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SUSTAINABLE BEHAVIOR: INCENTIVES, PRACTICE, AND EDUCATION

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ABSTRACT

As luxurious consumer lifestyles have grown more extravagant, creating a system of runaway consumption, and as populations continue to grow faster than the carrying capacity could ever evolve, ecological destruction will continue to worsen. This thesis looks at proenvironmental behavior and strategic altruism as one opportunity to create a more sustainable future. Understanding where, how, and why unsustainable consumption occurs from an evolutionary perspective, as one piece of an interdisciplinary approach to creating sustainable futures, can help us find holistic solutions to our world's climate dilemmas. This is done by introducing the evolutionary theory driving human behavior and existing research in order to address the role of gender, education, and proenvironmental practice in incentivizing sustainable consumer behavior.

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Chapter 1

Introduction

Humans often act in ways that contribute to environmental problems. Ecologically destructive behaviors are common in all human societies, ranging from large scale deforestation to localized overpredation of key species. In the current state of our globalized planet, we are seeing diminishing biodiversity, growing populations, food insecurity, immense finite energy extraction and use, increased industrialized manufacturing outputs, and expanding urban areas (World Commission on Environment and Development 1987). These are not all of the problems our developing world is facing nor are the mentioned problems isolated from one another. The growing global population, coupled with human's excessive resource consumption are driving forces creating these environmental problems. Individual actions accumulate into larger collective issues, such as the demand for seafood driving unsustainable ocean fishing, threatening trophic collapse (Dunne et al. 2016).

These collective action problems are difficult to solve because humans are unlikely to act in favor of the collective when it is costly to the self. More often than not, humans seek immediate benefits at the expense of long-term costs. Because of this tendency, it is important to better understand individual behavior in order to design appropriate interventions that promote prosocial and proenvironmental behavior. Without intervention, our world is at risk of increased environmental degradation, which can lead to social inequity, with environmental declines disproportionately affecting lower socioeconomic communities (Vanderheiden 2003).

A multilevel approach to understanding human behavior and its resulting impacts is beneficial to holistically create solutions. A multilevel approach to explaining why humans behave the way they do incorporates more proximate psychological mechanisms, and developmental processes, as well as more ultimate functions and processes, including cultural-historical trajectories, and evolutionary forces. There has been a significant amount of work studying how these forces individually shape human behavior and, in more recent years, synthesizing how they interact to create a broader, integrated understanding. In this paper, I focus on an ultimate explanation of the variables that drive individual and collective decision-making by combining sociocultural and evolutionary forces. As humans are animals and continuously evolving by natural selection, holistic understandings of human behavior are complex and varying across time and space (Penn 2003, 277). The forces of natural selection can shape behavioral tendencies as much as they shape morphological traits and these adaptive traits impact our everyday decisions (Griskevicius 2012). The more recent utilization of a multidisciplinary analysis of human behavior has taken into account these adaptive factors and has opened up new possibilities for applying these findings to address ecological problems (Penn 2003). This leads to the question, why and when do people refrain from or partake in sustainable behavior (Penn 2003)? In this thesis, I focus on the role of ultimate forces in affecting the decisions people make to purchase or consume sustainable or environmentally friendly products, what I will refer to here as “green behavior”.

Defining Issue Scope

Because humans have been shaped by a long history of natural selection, we can expect them to act in ways that avoid disadvantages and maximize benefits. The cultural environment provides these incentives via financial and social benefits. Incentives, both financial and social,

motivate an individual to act in a certain way. Financially incentivized green behavior is backed by a rational economic perspective, which suggests that behaviors that are seemingly costly to the individual, such as green behavior, could be motivated by economic benefits (Griskevicius et al. 2010). For example, individuals in the past have received tax breaks for investing in home solar panels or driving a Toyota Prius (Griskevicius et al. 2010). Social incentives for sustainable behavior are the promise of increased status or reputation after acting in a certain manner. For instance, people are more likely to give money in a public goods game to protect the environment when the action of giving is observed publicly and can have future implications for an individual's reputation (Griskevicius 2010). Status and reputation benefits offer more complex feedback than monetary incentives, making it significant to identify where they are most prevalent and how they overlap with other decision-making, in order to applicably relieve ecological problems caused by anthropogenic behavior.

While human behavior can be motivated it can also be constrained. One major constraint on proenvironmental behavior is education, as hypothesized by the environmental concern perspective. This perspective assumes that humans intrinsically care about the well being of the environment and that informing more people will help mitigate environmental degradation (Griskevicius et al. 2010). An individual's level and type of education can impact the way social and pecuniary benefits influence their decision making. Environmental education can often foster an individual's capacity for environmental concern, sometimes making them more aware of collective environmental problems. Increased knowledge of an issue interacts with an individual's ethos and pathos, fostering their level of environmental concern. For example, if an individual knows how devastating palm oil extraction is to an ecosystem, they may be less likely to use products containing palm oil. Lastly, it is important to note that incentives and constraints

are not mutually exclusive and both may work to influence individual and collective decision making.

Socially incentivizing altruistic behavior will be the primary focus in this paper. Altruistic behavior is costly to the self but beneficial to another individual or group as a whole. “Altruism has been defined as a motivational state aimed at increasing others’ well-being or a tendency to maximize others’ benefits with little or null interest in gains for oneself” (Tapia-Fonllem et al. 2013, 713). A classic example of altruism is the Native North American practice of potlatching. Tribal chiefs compete to give away their possessions in return for increased status and insurance for future assistance if vital resources are scarce (Griskevicius 2012). When that seemingly selfless behavior also benefits the environment, it is considered altruistic green behavior.

