase reliability.

5.1.5 Consumer Responsibility. This scale was being tested for the first time in this study, so there is no comparison of how different populations of students performed: this scale should be tested in future studies to increase reliability.

Items that were not retained often pertained to non-tangible impacts of global sustainability issues such as education and global connectivity, suggesting that these are concepts students need to develop. Students also struggled to understand how to impact sustainability issues through conscious consumption, also suggesting that students may need to develop a more holistic concept of affecting change through consumption.

5.1.6 Sustainability. Braun's (2011) study does not assess the reliability of the scale with a factor analysis, however, most items were retained in this present work, suggesting that it might already be a reliable scale. Only one item was not retained; it was the most pessimistically-phrased of all the items in this scale, suggesting that students prefer to think of sustainability as an optimistic topic. This scale should be tested on more student populations to reduce unnecessary items and increase its reliability.

5.2 Discussion of Hypothesis 2

This hypothesis sought to assess the applicability of the psychographic measures obtained in Hypothesis 1 to segment and assess different groups of students. Differences between academic disciplines and genders indicates that these constructs are complete and unique enough to vary amongst individuals. Results of all the performed ANOVAs suggest that there are more nuanced understandings of sustainability between academic disciplines than between genders, suggesting that segmentation by career field might be more fruitful for understanding new sustainability values. Constructs that did not have significant ANOVAs can be understood to be common concepts amongst diverse populations of students, and may be beneficial to target for marketers seeking to attract many different consumers.

5.2.1 Social Responsibility. In order to better understand the nature of the significant effects of major on Technology as an Equalizer and Common but Differentiated Responsibilities,

group means were plotted (see Figure 2 and 3; respectively). Error bars are used to signify standard error.

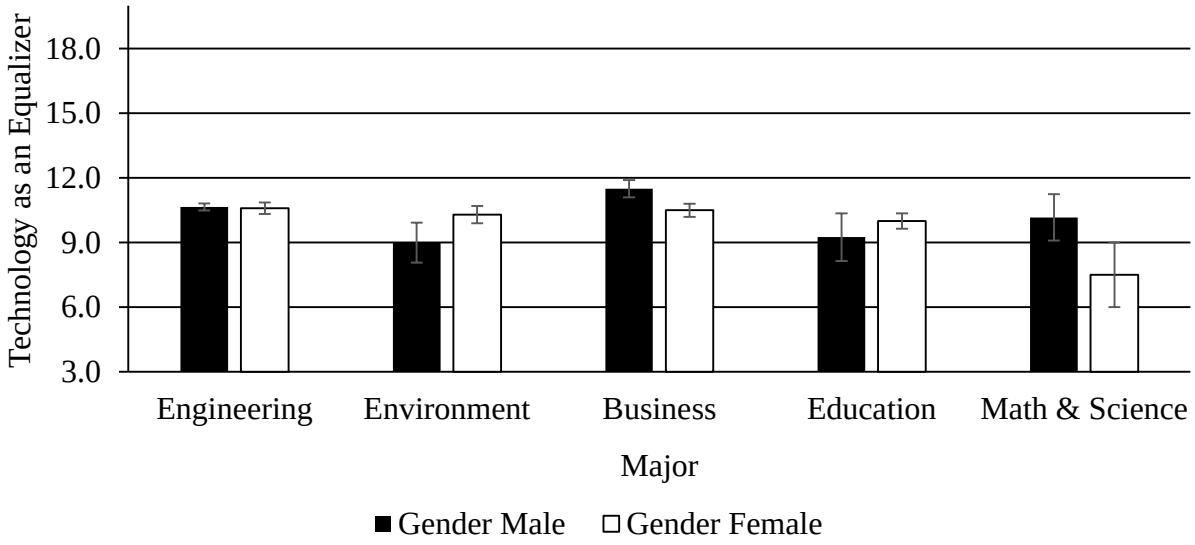
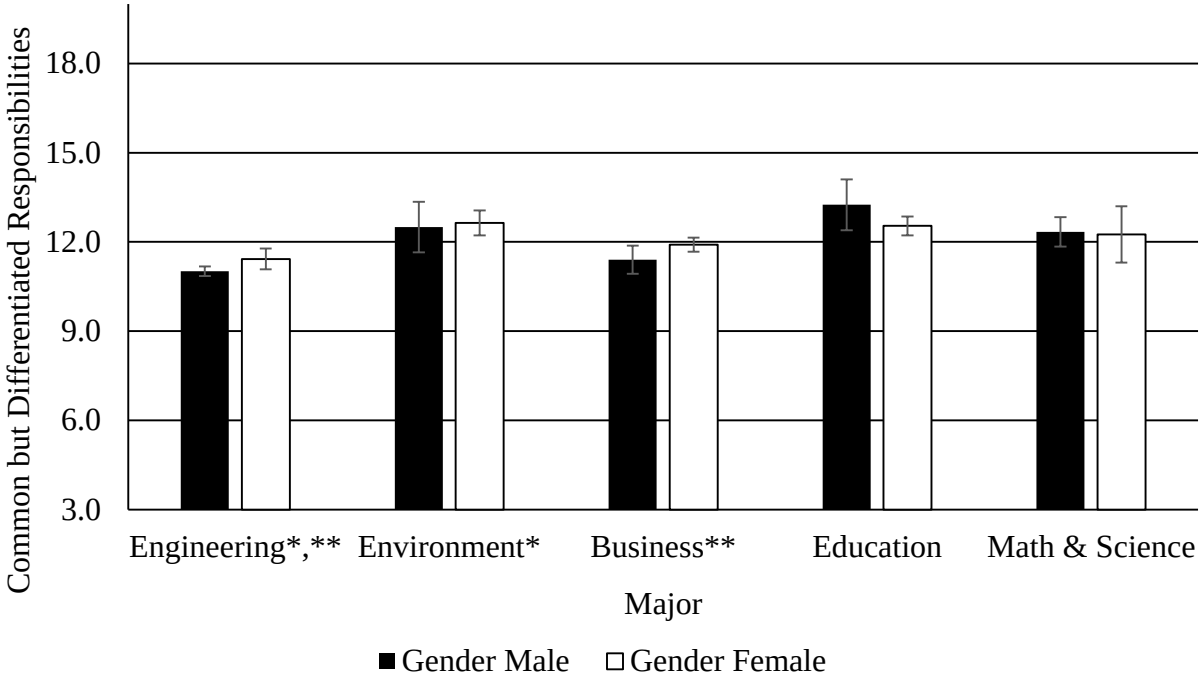


Figure 2. Marginal Means of Technology as an Equalizer Construct

Results suggest that engineering students are more likely to approach social responsibility through applying technology and science to advance global equality than they are to do so through taking responsibility as privileged global citizens. Sustainability marketers that seek to attract engineering students as consumers should investigate and develop ways to integrate technology and science into their products. Similarly, those seeking to increase social responsibility values in engineering students can target the construct of Common but Differentiated Responsibilities.

Because there were no significant differences between neither major nor gender for the construct of Social Justice, this suggests that this construct is a commonly held concept that can be targeted by marketers to attract a diverse population of students.



* indicates one significant post-hoc contrast, ** indicates a second significant post-hoc contrast

Figure 3. Marginal Means of Common but Differentiated Responsibilities Construct

5.2.2 Global Competence. In order to better understand the nature of the significant effects of major on Intercultural Communication & Interaction, group means were plotted (see Figure 4).

Results suggest that education and business students are more comfortable with intercultural communication than students in engineering and environment. Because post-hoc tests failed to confirm true significant differences between majors, more testing of students from similar disciplines should be performed to assess if some students are more confident than others in interacting with people from other cultures.

Because there were no significant differences between neither major nor gender for the construct of Confidence in Addressing Global Problems, this suggests that this construct is a commonly held concept that can be targeted by marketers to attract a diverse population of students.

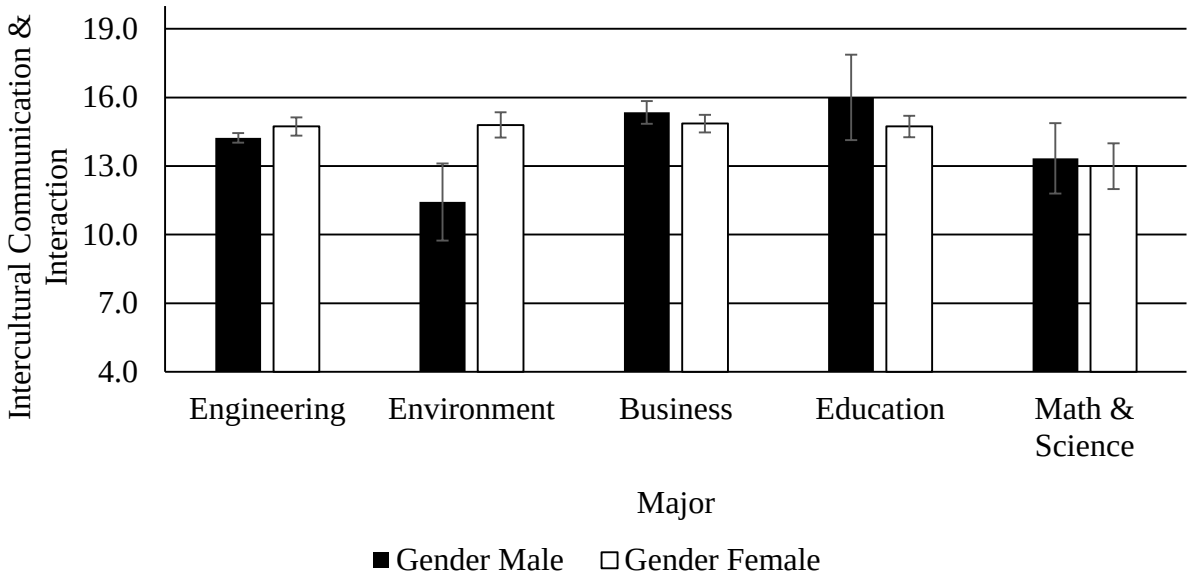
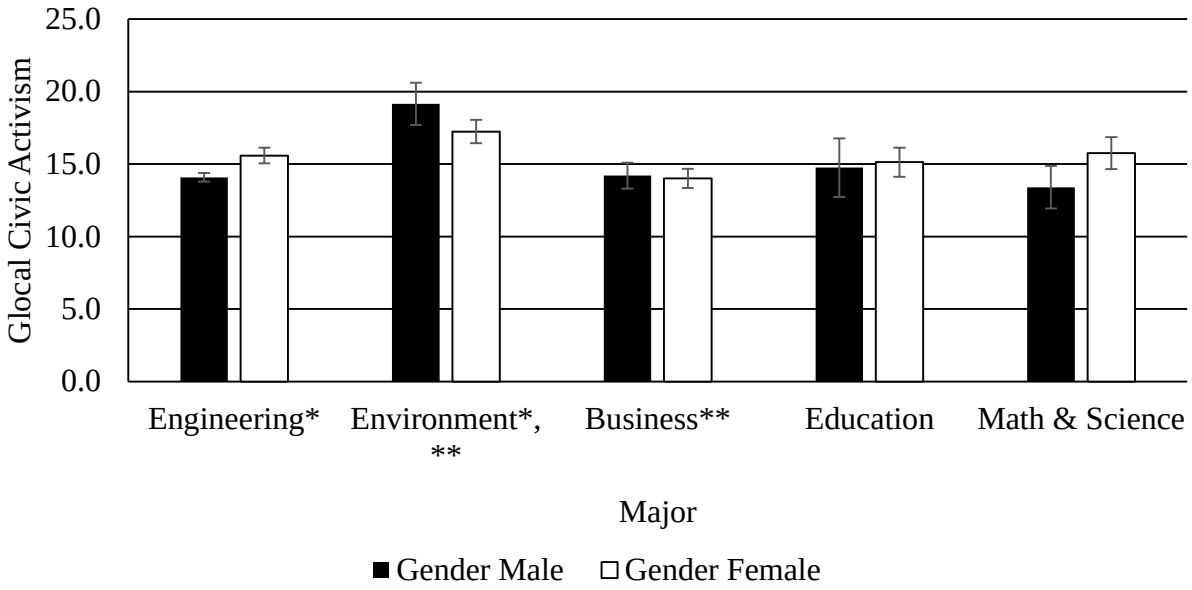


Figure 4. Marginal Means of Intercultural Communication & Interaction Construct

5.2.3 Global Civic Engagement. In order to better understand the nature of the significant effects of major on Glocal Civic Activism, group means were plotted (see Figure 5). Results suggest that environment students have a stronger concept of how to "think globally, act locally" than engineering and business students. Individuals interested in increasing global civic engagement values in engineering and business students can seek ways to help students develop the construct of Glocal Civic Activism.