Altruistic behavior can be difficult to incentivize because of the lack of direct and immediate, positive returns observed by the practitioner. Historically, proenvironmental behavior has been considered costly to the individual partaking in it. However, more recent research has exposed numerous indirect benefits that an altruistic individual may receive, expanding the definition of altruism. It is important to put a focus on altruistic behavior as it is practiced cross-culturally and adds another dimension to understanding human behavior. In order to address complex ecological problems, it is key to understand how humans behave and how it could help solve some of the global environmental issues we currently face. Can social incentives support altruistic behavior, particularly behavior that is directly costly to the individual but has a benefit to the environment as a whole?

In order to address the question of whether or not social incentives can motivate altruistic proenvironmental behavior, I will focus on aspects of consumer behavior. By consumer

behavior, I refer to the choices that people make about whether to purchase costlier, but more sustainable or proenvironmental products over less costly, but less environmentally friendly products. There are four principal facets of consumer behavior to identify; (1) the behavior can occur for the individual or as a group, (2) the behavior involves product selection, procurement, use, and disposal, (3) the behavior and consumer choices extend beyond products to experiences, services, and ideas, (4) behavior has ecological impacts (Budica et al. 2010). In summary, the scale of the consumer and product being consumed can vary but there is always an ecological impact. When referring to consumer behavior in this paper, the scale of the consumer is on an individual level, in a social setting, and the product being consumed satisfies vital human needs (i.e. food, energy).

This paper examines altruistic, proenvironmental, consumer behavior from an evolutionary perspective. As outlined below, I will start by identifying the problems certain consumer behaviors has helped create as well as the potential altruistic behavior has to mitigate these problems. Second, I will discuss the evolutionary theories that suggest social incentives can motivate proenvironmental behavior. Third, I will identify the benefits of altruism in a consumer context. Fourth, I will summarize studies of altruistic, proenvironmental, consumer behavior that have nominated social incentives as an important motivating factor. Fifth, I will introduce my research on social incentives, practice, and education. Sixth, I will discuss these findings and my results as they relate to the original question, can social incentives motivate proenvironmental choices. Finally, I will address some of the future implications of using and understanding social incentives as a means to motivate proenvironmental behavior.

Problem Recognition

Our world's environmental issues are due to a combination of overpopulation and excessive consumption (Penn 2003, 276). As the global population continues to grow, it is important to understand what motivates consumer behavior as well as sustainable, proenvironmental behavior in order to meet the needs of future generations. Efforts to sustain population growth are important in mitigating ecological degradation (Penn 2003). However, slowing population growth will only reduce ecological impacts if it is coupled with an overall reduction in resource consumption. For example, "Americans...represent around 5 percent of the Earth's population, and yet consume 25 percent of the resources, release 20 percent of the carbon dioxide emissions that contribute to global climate change, and generate almost 50 percent of the hazardous waste produced on the planet" (Penn 2003, 282). The current environmental crisis is not because humans are overconsuming resources essential for survival, but because of human's pursuit of extravagant goods (Penn 2003, 282).

While there are many ways to measure the impact of consumer decisions on the environment, for this paper, I focus on the extent to which products are ecologically sustainable. Sustainability is defined as consuming products on a scale that does not exceed the maximum sustainable yield, the highest amount of a resource that can be extracted from a particular population in a defined area so as to not cause extinction (Oxford University Press 2013). More specifically, a sustainable rate of use occurs when the growth or renewal rate of the resource is higher than its rate of harvest (Alvard 1995). However, because I am interested in how social incentives can be used to support proenvironmental behavior, measures of sustainability should include its effects on human populations relative to the ability to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (World

Commission on Environment and Development 1987). Needs can be understood as materials, emotions, experiences, and relationships and change over time and space. Human lifestyles, though varying, must evolve in a way that will sustain the environment in which they are a part of. Proenvironmental behavior positively contributes to overall sustainable behavior and therefore sustainable development.

Chapter 2

Evolutionary Theory

Amid increasing concerns about environmental degradation and global climate change, new social norms seem to be evolving that incorporate demonstrations of austerity rather than ostentation—particularly austerity that reduces the environmental impact of consumption (Sexton & Sexton 2014, 303). For example, the tiny house movement offers individuals involved the change to gain green distinctions (Horton 2003). People voluntarily live in smaller homes, consume less, and display that to their neighbors, in turn receiving a level of prestige for behaving proenvironmentally. The movement has become mainstream, offering more chances for individuals involved to display their austerity. The following theories explain why that can be beneficial to individuals.

Costly Signaling Theory (CST)

The main theory used to understand why individuals and groups partake in proenvironmental consumer behavior is called costly signaling theory. There are four conditions needed in order for costly signalling to occur: (1) members of a social group vary in some underlying attribute that can be difficult to observe, (2) observers stand to gain from honest information about a particular variation in attribute quality, (3) signalers and recipients have conflicting interests in that successful deceit would benefit signalers at the expense of recipients, (4) signal cost or benefit to the signaler is quality dependent (Bliege Bird & Smith 2005, 224). When these conditions are met, evolutionary design forces, like natural selection, favor specific

variations in an attribute that is communicated from the signaler to those who are receptive (Bliege Bird & Smith 2005, 224).

Summarized, “expensive and often seemingly arbitrary or ‘wasteful’ behavioral or morphological traits are designed to convey honest information benefiting both signalers and observers” (Smith & Bliege Bird 2005, 116). In these scenarios, a wasteful action may not actually be wasteful to the individual doing them if that individual gains social benefits as a result of paying a cost. That cost may be paid in terms of time, money, ability to take on luxuries, or consume material resources. The social gains can be in the form of status, reputation and ultimate evolutionary benefits such as increased fitness.

Costly signaling theory can provide an explanation for why individuals partake in cooperative or group-beneficial behavior (Smith & Bliege Bird 2005, 118). Displays of costly signaling are dependent on the signaler consuming or conserving a product or resource and the interpretation of the individual receiving the signal. If the signaler acts in an altruistic way, taking on a cost to benefit the overall group, it can incentivize other individuals benefitting in that scenario to reciprocate (Barclay 2004). This can be defined as cooperative behavior and can benefit the commons. Cooperative behavior is of interest because it is one way to help explain how to motivate proenvironmental behavior.