Because there were no significant differences between neither major nor gender for the constructs of Involvement in Civic Organizations, Volunteer World Abroad, and Political Voice, this suggests that these constructs are commonly held concepts that can be targeted by marketers to attract a diverse population of students.

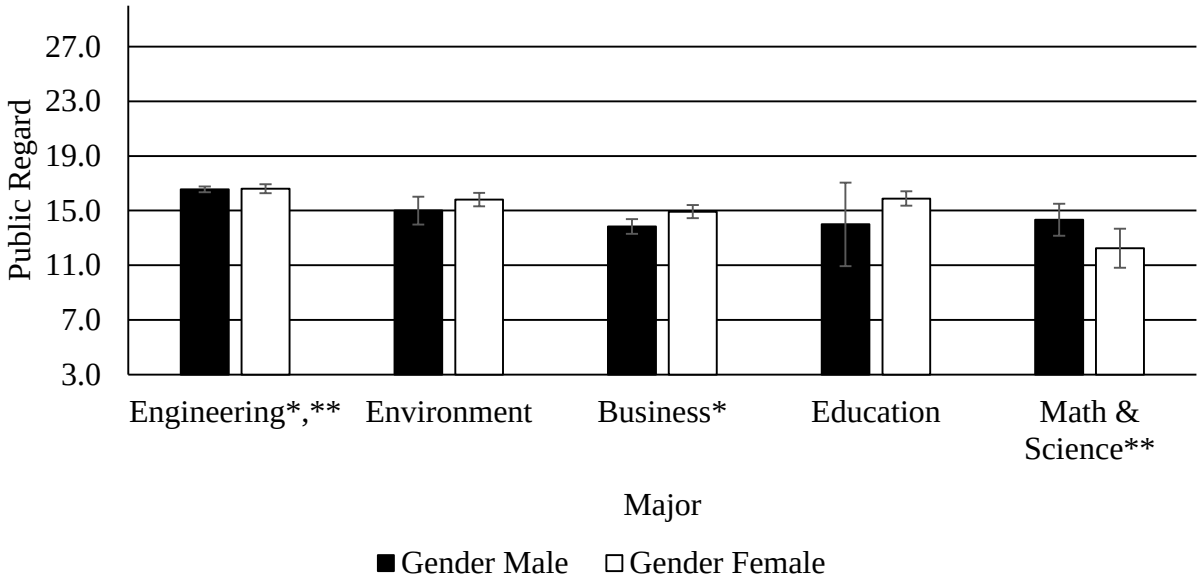


* indicates one significant post-hoc contrast, ** indicates a second significant post-hoc contrast
Figure 5. Marginal Means of Glocal Civic Activism Construct

5.2.4 Professional Identity. In order to better understand the nature of the significant effects of major on Public Regard, group means were plotted (see Figure 6). Results suggest that engineering students have a higher perception of the public's regard for their career field than students in business and students in math and science majors. Sustainability marketers seeking to attract engineering students as consumers should target concepts of public regard.

Because there were no significant differences between neither major nor gender for the constructs of Group Identification & Centrality and Private Regard, this suggests that these constructs are commonly held concepts that can be targeted by marketers to attract a diverse population of students. In Chachra et al.'s (2008) study of undergraduate engineering students, women had higher scores of centrality than men, while men had higher perception of public regard for engineers than women: because there were no differences by gender in students surveyed in

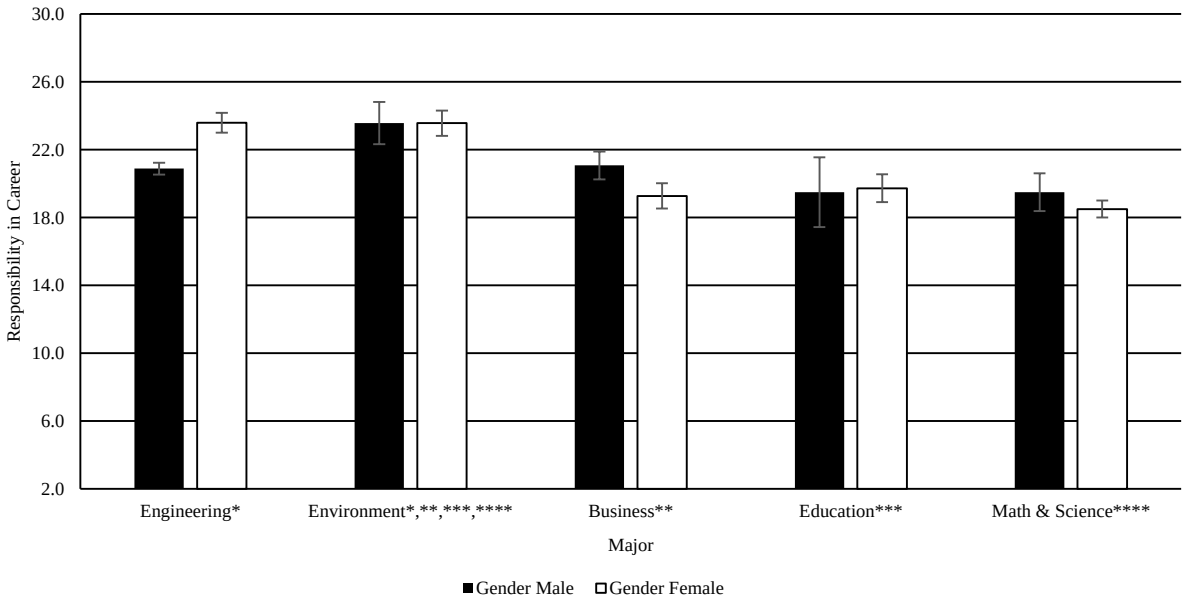
this work, further work should be done to investigate if this difference can also be seen amongst students in different populations.