Conspicuous Conservation

An applied variation of CST that can motivate individuals to partake in proenvironmental consumer behavior is derived from Thorstein Veblen’s 1899 theory on honest signaling theory. Veblen “coined the term conspicuous consumption to describe extravagant and ostentatious displays of resources that function as a competitive strategy to demonstrate wealth and social status” (Penn 2003, 282). Conspicuous consumption and the theories derived from it can be

considered a form of costly signaling. Individuals display acts of ostentatious consumption, waste, or leisure to other individuals or groups to show that they can incur the costs. Waste produced from conspicuous consumption is increasingly more prevalent in hierarchical, stratified societies. The idea is that individuals try to emulate the socioeconomic class above them by buying the more costly, luxury items of higher status individuals in order to display their wealth (Penn 2003). When “lower” class individuals are able to procure the items of individuals from the class above them, the “lower” class will attain more costly items, perpetuating a wasteful consumer cycle (Penn 2003).

Fortunately, there is a type of consumer signal that can mitigate runaway consumption. “Conspicuous generosity is no different from conspicuous expenditure: both are ultimately strategic actions designed to accumulate symbolic capital” (Bliege Bird & Smith 2005, 223). Conspicuous conservation or generosity is another type of act used to display an individual's status. The act or behavior is still communicated to an individual's community but instead of wasting resources, the individual is displaying the conservation of common pool resources. An individual partaking in costly proenvironmental behavior may be using it to exhibit either their wealth or their sense of ethics (Hards 2013). Whether it is a conscious decision or not, what can an individual display about their ethical values through costly acts of conservation? Engaging in proenvironmental behavior can signal to others that an individual is prosocial (Griskevicius 2010). Having a prosocial reputation can have beneficial returns as others can see you as trustworthy, cooperative, and a team player (Barclay 2004; Griskevicius 2010).

Feedback and Framework Variations

Having a prosocial reputation is where evolutionary benefits can come into play. Evolutionary benefits are either proximate or ultimate, both of which are complementary to each other. Proximate benefits are the immediate beneficial outcomes of behavior such as happiness, contentment, or what some have referred to as ‘warm glow,’ the immediate feeling following an altruistic act. Ultimate benefits are more long term, and generally refer to reproductive success or its close correlates, such as child survivorship, fertility, health, or resource availability. For instance, a proenvironmental act can be driven on a proximate level by a desire to help the environment and on an ultimate level by the unintentional reason of being nice because it helps one's reproductive fitness by enhancing one's reputation (Griskevicius 2012, 116).

In competitive environments, such as when selecting a mate, altruistic prosocial actions signal to another that you would be a trustworthy and generous mate (Boone 1997). Prosocial reputations can hold more weight when child-rearing time and costs are more demanding on the parents, potentially displaying an individual as a more trustworthy mate choice (Boone 1997). Therefore, displays of conspicuous conservation can signal that an individual would make a good partner, ultimately increasing their fitness.

One framework variant of conspicuous conservation is competitive altruism (Barclay 2004). This occurs when individuals compete for prosocial status: which can be seen when selecting a mate, as mentioned above, or in groups that rely on food sharing. When altruistic signaling becomes competitive it adds a dimension in which costs to an individual can increase based on their social context (Hards 2013). One example of competitive altruism is amongst wealthy celebrities who make large public donations to display their sense of ethics

(Griskevicius 2012). Their wealthy peers are motivated to donate as well, sometimes increasing the amount of their donation to increase their generous reputation.

Benefits of Altruism

Costly signaling, conspicuous consumption, conspicuous conservation, competitive altruism and reciprocal altruism are all contextual, varying spatially and temporally. Benefits of these systems are expressed above but it is important to further highlight status and reputation, two potential ultimate outcomes of proenvironmental behavior. Status and reputation have been used interchangeably, however, reputation is determined for an individual by another individual while status is determined by the individual within his/her social context. Reputation refers more to an individual's values and status refers more to an individual's place within a hierarchical cultural system.

Costly signaling can promote cooperation when acting cooperatively leads to positive impacts on one's reputation, and one's reputation has an important role to play in providing social or economic benefits, therefore incentivizing further investments in cooperative behavior. When cooperation is the incentive and benefit for acting altruistically there is the possibility to promote a greater awareness of the commons (Smith & Bliege Bird 2005, 126). When individuals invest in common pool resources, as opposed to excessive consumption due to selfish motives, they can benefit from the security of knowing that their efforts will pay off in the form of increased access to cooperative partnerships (Macfarlan et al. 2013). Therefore, participating in altruistic behavior is a direct investment in others and an indirect investment in oneself. This has greater ecological benefits as collective conservation has more power for proenvironmental impact because of the scale of proenvironmental actions. These larger group impacts will be discussed in the section titled "Future Implications."

How can social status be beneficial for individual signalers and the ecological systems in which they reside? Conspicuous consumption, with conspicuous conservation and competitive altruism under its umbrella, predominantly promotes returns in the form of reputation or status. Whether it is consciously or unconsciously done, altruistic behavior resulting in a beneficial reputation or status feedback is a direct investment in oneself under a conspicuous consumption framework (Sexton & Sexton 2014). When an individual signals that they can incur costs that benefit the commons, it can help their status or reputation, depending on the action. Distinguishing oneself as an individual who can incur costs results in ultimate fitness benefits. Signaling that a person is selfless rather than selfish, altruism can concurrently display that one has ample amounts of time, energy, money, or other resources to be able to afford to donate such resources without a negative repercussions on one's fitness (Griskevicius 2010, 399). Greater ecological benefits manifest indirectly. Individuals are socially incentivized to act proenvironmentally by increasing their prosocial reputation or social status. When many individuals partake in this behavior, like with runaway competitive altruism, the scale in which positive ecological impacts occur grows.

Chapter 3

Case Studies

Since the 1990's, there has been a significant increase in research on socially incentivized behavior and its varying benefits. This section is dedicated to providing examples of that research and its correlating benefits.

Status and Conservation. Griskevicius *et al.* (2010) researched status, reputation, and conservation and tested whether or not activating status motives is a viable strategy to promote proenvironmental behavior. They conducted a series of three experiments, in a student population at a large university, to examine the socioeconomic variables involved in choosing proenvironmental products. The three experiments found significant results. (1) Activating status motives by simulating social scenarios increases an individual's tendency to choose self-sacrificing prosocial green products over more luxurious nongreen products when the pecuniary cost was the same. (2) Comparing how status motives influence consumers in public versus private purchasing scenarios resulted in reputational benefits to be higher in public environments, leading individuals to be more likely to purchase self-sacrificing prosocial green products while in public. (3) Addressing how pecuniary costs can influence consumer decision-making found that when prosocial green products were more expensive, individuals were more likely to choose them when social status was elicited, signaling an individual's ability to incur costs and contributing to their prosocial reputation (Griskevicius 2010). These findings support the idea that social incentives can influence an individual to partake in costly proenvironmental behavior when there are future social interactions expected.

Status and Energy Consumption. Hards proposes that practices such as cooking, heating, and lighting a home can impact a person's status, and that varying domestic energy practices may have divergent social meanings (Hards 2013, 441). Energy, as a product being consumed, has historically been viewed as void of symbolic communicative potential. Hards looks at how energy consumption has signaling potentials and the recent trends of conspicuous energy conservation. Like other products to be consumed, it is interesting to note how status and reputation linked with various signals of energy consumption changes over time and space. Hards findings on status and its relation to the visibility and active management of an individual's energy practices helps support that idea that social incentives can motivate costly proenvironmental behavior. Specifically, two key findings suggest: (1) making practices visible can reflect positively on the status of the practitioner, especially when those practices are normally inconspicuous, (2) consumers often seek to limit the visibility of their energy practices when they could have negative status connotations (Hards 2013, 440-450). Interestingly, Hards adds another dimension to the pursuit of status. As a certain reputation is sought out through signaling one's consumptive practices, the coinciding reputational stigmas or undesirable reputations are also avoided by signalers (Hards 2013).

Status and Pecuniary Costs. Sexton & Sexton (2014) also find that social incentives can influence altruistic proenvironmental behavior. Their work examined conspicuous vehicle purchases, focusing on the popular electric hybrid, the Toyota Prius. The Toyota Prius was the first popularized hybrid vehicle, recognizable by its distinct shape and signage, and has become the poster child for environmentally friendly single or multi- occupancy vehicles. It is interesting to note that a Prius is not necessarily ecologically friendly but that it has the image of being so. The data that Sexton & Sexton consolidate shows that consumers in Colorado and Washington

State are willing to pay up to several thousand dollars more in order to display their proenvironmental predilection through their vehicle choices (Sexton & Sexton 2014, 316). They also found that status-seeking by individuals acting in a proenvironmental way—conscious environmentalism in this case—can increase private provisions of environmental public goods that are only accessible to certain socioeconomic classes. This results in decreased equitable social welfare, making proenvironmental products less accessible to individuals in lower socioeconomic groups.

Cooperative Reputations. The following three case studies are focused on how socially incentivized proenvironmental behavior can benefit one's reputation in the form of symbolic capital. Macfarlan *et al.* (2013) looked at the interaction between cooperative behavior and reputation in the village of Bwa Mawego. Individuals in this village participate in a small-scale, highly visible form of labor exchange. The inhabitants of Bwa Mawego rely on cooperative relationships to distill bay oil, a highly intensive job that cannot be completed alone. If an individual had a better reputation for helping others, they had more cooperative partnerships. These cooperative reputations are built through an individual observing another participating in bay oil distillation. Mcfarlan *et al.* (2013) asked whether it was the number or the breadth of cooperative acts that predicted reputation. Through monitoring labour interactions and reported reputations of 53 men, their results suggested that an individual's prosocial reputation was built not through the breadth but through helping a greater number of other individuals. The larger their cooperative network built through cooperative behavior, the more reciprocated help an individual received because of their contextually better reputation. Increased labor assistance can result in an increase of resources for an individual and more access to resources can positively impact an individual's health and fitness. This is one case where a better prosocial reputation can

benefit an individual and can offer insight into how proenvironmental altruistic behavior can offer a beneficial reputational outcome.

Discussion

The goal of this paper is to identify theories and empirical examples that support the hypothesis that social incentives can motivate altruistic proenvironmental behavior. Costly signaling theory, conspicuous conservation, and the theories derived from them, offer an evolutionary explanation as to why humans partake in particular public behavior. Qualities being advertised can vary but all can be classified as social power or social capital, the ability to obtain and support access to fitness-affecting benefits in the form of goods and services originated by members of a social group independently or through various means of collaboration (Boone 1997, 5). These qualities can then be categorized as either the capacity to impose costs or the capacity to dispense benefits.

In terms of proenvironmental behavior, the social incentives motivating an individual to partake in displaying particular qualities manifest as either direct or indirect benefits of status or reputation. Status has been the primary focus as it is more commonly observed, quantifiable, and generalizable. Understanding how these benefits can act as motivators for proenvironmental behavior helps in gaining a better understanding of how to mitigate environmental destruction that has been caused in part by alternative human behavior. Continued research and syntheses of cross-disciplinary work helps grow this overall understanding.