* indicates one significant post-hoc contrast, ** indicates a second significant post-hoc contrast
Figure 6. Marginal Means of Public Regard Construct

5.2.5 Consumer Responsibility. In order to better understand the nature of the significant effects of major and the interaction between major and gender on Responsibility in Career, group means were plotted (see Figure 7). Results suggest that environment students have a stronger understanding of how to advance global sustainability while working in their field: this is a concept than can be improved in students from other disciplines to increase consumer responsibility values. Furthermore, females in engineering have a stronger concept of Responsibility in Career than males in engineering, while the opposite is true for different genders majoring in business; this disordinal interaction suggests that genders in these majors perceive their ability to advance sustainability in their career field differently.

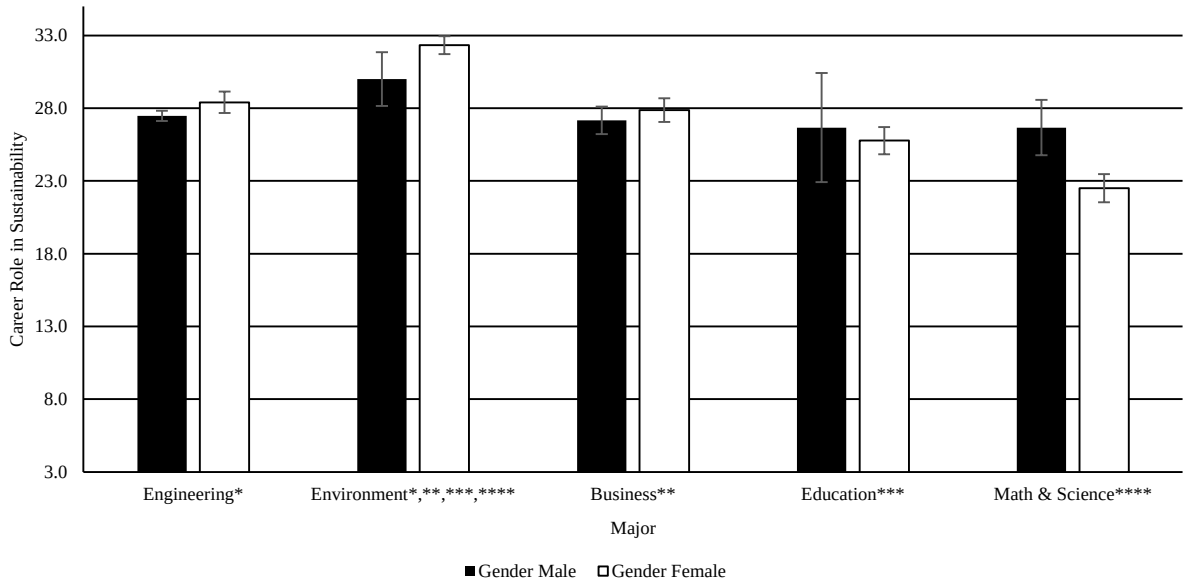
Because there were no significant differences between neither major nor gender for the constructs of Attentiveness, Competence, and Responsibility as Consumer, this suggests that these constructs are commonly held concepts that can be targeted by marketers to attract a diverse population of students.



* indicates a significant post-hoc contrast, ** indicates a second significant post-hoc contrast, ***indicates a third significant post-hoc contrast, **** indicates a fourth significant post-hoc contrast

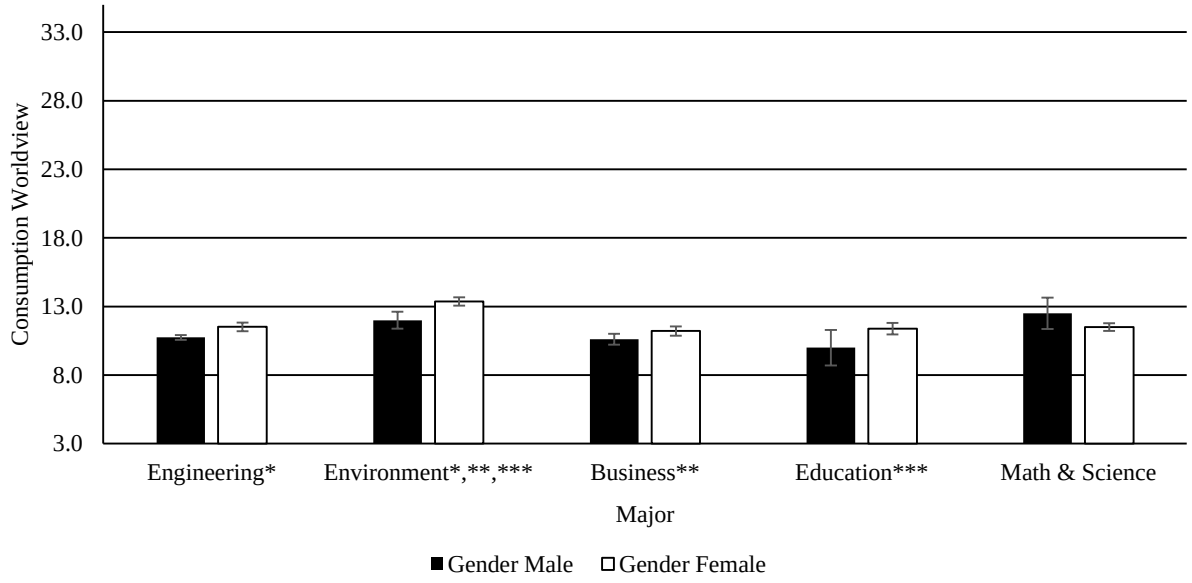
Figure 7. Marginal Means of Responsibility in Career Construct

5.2.6 Sustainability. In order to better understand the nature of the significant effects of major on Career Role in Sustainability and Consumption Worldview, group means were plotted (see Figure 8 and 9; respectively). Results suggest that environment students have a stronger concept of the role their career can play in advancing global sustainability, as well as how global consumption patterns can affect sustainable development: these are both concepts than can be improved in students from other disciplines to increase sustainability values.



* indicates a significant post-hoc contrast, ** indicates a second significant post-hoc contrast, ***indicates a third significant post-hoc contrast, **** indicates a fourth significant post-hoc contrast

Figure 8. Marginal Means of Career Role in Sustainability Construct



* indicates a significant post-hoc contrast, ** indicates a second significant post-hoc contrast, ***indicates a third significant post-hoc contrast

Figure 9. Marginal Means of Consumption Worldview Construct

5.3 Discussion of Hypothesis 3

This final hypothesis demonstrates how an improved understanding of psychographic measures can aid sustainability marketing in the tourism industry. Predicted and actual values of sustainability constructs by gender and by major were not the same, revealing that there is a variety of sustainability values that are held by both high and low propensity market segments. The failure to support this final hypothesis suggests that the traditional approach to tourism marketing based on value segmentation of individuals at the destination fails to generate the full breadth of values that can be useful for identifying new market segments. Sustainability marketing that assesses a variety of individuals can develop new marketable values that will attract more sustainable consumers.