Chapter 4

Research

Research Introduction

An opportunity for research lies in understanding how individuals who have grown up with popular concerns of ecological problems and climate change behave from an evolutionary perspective. If status through altruistic proenvironmental behavior was pursued by an individual's caretakers, how would that combined with environmental education, influence his/her proenvironmental behavior in regards to costly signaling theory and conspicuous conservation? Environmental education is heavily relied on by modern environmentalists to mitigate the ecological crisis. However, education without social incentives is not holistically effective in motivating individuals to act proenvironmentally and prosocially (Penn 2003). Leading to the question, can prosocial and proenvironmental practices participated in during the adolescent years of millennials promote more sustainable consumer behavior than environmentally and socially conscious education alone?

When the Brundtland Report was published in 1987, it helped propel issues and facts about climate change, rising greenhouse gasses, and depleted resources into the knowledge of the general public (Schubert and Lang 2005). As a result, millennials, defined as the generation born between 1983 and 2000, have been raised with the knowledge of environmental degradation and the fear of climate change (United States Census Bureau 2015). Growing up with these public concerns, millennials experienced policy, commerce, and social change. Because of this unique

enculturation, differing from previous generations, millennials have the potential to partake in different behavior and be influenced differently than individuals who have been studied in the past.

Based on conspicuous conservation as a form of costly signaling theory and research on environmental education as a motivation to behave sustainably, the hypothesis is that more sustainable practices in adolescent years combined with increased environmental education create a more sustainable consumer in social situations?

Research Objectives. The goal of the study was to see if an individual's adolescent practices and education interact and influence current decision making as it pertains to sustainability. When status is elicited, it is expected to see an increase in an individual's sustainability score as both a participant's sustainable practices score and proenvironmental education score increase. However, if an individual's scores show they have participated in minimal sustainability practices but received a high level of proenvironmental education, the prediction is that their overall sustainability score will not increase. This would indicate that proenvironmental education alone is not sufficient to motivate sustainable decision making.

Method

The methodology used for this study was modeled after the Griskevicius *et al.* (2010) study on conservation, status, and reputation. To limit suspicions, the words sustainability and status are excluded from both surveys. Lastly, Human Subjects Approval was obtained through a university Institutional Review Board and all practices are in compliance with regulations.

Participants. Seventy-nine individuals (seventeen males, sixty-two females) volunteered to participate in the study. All participants were enrolled in an undergraduate program in different colleges. Individuals were recruited from a large general education environmental

science course at a large public university and had the opportunity to receive course credit for participating. Each individual completed the study on their own time, through an online platform.

Design and Procedure.

Study 1. Two surveys were administered to each participant. The first study, completed first by each individual, was designed to observe how eliciting status motives affects an individual's product choice. Each individual read a short story simulating high social stakes and responded to three related questions, choosing between a more sustainable product versus a less sustainable, more luxurious product. This was repeated three times with a total of three stories and three response questions for each. Each story read consisted of approximately 150 words, following a model used by Griskevicius *et al.* (2010) to successfully elicit status motives. Lastly, in order to limit suspicions, students were told the study was on memory.

In the first and second stories, the purchasing or use of a product was done in the presence of an individual's peers. The first story, participants read about their current involvement in a class and their future participation in a semester long project. After being in class together for the first semester, individuals choose their group project partners off of how well they worked together last semester. The products individuals choose will be shared at an end of semester party and groups will be chosen after. This story was created to elicit status and cooperation motives. The second story, participants read about how they are on a coed soccer team and their team is doing well. The individual sees her teammate who works at a grocery store while purchasing food. This story is created to potentially elicit status and mate choice.

The third story was used to create a private consumer environment. This is done to create a private sustainability score to compare to public sustainable consumer behavior. Individuals read about their living situation and how they purchase personal items for their home. While they

live with roommates, common for the participants demographic, products are purchased and used only in the privacy and comfort of one's home. This story was created to observe consumptive behavior in a private situation where status and reputation are minimally implicated.

The products used in each response question offer a choice for the individual consumer. They may choose between a more luxurious unsustainable item or a less luxurious more sustainable item. An item is considered more luxurious if it takes less time, resources, or energy to purchase or consume. The items listed fall under the category of food or everyday food related products such as vegetables, dish soap, or coffee. For example, individuals had to choose between (A) packaged, pre-cut, conventional carrots or (B) unpackaged, organic, whole carrots. Choice A is considered more luxurious as it takes less time to prepare and consume but is considered less sustainable than choice B based off of the assumed life-cycle and ecological impact of the item. This was done for all nine response questions.

Based off of the nine response question that each individual answers, they are assigned an overall sustainability score. If the participant chooses the more sustainable product, they receive one point, if they choose the less sustainable product, they receive a zero. These points result in an individual's sustainability score, ranging from zero to nine, with a nine being the most sustainable. For continuity in comparing scores, the overall sustainability score is broken down from the nine point score and simplified on a final scale of one to three. For this variable, sustainability refers to an individual's decision to purchase a proenvironmental product with and without activating status motives and a score of three indicates that on average the participant chose the more sustainable product. These scores will be compared to results gathered from study 2.

A second set of sustainability scores was created from the first study from each story. The first two stories created separate public sustainability scores while the third story created a private sustainability score. The first two public scores are compared to the private score in order to see if eliciting status and reputation change the way an individual consumes resources.

Study 2. The second survey was administered after participants completed study one. This survey was designed to collect background information for each individual. First, individuals were asked basic information such as year in school, major, and gender to use as controls. Second, individuals were asked a series of questions to gauge the amount of sustainable practices they reported participating in during their adolescent years. Finally, they were asked another series of questions to gauge the level of environmental education each individual has received. These three categories of information will be used to create the variables that affect an individual's likelihood to partake in sustainable decision making.