Chapter 6. Limitations and Implications

6.1 Limitations and Advantages

There are some limitations of using survey research to develop sustainability values. Survey research itself can be limited in forcing individuals to shape their values and opinions towards items that are not their own words: this survey did have short answer segments to give individuals a chance to describe their thoughts on sustainability, however, these were not assessed in this study. Comparing the constructs developed in this study and the constructs that are generated through a qualitative assessment of short answer responses could reveal even more nuanced understandings of individuals' sustainability values.

Additionally, this survey was lengthy; typically requiring 30-45 minutes to complete. This is a frequent challenge in designing value-based questionnaires (Belz & Peattie, 2012), however this stresses the importance of evaluating surveys with factor analysis to continually reduce the amount of questions that are necessary to evaluate student values for comparison purposes. Another

common critique of sustainability values surveys is that the questions are subject to a social desirability bias, where students may try to answer questions based on what they think the researcher or others would expect of them. Under this lens, differences between students could be interpreted to represent differing pressures on different groups of students to value certain sustainability constructs. This interpretation is not mutually exclusive from the one taken in this work, and it is possible that scores represent a combination of students' purely individualized values and the values they think society would like them to have.

While Morais and Ogden (2011) did test the reliability of their scales, Chachra et al. (2008) and Braun (2011) did not, meaning that some items from their scales may be unnecessary and may also not represent separate, unique values. This study seeks to test scales on different student populations than the ones the scales were designed for in an effort to contribute to the reliability of these scales and add to the literature on sustainability values. Like these other studies, this work surveys undergraduate students who were - in a variety of forms including gift cards and extra credit - incentivized to complete the entire questionnaire. The field of psychology has been often criticized to over-survey undergraduate students in order to draw conclusions about larger populations. This work seeks emphasize that its conclusions about sustainability values should only be applied to populations similar in characteristics to the students surveyed in this study. While students surveyed do not ideally represent ecotourists, as these individuals are more likely to be older (35 – 65 yrs), they do represent voluntourists very well (most often students between the ages of 17-24) (Wight, 1996). The marketing implications of this paper could be strengthened by additionally surveying older populations more likely to be ecotourists.

6.2 Implications and Conclusions

This study contributes to a better understanding of sustainability-related psychographic measures. Scales designed to measure sustainability values should be tested with diverse populations in order to establish reliability and assess variability among market segments. Reliable measures can be utilized by a wide variety of fields interested in increasing sustainable behaviors; constant assessment of evolving sustainability values can assist those who seek to educate and encourage people to consumer or behave in a more sustainable manner. Below are a few examples of how the results of this work can be utilized by marketers interested in increasing consumption of sustainable products – especially those marketing tourism.

The new and unique constructs developed in Hypothesis 1 provide insights into potential differences between undergraduate students at different schools. Understanding variability in psychographic measures can help educators and marketers target gaps and poorly developed concepts so that individuals are more likely to perform sustainable behaviors. The results of this hypothesis further the conclusions of Morais and Ogden (2011) that American undergraduate students do not have strong concepts of social responsibility.

Marketers seeking to improve social responsibility values in tourists may want to emphasize this construct in educational messages or new product design. For example, a public tourism broker such as a destination local government might want to develop a new tourism plan that brings in student volunteers from developed countries to provide poverty relief and aid. The broker could design interpretive media to educate tourists on ways in which they can take action to improve global inequalities and social injustices while traveling at that destination.

Existence of differences between majors, as confirmed by Hypothesis 2, indicates that these scales can be used to evaluate students and compare their views of sustainability. Marketers seeking to

diversify their products or design new tourism experiences could find it more beneficial to target segments based on occupation and career field than by gender. This adds to the growing body of literature that seeks to challenge the notion of ecotourists as being mostly women, and could be used by brokers to more effectively market specialty products. As an example, a private tourism broker seeking to increase sales of their offered tours may find it more beneficial to develop new products based on occupation (tours of local schools for education career fields, or architecture tours for engineers) than on gender (women/men-only tours).

The results of the final hypothesis emphasize that psychographic measures developed to characterize or profile tourists are not always effective at predicting which values should be targeted to increase consumption of sustainable tourism. Future studies that can connect and develop new sustainability values known to be related to tourism can aid brokers even further to continually increase sustainable behaviors and consumption.

Brokers seeking to develop new markets should target sustainability values held by low-propensity segments: two such constructs found in this study include Technology as an Equalizer and Public Regard. Brokers who may already have a sustainable tourism product such as an eco-lodge or hotel can advertise how ways in which the operation improves social disparities and inequalities in its local area through advancing and increasing access to technology, or how individuals can increase public perception of their occupation by being able to apply career-specific skills while assisting others in developing countries (such as Engineers without Borders).

The psychographic measures developed in this study reveal nuances in how student values of sustainability, global citizenship, and professional identity vary from other populations, highlighting the importance of constant revision of our understanding of segment characteristics. In the fast-paced globalized market, consumer wants and desires change rapidly, and new and

different values will also arise. Accurate and effective sustainability marketing must understand and monitor these changes to design and develop new products to attract new consumers.

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Appendix A. Survey and Informed Consent

Question 1.
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**Please note that we cannot ensure the confidentiality of information sent via e-mail.*

Investigators' statement: We are asking you to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether or not to be in the study. Please read the form carefully. You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called informed consent.

Purpose of this Study: The purpose of this survey is to study how undergraduate students view and understand sustainability in modern society. With the results of this study, we hope to understand how to best incorporate sustainability into undergraduate classes and curricula.

Procedures: If you choose to be in this study, we would like you to participate in a 20-30 minute survey. In the surveys, we will ask you questions such as the following:

How much do you agree or disagree with the following statements?
I wish I had gone to another university instead of this one.
In light of my intended occupation, I feel responsible for improving the sustainability of energy/power my work/career.