Two separate scores are derived from the second study, based on an individual's sustainable practices and their environmental education background. To develop an adolescence sustainability practice score, nine questions were asked about an individual's caretakers practices, other activities they participated in like recycling or composting, and their current practices. Of these nine questions, four were chosen to represent an individual's sustainable practices. They were then given a score from zero to eighteen, eighteen being the most sustainable. To create an individuals education score, the four questions asked whether or not they received climate change or environmental education at each stage of their education, up to the time of the survey. For each of the four dichotomous question, if they answered yes to experiencing proenvironmental education, they received one point and zero points if they answered no. Scores ranged from zero to four, four being the most sustainable and were then

simplified to a dichotomous score of zero (e.g. minimal environmental education) and one (e.g. maximal environmental education). These two variables, with controls, will be used to understand overall sustainable practices by comparing them to the overall sustainability score generated from study 1.

Chapter 5

Results

Do adolescent sustainability practices, proenvironmental education, and gender of millennials affect an individual's sustainable behavior in social settings? All formal models assume that residuals are normally distributed and there is constant variance among residuals.

Sustainability Score and Gender. Are males or females more likely to participate in sustainable behavior in a public setting? Figure 1 depicts the sustainability scores of females compared to males. Females have a mean sustainability score of 2.15 and males have a mean sustainability score of 1.82. Females have a more positive relationship with the sustainability score than males do.

Sustainability Score and Practice Score. Do sustainability practices in adolescent years impact an individual's sustainability behavior? Figure 2 illustrates the positive relationship between a higher practice score and a higher sustainability score. Table 1 shows the results of the linear regression model. Every one unit increase in practice score leads to a 0.067 unit increase in sustainability score.

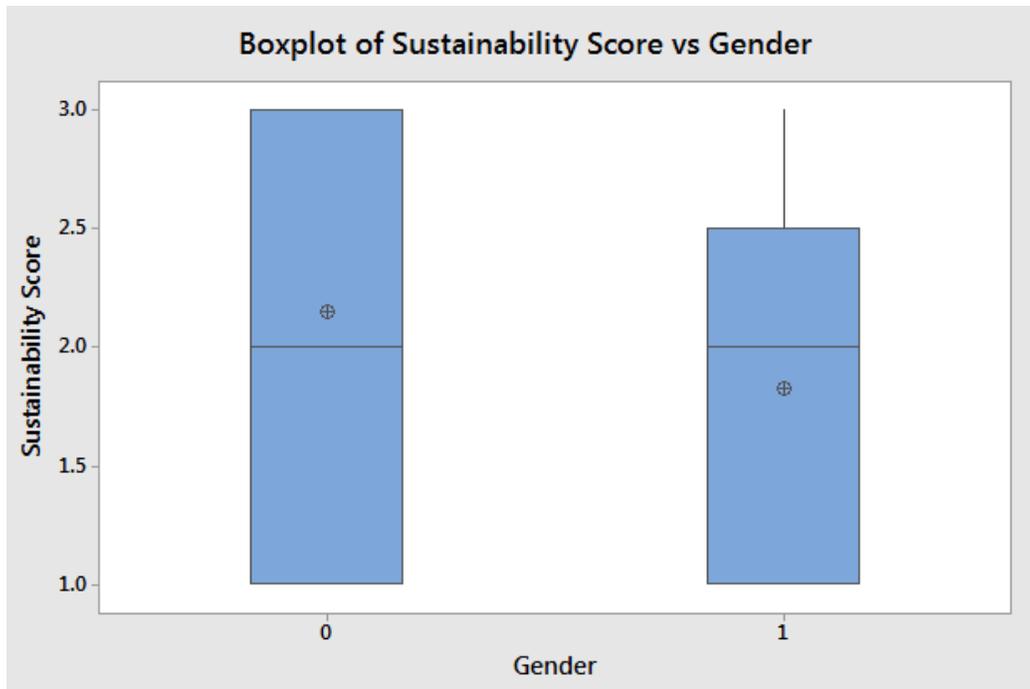


Figure 1. Boxplot of Sustainability Score vs Gender. A score of zero for gender represents females and a score of one represents males. The mean sustainability score is 2.15 for females and is 1.82 for males.

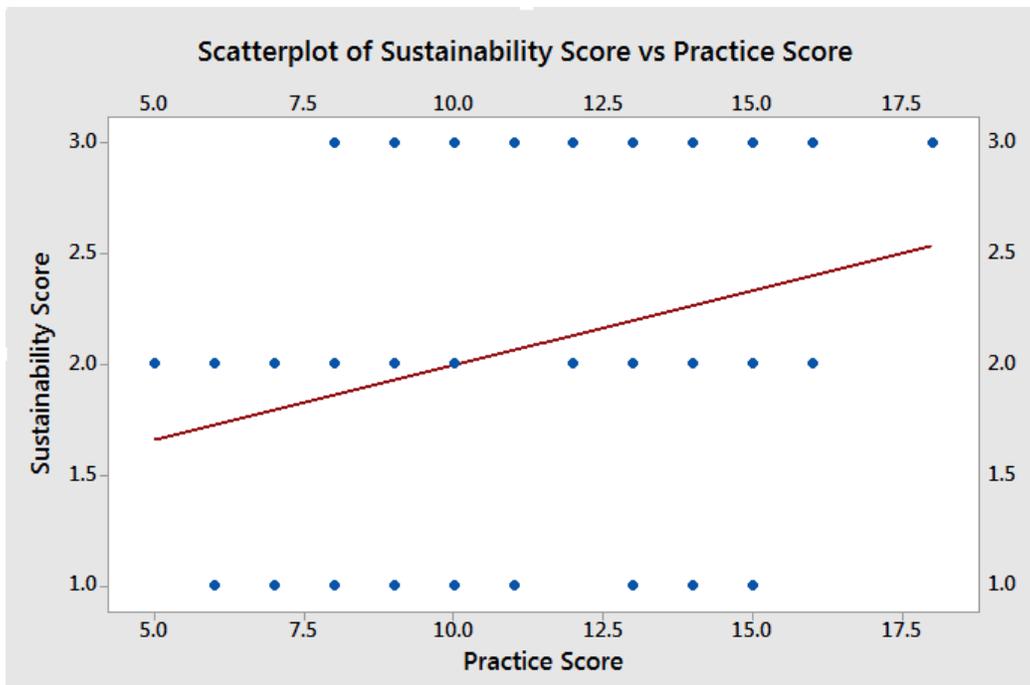


Figure 2. Scatterplot of Sustainability Score vs Practice Score. Circles represent individual's practice scores from one to eighteen and their sustainability score from one to three.