You do not have to answer every question on the survey. Your name and email will not be associated with your survey responses.

Risks, Stress, or Discomfort: Breach of confidentiality is a risk if it happened that someone saw your responses associated with you email address or name at the time you were taking the survey.

Alternatives to Taking Part in this Study: The alternative to taking part in this study is to refrain from taking the survey. You will have a chance to select either option at the bottom of this page.

Benefits of this Study: We hope that the results of this study will provide us means for improving teaching approaches to sustainability in the undergraduate classroom.

Other Information: Taking part in this study is voluntary. You can stop at any time. You may refuse to participate or withdraw at any time without any penalty or loss of benefits to which the subject is otherwise entitled. You are free to decline participation and to stop at any time and refusal to participate or stopping participation will not impact any benefits to which you are already entitles and will not impact your relationship with your department. We are not collecting your name or your email address. Government or university staff sometimes review studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at legal risk of harm. You may print a copy of this information statement for your records.

Funding: This research study is funded by the National Science Foundation.

Contact Information: For questions about this research, or in the event of a research-related injury to the subject, please contact Denise Wilson at densiew@uw.edu or at (206) 221-5238.

For questions about subject's rights in this research, please contact the UW Human Subjects Division at hsdinfo@uw.edu or at (206) 543-0098.

Cheryl Allendoerfer
Research Scientist, College of Engineering
March 29, 2015

Yes, this study has been explained to me. I agree to take part in this research by completing the survey.

No, I do not wish to participate in this research.

Question 2.
According to the University of Washington, you are a (check one):

Freshman

Sophomore

Junior

Senior

Fifth-year Senior (or more)

Post-Bachelors Degree or Other

Question 3.

What is your Major (or most likely Major, if you have not yet declared):

Question 4.
When did you begin attending college whether university or community college? (Quarter/Semester and Year)

Question 5.
When did you begin attending the University of Washington ? (Quarter/Semester and Year)

Question 6.
When do you anticipate you will graduate with your Bachelor's Degree? (Quarter/Semester and Year)

Question 7.
How do you define sustainability?

Question 8.
What do you believe your most important contribution to sustainability will be as a professional in your future career?

Question 9. Academic Orientation – Self-Efficacy (1) and Task Value (2)
For each statement below, please select the response that best describes how strongly you agree or disagree with the statement as it applies to your experience at the University of Washington.

(AO11) I believe I will receive excellent grades in the classes in my major.

(AO21) I think I will be able to use what I learn in classes in my major in my chosen profession.

(AO14) I'm certain I can understand the most difficult material taught in the classes in my major.

(AO15) I'm confident I can do an excellent job on the assignments and tests given in the classes in my major.

(AO13) I expect to do well in the classes in my major.

(AO21) I am very interested in the content area of courses in my major.

(AO12) I'm confident I can understand the most complex material presented by the instructors in the classes in my major.

(AO22) It is important for me to learn the material presented in the classes in my major.

(AO24) I think the material learned in classes in my major is useful for me to learn.

(1) Strongly Disagree

(2) Disagree

(3) Somewhat Agree

(4) Agree

(5) Strongly Agree

Question 10.
What do you believe your most important contribution to sustainability will be as a consumer?

Question 11. Sense of Belonging – Major Level (1) University Level 1 (2) and University Level 2 (3)
For each statement below, please select the response that best describes how strongly you agree or disagree with the statement as it applies to your experience at the University of Washington.

(SB11) I feel that I am a part of this major.

(SB33) I feel like there is a strong feeling of togetherness on campus.

(SB13) I feel comfortable in this major.

(SB21) I really enjoy going to this university.

(SB23) I wish I had gone to another university instead of this one.

(SB14) I feel that I am accepted in this major.

(SB24) I wish I were at a different university.

(SB 31) People at this school are friendly to me.

(SB32) I feel that there is a real sense of community at this school.

(SB12) I feel that I am supported in this major.

(SB22) I feel like I really belong at this university.

(1) Strongly Disagree

(2) Disagree

(3) Somewhat Agree

(4) Agree

(5) Strongly Agree

Question 12.
What part of sustainability do you believe you will be least likely to impact as a professional in your future career?

Question 13.
What part of sustainability do you believe you will be least likely to impact as a consumer?

Question 14.

What is your current GPA?

Question 15. Job Values/Goals
For each statement below, please select the response that best describes how important each characteristic is to you.

When you think about your future job, how important are the following?

Job security.
High salary.
Good possibilities to be promoted.
An interesting job.
A job where you can be independent.
A job where you can help others.
A job where you can do something useful.
A job with flexible working-hours.
A job that allows for leisure time.
A job working with others.
Possibilities for part-time working.
A job where you can create new things.
A job where you can form friendships.

(1) Not Important at All
(2) Kind of Important
(3) Important
(4) Pretty Important
(5) Very Important

Question 16.
What is the highest level of education completed by your mother or other primary caregiver? (check one)

Did not finish high school
High school
Attended college but did not complete a degree
Associate's degree (A.S., A.A.)
Bachelor's degree (B.A., B.S., etc.)
Master's degree (M.A., M.S., etc.)

Doctoral or Professional degree (Ph.D., J.D., M.D., etc.)

Question 17. Social Responsibility – Global Justice and Disparities (1), Altruism and Empathy (2), and Global Interconnectedness and Personal Responsibility (3)
For each statement below, please select the response that best describes how strongly you agree or disagree with the statement.

(SR11R) I think that most people around the world get what they are entitled to have.

(SR13R) I think that people around the world get the rewards and punishments they deserve.

(SR14R) In times of scarcity, it is sometimes necessary to use force against others to get what you need.

(SR15R) The world is generally a fair place.

(SR16) No one country or group of people should dominate and exploit others in the world.

(SR17) In general, science and technology help to make the world a more fair place.

(SR32) Americans should emulate more sustainable and equitable behaviors of other developed countries.

(SR18R) In general, science and technology have increased opportunities for one country or group of people to dominate or exploit others.

(SR110) Technology enables greater justice around the world.

(SR21) The needs of the worlds' most fragile people are more pressing than my own.

(SR22R) I think that many people around the world are poor because they do not work hard enough.

(SR23) I respect and am concerned with the rights of all people, globally.

(SR31) Developed nations have the obligation to make incomes around the world as equitable as possible.

(SR33R) I do not feel responsible for the world's inequities and problems.

(SR34) I think in terms of giving back to the global society.

(SR12R) It is OK if some people in the world have more opportunities than others.

(SR19) Science and technology help give more opportunities to poor or disadvantaged people.

(1) Strongly Disagree

(2) Disagree

(3) Somewhat Agree

(4) Agree

(5) Strongly Agree

Question 18.

What is the highest level of education completed by your father or other primary caregiver? (check one)

- Did not finish high school
- High school
- Attended college but did not complete a degree
- Associate's degree (A.S., A.A.)
- Bachelor's degree (B.A., B.S., etc.)
- Master's degree (M.A., M.S., etc.)
- Doctoral or Professional degree (Ph.D., J.D., M.D., etc.)

Question 19. Consumer Responsibility – Attentiveness (1), Competence (2), Responsibilty in the field (3), Consumer responsibility (4)

For each statement below, please select the response that best describes how strongly you agree or disagree with the statement from the perspective of your own major or intended occupation.

- (CR11) I believe that resource scarcity impacts global sustainability.
- (CR13) I believe that climate change impacts global sustainability.
- (CR14) I believe that access to education impacts global sustainability.
- (CR15) I believe that global connectivity impacts sustainability.
- (CR16) I believe that the proliferation of waste electronics impacts sustainability.
- (CR21) I know a great deal about resource scarcity in the world today.
- (CR22) I know a great deal about sustainable energy.
- (CR23) I know a great deal about global climate change.
- (CR24) I know a great deal about access to education around the world today.
- (CR25) I know a great deal about global connectivity.
- (CR26) I know a great deal about the proliferation of waste electronics.
- (CR31) As an undergraduate in my major, I feel responsible for addressing global resource scarcity in my future work/career.
- (CR32) As an undergraduate in my major, I feel responsible for improving the sustainability of energy in my future work/career.
- (CR33) As an undergraduate in my major, I feel responsible for mitigating climate change in my future work/career.
- (CR34) As an undergraduate in my major, I feel responsible for improving access to education in my future work/career.
- (CR35) As an undergraduate in my major, I feel responsible for improving global connectivity in my future work/career.
- (CR36) As an undergraduate in my major, I feel responsible for decreasing the impact of waste electronics in my future work/career.

(CR41) As a consumer, I feel responsible for addressing global resource scarcity.

(CR42) As a consumer, I feel responsible for improving the sustainability of energy.

(CR44) As a consumer, I feel responsible for improving access to education.

(CR45) As a consumer, I feel responsible for improving global connectivity.

(SS1) Everything must go somewhere.

(SS2) Everything connects to everything else.

(SS3) Nature knows best and bats last.

(CR46) As a consumer, I feel responsible for decreasing the impact of waste electronics.

(SS4) There is no such thing as a free lunch.

(CR43) As a consumer, I feel responsible for mitigating climate change.

(SS5) Professionals in my intended career should select processes/products holistically and integrate environmental impact assessment tools into their work.

(SS6) Professionals in my intended career should conserve and improve natural ecosystems while protecting human health and well-being.

(SS7) Professionals in my intended career should ensure that all material and energy inputs and outputs are as inherently safe and benign as possible.

(SS8) Professionals in my intended career should minimize depletion of natural resources.

(SS9) Professionals in my intended career should develop and apply solutions to problems, while being cognizant of local geography, aspirations, and cultures.

(SS10) Professionals in my intended career should create solutions to problems beyond current or dominant technologies, and improve, innovate, and invent (technologies) to achieve sustainability.

(SS11) Professionals in my intended career should actively engage communities and stakeholders in development of solutions to problems.

(CR12) I believe that energy availability impacts global sustainability.

(1) Strongly Disagree

(2) Disagree

(3) Somewhat Agree

(4) Agree

(5) Strongly Agree

Question 20.
Why did you choose your major (Check all that apply)?

My father, mother, or close relative has worked in the field of my chosen major.

I did well in math and/or science in high school.

I find my major to have many opportunities to benefit society.

I like to build things or work with my hands.

I like to program.

Other (please specify)

Question 21. Global Competence – Self-Awareness (1), Intercultural Communication (2), Global Knowledge (3)
For each statement below, please select the response that best describes how strongly you agree or disagree with the statement.

(GC21) I unconsciously adapt my behavior and mannerisms when I am interacting with people of other cultures.

(GC32) I feel comfortable expressing my views regarding a pressing global problem in front of a group of people.

(GC23) I am able to communicate in different ways with people from different cultures.

(GC24) I am fluent in more than one language.

(GC27) As a future professional in my field, I feel comfortable developing and adapting technologies to different cultures around the world.

(GC25) I welcome working with people who have different cultural values from me.

(GC26) I am able to mediate interactions between people of different cultures by helping them understand each other's values and practices.

(GC31) I am informed of current issues that impact international relationships.

(GC22) I often adapt my communication style to other people's cultural background.

(GC34) I am aware of how national and global politics affect technology and technology development.

(GC12) I know how to develop ways to help mitigate a global environmental or social problem.

(GC13) I know several ways in which I can make a difference on some of this world's most worrisome problems.

(GC11) I am confident that I can thrive in any culture or country.

(GC14) I am able to get other people to care about global problems that concern me.

(1) Strongly Disagree

(2) Disagree

(3) Somewhat Agree

(4) Agree

(5) Strongly Agree

Question 22.
In the first three years after graduation, I see myself...

Finding a job working in a profession closely related to my major

Finding a job working in a profession somewhat related to my major

Finding a job unrelated to my major

Going to graduate school in an area closely related to my major (Masters/PhD)

Going to a non-technical professional school (business, law, medicine, etc.)

Going to graduate school in an area unrelated to my major (Masters/PhD)

Other (please specify)

Question 23. Global Civic Engagement – Involvement in Civic Organizations (1), Political Voice (2), Glocal Civic Activism (3)

For each statement below, please select the response that best applies.

(GCE210) After I graduate, I will display and/or wear badges/stickers/signs that promote a more just and equitable world.

(GCE11) During my undergraduate career, I have done or will do volunteer work to help individuals and communities abroad.

(GCE12) After I graduate, I plan to do volunteer work to help individuals and communities abroad.

(GCE13) During my undergraduate career, I have participated in or will participate in a walk, dance, run, or bike ride (or of similar nature) in support of a global cause.