	Coef (\pm s.e.)	P-Value	R-Squared
practice score	0.067 (.03)	0.032	5.86%

Table 1. Linear Regression model explaining the relationship between sustainability score and practice score.

Sustainability Score and Education Score. Does proenvironmental education received in adolescent years increase an individual's sustainable behavior? As figure 3 depicts, the mean sustainability score of an individual with an education score of zero is 2.0. The mean sustainability score of an individual with an education score of one is 2.15. This shows a minimal increase of sustainable behavior as proenvironmental education increases. Table 2 displays the results for the linear regression model and confirms that there are no significant outcomes with a P-value of 0.416.

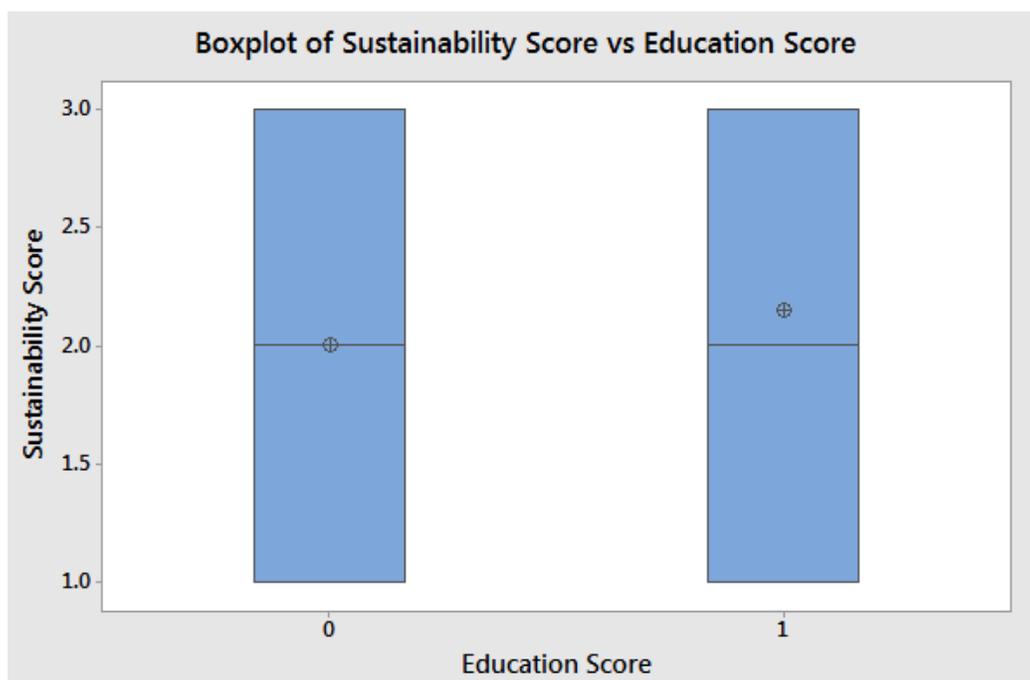


Figure 3. Boxplot of Sustainability Score vs Education Score. The y-axis shows an individual's sustainability score from one to three. On the x-axis, a one refers to an individual who has received proenvironmental education and a zero refers to an individual who has received minimal proenvironmental education. The mean sustainability score is 2.0 for an education score of 0 and 2.15 for an education score of 1.

	Coef (\pm s.e.)	P-Value	R-Squared
education score	0.15 (.18)	0.416	0.86%

Table 2. Linear Regression model explaining the relationship between sustainability score and education score.

Correlation between Practice and Education. Do higher combinations of practice and proenvironmental education scores result in higher sustainability scores? Table 3 depicts the interaction of practice and education through a linear regression model. With a P-value of 0.66, there is limited interaction between an increasing practice and education score. Notably, practice in relation to education no longer shows a significant outcome with a P-value of 0.25.

	Coef (\pm s.e.)	P-Value	R-Squared
practice score	0.05 (.04)	0.25	6.31%
education score	-0.24 (.73)	0.74	6.31%
practice*education	0.028 (.06)	0.66	6.31%

Table 3. Linear Regression model explaining the relationship between sustainability scores and the interaction of practice scores and education scores.

Public vs. Private Sustainability Score. Do consumer choices change when participated in publicly versus privately? For the first public sustainability score, the mean difference compared to the private sustainability score was 0.873 showing that there is almost a one point difference in scores. For the second sustainability score, the mean difference compared to the private sustainability score was 0.506. While not as significant as the first comparison, individuals were on average half a point higher for their sustainability score in public versus in private. For both comparisons, individuals chose more sustainable products in the public setting than in the private setting.

	N	Mean	StDev	SE Mean
public sust. score 1	79	1.380	1.004	0.113
public sust. score 2	79	1.759	0.866	0.097
private Sust. Score	79	0.873	1.102	0.124
public 1 vs. private difference	79	0.506	1.119	0.126
public 2 vs. private difference	79	0.886	1.261	0.142

Table 4. Paired T-Test of Public Sustainability Scores vs Private Sustainability Score.