(GCE14) After I graduate, I will participate in a walk, dance, run, or bike ride (or of similar nature) in support of a global cause.

(GCE16) After I graduate, I will volunteer my time working to help individuals or communities abroad.

(GCE17) During my undergraduate career, I have been or plan to get involved with a global humanitarian organization or project.

(GCE18) After I graduate, I plan to get involved with a global humanitarian organization or project.

(GCE19) During my undergraduate career, I have helped or plan to help international people who are in difficulty.

(GCE110) After I graduate, I plan to help international people who are in difficulty.

(GCE111) During my undergraduate career, I have been or plan to get involved in a program that addresses the global environmental crisis.

(GCE112) After I graduate, I plan to get involved in a program that addresses the global environmental crisis.

(GCE113) During my undergraduate career, I have worked or will work informally with a group toward solving a global humanitarian problem.

(GCE114) After I graduate, I will work informally with a group toward solving a global humanitarian problem.

(GCE115) During my undergraduate career, I have paid or will pay a membership or make a cash donation to a global charity.

(GCE31) If at all possible, I will buy fair-trade or locally grown products and brands.

(GCE15) During my undergraduate career, I have volunteered or will volunteer my time working to help individuals or communities abroad.

(GCE32) I will deliberately buy brands and products that are known to be good stewards of marginalized people and places.

(GCE33) I will boycott brands or products that are known to harm marginalized global people and places.

(GCE21) Before I graduate, I will contact a newspaper or radio to express my concerns about global environmental, social, or political problems.

(GCE22) After I graduate, I anticipate that I will contact a newspaper or radio to express my concerns about global environmental, social, or political problems.

(GCE23) Before I graduate, I will express my views about international politics on a website, blog, or chat room.

(GCE24) After I graduate, I will express my views about international politics on a website, blog, or chat room.

(GCE25) Before I graduate, I will sign an e-mail or written petition seeking to help individuals or communities abroad.

(GCE26) After I graduate, I will sign an e-mail or written petition seeking to help individuals or communities abroad.

(GCE27) Before I graduate, I will contact or visit someone in government to seek public action on global issues and concerns.

(GCE28) After I graduate, I will contact or visit someone in government to seek public action on global issues and concerns.

(GCE29) Before I graduate, I will display and/or wear badges/stickers/signs that promote a more just and equitable world.

(GCE211) Before I graduate, I will participate in a campus forum, live music, or theater performance or other event where people express their views about global problems.

(GCE212)After I graduate, I will participate in a forum, live music, or theater performance or other event where people express their views about global problems.

(GCE116) After I graduate, I will pay a membership or make a cash donation to a global charity.

(1) Never

(2) Almost Never

(3) Sometimes

(4) Often

(5) Very Often

Question 24. Personal Identity

For each statement below, please select the response that best describes how strongly you agree or disagree with the statement. Please respond to the question in the context of your current or intended occupation. For example, if you intend to become a manager, answer the questions as if you were training to be and will become a manager. If you intend to become an environmental scientist, answer the questions as if you were training to be and will become an environmental scientist, and so on.

(PI11) I am happy to be a (your chosen occupation).

(PI32R) I often regret that I am going to become a (your chosen occupation).

(PI13) I identify with (your chosen occupation).

(PI53) I fit in well with other professionals in (your chosen occupation) or students in my major.

(PI21R) Overall, being a professional in (your chosen occupation) has very little to do with how I feel about myself.

(PI22) I have a strong attachment to other professionals in (your chosen occupation) or students in my major.

(PI23) Being a professional in (your chosen occupation) is an important reflection of who I am.

(PI43) Society views professionals in (your chosen occupation) as a positive asset.

(PI31) I am happy that I am going to be a professional in (your chosen occupation).

(PI33) I feel that professionals in (your chosen occupation) have made major accomplishments and advancements.

(PI41) Overall, professionals in (your chosen occupation) are considered good by others.

(PI42R) Professionals in (your chosen occupation) are not respected by the broader society.

(PI12R) I often regret that I chose to be a professional in (your chosen occupation).

(PI44) In general, other professionals view (your chosen occupation) in a positive manner.

(PI51) I think students in my major work well together.

(PI52R) I feel uneasy around other professionals in (your chosen occupation) or students in my major.

(PI54) I identify with other professionals in (your chosen occupation) or students in my major.

(1) Strongly Disagree

(2) Disagree

(3) Somewhat Agree

(4) Agree

(5) Strongly Agree

Question 25.
What is your age (in years)?

Question 26.
What is your gender?

Male

Female

Question 27.

What is your status in the U.S.?

U.S. citizen

Permanent resident

Foreign student

Please specify country of citizenship, if not U.S.

Question 28.
Please indicate your race (Check all that apply)

Asian

Black

Latina/o

Native American

Pacific Islander

Non-Hispanic White

Other (please specify):

Question 29.
Approximately what was your average family income while growing up (during the first 18 years of your life)?

Less than $10,000/year

$10,001-20,0000/year

$20,001-40,000/year

$40,001-60,000/year

$60,001-80,000/year

$80,001-100,000/year

$100,001-150,000/year

More than $150,000/year

Question 30.

Which of the following would you use to describe your family's social class while growing up (during the first 18 years of your life)?

- Poor
- Working Class
- Lower Middle Class
- Middle Class
- Upper Middle Class
- Upper Class
- Other (please specify)

Question 31.

The following statement best describes my situation with respect to my chosen major (Check one): When I started at the University of Washington, I ...

- Intended to pursue my current major (or a closely related one) and never doubted the decision
- Intended to pursue my current major (or a closely related one) and have had doubts
- Considered my current major, but was also open to other majors not closely related to it
- Intended a major not closely related to the one I am currently pursuing
- Was completely undecided regarding my intended major
- Other (please specify)

Question 32.

Thank you so much for your time in completing this survey. Your time is valuable and we very much appreciate you sharing some of your time to assist us. If you have any further comments that are related to the questions on this survey, please feel free to include them here.

Question 33.

In appreciation for your time in completing this survey, we would like to provide you with an Amazon gift card in the amount of $10. Please select one of the following. If you choose a gift card and would like to have it sent to an e-mail address other than your @uw address, please write that address in below.

- Yes, thank you. I would like a gift card.
- No. I do not need a gift card.
- Other: Please provide the e-mail address to which you would like the gift card to be sent.