Chapter 6

Discussion

These results show that there is a significant correlation between adolescent proenvironmental practices (i.e. recycling, composting, shopping with parents who buy locally and all naturally) and adult sustainable behavior in a social setting. This indicates that when status or reputation associated with proenvironmental behavior are perceived as benefits, whether consciously or subconsciously, an individual who participated in more proenvironmental behavior as a child is more likely to make proenvironmental decisions as an adult. However, an individual who received high amounts of proenvironmental education is no more likely to participate in sustainable behavior than an individual who received low amounts of proenvironmental education. Lastly, when the interaction between practice and education was analyzed, no significant outcomes were produced. This supports the original hypothesis that education alone is not sufficient in encouraging sustainable behavior.

One interesting outcome was the trend of gender influencing sustainable behavior. Females were on average more likely to participate in sustainable behavior than men. To better understand the differences in the way men and women behave sustainably, a larger sample would be needed with a more thorough understanding of the education and practice backgrounds for each individual to better understand these differences.

Limitations. This research project faced several limitations. One shortcoming in the collection of data was that many of the questions were subjective, resulting in the possibility for a decrease in continuity amongst responses. The remaining minor limitations are as follows: (1) a

lack of diversity in the sample, (2) suspicions in responses from recruiting within an environmental science course, and (3) limited control in response environments as each participant responded in their own time. All of these are factors to take into consideration when understanding data outcomes but is believed that they did not have significant impacts on final results.

Future Implications

The goal of this project is certainly not an attempt to discredit the benefits of proenvironmental education but to encourage the incorporation of practice opportunities that coincide with educational opportunities. Practices that can be supported by collective action, strategic altruism, social marketing, pecuniary incentives, and policy change. This support can come in the form of both punitive stimuli to comply with baseline proecological decision making as well as positive incentives to encourage continued integration and innovation of sustainable behavior into consumer lifestyles. These strategies with continued research and engagement can build the capacity of communities to mitigate environmental degradation and adapt with the global climate crisis.

Solving the Tragedy of the Commons. As Hardin introduced in 1968, a tragedy of the commons occurs when the users of a common pool resource system act on it independently, according to their own self interest, behaving in opposition to the common good of each user, and ultimately end up depleting that shared resource (Hardin 1968). The tragedy of the commons helps explain in part why ecological destruction has worsened as the global population grows. Competitive altruism as a runaway form of conspicuous conservation can help in solving the problem of shared resource depletion. The likelihood for competitive altruism increases as incentives to trust others arise (Barclay 2004, 217). Barclay (2004) postulates that the more

altruistic an individual is the more likely they are to attract the best or most cooperative partners or mates when future interactions are expected. When competitive altruism is motivated by an individual's self interest to build his/her status, reputation, or cooperative possibilities, competitive altruism acts as the incentive to positively contribute to common pool resources. More research is needed on what circumstances and conditions under which competitive altruism could incentivize conservation of the commons.

Generosity, sharing, and cooperation are cross-cultural occurrences of strategic altruism (Smith & Bliege Bird 2005). Costly signaling theory in the form of mutualistic altruism, but not mutually exclusive from reciprocity or coercion, can provide evolutionary insight as to why individuals positively contribute to common goods. Improved reputations, social status, and its consequent mating advantages could be the “selective incentive” that motivates certain individuals to contribute to collective goods (Smith & Bliege Bird 2005, 127). This collective action is one integral piece in combating wide scale tragedy of the commons and environmental degradation.

Strategic Marketing. Evolutionary approaches to understanding human behavior are increasingly influencing marketing (Griskevicius et al. 2012, 116). Evolutionary theory helps us understand why people act in ways that degrade the environment as well as why individuals act in ways that benefit the environment. In working with, rather than against evolutionary behavior, green marketing can be a positive platform for motivating consumers to act proecologically. In existing capitalist societies, in order for profit to be sustainable, marketing strategies that support and incentivize proecological products will need to be adopted. It is important to note that this is not the only change needed in environmentally destructive capitalist societies. If overconsumption of extravagant goods continues and products are deceitfully advertised as

environmentally friendly, this strategy could have the potential to do more harm than good. It does however have the possibility to incentivize proenvironmental choices amongst consumers.

Public Welfare and Policy. The Griskevicius *et al.* (2010) study suggested that the costs of proenvironmental products are important for incentivizing individuals to buy them. As the demand for certain proenvironmental products increases, this might reduce the pecuniary costs of those products, making proenvironmental available to more individuals, including those with fewer economic resources. If the cost of a proenvironmental item decreases, it could undermine an individual's ability to signal their wealth or prosociality (Griskevicius et al. 2010). If there is a shift to decrease costs of proenvironmental products, signaling benefits may no longer motivate individual choices. However, this is not to suggest green product prices should remain high and proenvironmental behavior inequitably distributed across economic classes. At the same time, it is important to highlight this potential shift so alternative evolutionary incentives can be applied to thinking about consumer choices.

As evolutionary theory can be used to better understand marketing strategies, it can also help policy makers to promote social welfare and equity (Zabkar & Hosta 2013). Penn (2013) elaborately highlights why it is important for policy makers to take into account evolutionary perspectives when implementing policy that could have ecological impacts. In implementing sustainable change, there are several platforms from which the evolutionary perspectives discussed in this paper can be beneficial. Sexton & Sexton (2014) suggest that “there may exist a role for policy to enhance the conspicuousness of private behaviors that bear on the stock and quality of environmental public goods” (316). This suggests that policy plays a major role in influence future consumer behavior that coincides with creating social equity.

Conclusion

Environmental degradation and global climate change are international problems that affect everyone. As concerns for these issues and their impacts collectively grow, it is important to consider the evolutionary behavior that can motivate the means in which individuals and communities make decisions. Costly signaling theory, conspicuous conservation, and their derivative theories can provide insight into how humans will respond. Specifically, this paper works to consolidate research conducted to test how humans behave when status is used as a social incentive. These findings can then be applied to understanding collective action movements, marketing strategies, and policy initiatives.

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