

THE SUSTAINABLE DEVELOPMENT GOALS AND BUSINESS STUDENTS'  
PREFERENCES: AN EXPLORATORY STUDY ON CHANGES PRE- AND POST-  
PANDEMIC

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## **Abstract**

### **THE SUSTAINABLE DEVELOPMENT GOALS AND BUSINESS STUDENT PREFERENCES: AN EXPLORATORY STUDY ON CHANGES PRE- AND POST- PANDEMIC**

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In 2015, the U.N. developed a resolution creating 17 Sustainable Development Goals (SDGs) with the objective to “stimulate” action towards capacity-building and resiliency. One of the best methods by which societies can gain support for SDG implementation is through higher education, as it represents a primary means by which individuals internalize societal norms, values, and beliefs. This is particularly true for higher education in the field of business, as organizations are intricately involved in resource extraction, supply chain management, and waste generation (amongst other sustainability challenges). The Covid-19 pandemic represents a punctuated equilibrium event, whose disruptions forced institutions and organizations within society to break from their evolutionary stasis, generating rapid adaptations and dynamic responses to ever changing conditions. This study explores pandemic effects on business student SDG preferences pre- and post-pandemic, examining which personal attitudes, values, and behaviors are related to the SDGs, what such preferences could indicate for the SDGs, and what, if any, influence the pandemic may have had on these factors. Survey method

was utilized, with a sample of 187 students, and a post-pandemic sample of 126 students. Results of a series of cluster analyses suggest a shift has occurred, most notably in SDG 1: No Poverty, and preferences for working in a green organization, green human resource management, with authoritarianism, individualism/collectivism, religiousness, religious importance, political ideology, and political affiliation.

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## **Introduction**

### **Background: The Covid-19 Pandemic**

Covid-19 is a zoonotic virus that emerged in late December 2019, having originated in Wuhan, China (He et al., 2020; Perlman, 2020). This new disease was determined to be a member of a diverse set of RNA viruses known as coronaviruses (CoV) which can cause an array of symptoms in humans and animals alike (Perlman, 2020). Though generally mild, two prior coronaviruses, MERS-CoV and SARS-CoV, caused epidemics, killing 334 and 800 people respectively (He et al., 2020). The so-called Covid-19 virus (officially SARS-CoV2) proved to be even more severe in nature as its unique spike protein, rapid mutation, and viral replication allowed for a high transmissibility rate that evaded most natural immunity (Yewdell, 2021). Within a matter of months, Covid-19 spread across the globe, developing into a pandemic situation that killed thousands by February 2020 alone, surpassing the death count of both precursor epidemic events combined (He et al., 2020). Now, nearly three years after its emergence, Covid-19 has claimed 6.5 million lives and still continues to strain medical systems and societies around the world (World Health Organization, 2022).

### **The Covid-19 Pandemic Understood Through Punctuated Equilibrium Models**

All RNA viruses are known for their spike proteins, rapid mutation, and high rate of viral replication (Yewdell, 2021). Even though Covid-19's spike protein is unique and differentiates it vastly from its predecessors, what allowed it to become so dangerous and prolific when other coronaviruses have not? In studying the RNA virus for Mouse Hepatitis Virus (MHV), Baric et al. predicted that the high mutation and genetic recombination ability of RNA viruses indicated, "a significant latent capacity to evolve rapidly in periods of environmental flux" (Baric et al., 1997, pp. 1946-1947). Supporting this prediction, the theory of punctuated equilibria postulated

by Stephen Jay Gould and Niles Eldredge explains that “well-adapted populations maintain relatively low evolution rates until environmental conditions change, resulting in dramatic shifts in natural selection and accelerating rates of evolution” (Baric et al., 1997, p. 1946). In other words, populations will remain in a period of evolutionary stasis experiencing only minor, incremental change, until disruptions in the population’s environment trigger an adaptation opportunity in which some, or all, of the population is able to break through the equilibria with continuous evolutionary events (Gould & Eldredge, 1972).

While Gould and Eldredge’s theory of Punctuated Equilibria was initially applied to studies in the biological evolution of primates (1972), the theory can also be applied to a number of other fields of study including that of the humanities. Logically, regardless of study field, without the need for change, the status quo operates as the efficient situation for any subject, as it delivers the optimum level of needs to a given population. Thus, this status quo would exist in periods of stasis noted by incremental changes until an event triggers the necessity of adaptation for survival because the situation no longer suffices (Jones & Baumgartner, 2012). For instance, governance institutions have observed long periods of stability that are then forced into punctuated periods of instability when the status quo no longer suffices as a containment measure for the demands of society (Jones & Baumgartner, 2012). Here, “dramatic shifts in natural selection” would refer to shifts in policies that no longer meet the society’s needs, and “accelerating rates of adaptation” (Baric et al., 1997, pp. 1946-1947) could present itself as a new political party or economic model, a major shift in political party control or values, or at the extreme, a revolutionary response (Baumgartner & Jones, 2002). This is the same conceptual basis for the application of the punctuated equilibrium model in organizational transformation. Just like in the fields of biology and political science, the punctuated equilibrium can be seen in

organizations going through rapid, fundamental changes after periods of general stasis. Furthermore, these fundamental changes affected every level of the organization, and were generally witnessed after an extreme environmental change such as a CEO succession (Romanelli & Tushman, 1994).

### **The Potential Implications for Sustainability, Society, and Institutions and Organizations**

Presently, climate change threatens to put many environments around the globe into a state of flux as they are forced to confront dramatic changes caused by more extreme weather events, ecological constraints, and habitat loss and destruction all of which are occurring at faster rates than previously predicted (Intergovernmental Panel on Climate Change [IPCC], 2013). As previously explored, the Covid-19 pandemic evolved biologically as a punctuated equilibrium event and disrupted nearly every aspect of life (Baric et al., 1997; Gould & Eldredge, 1972; He et al., 2020; Yewell, 2021). It has been suggested that environmental and climatic fluctuations, such as those caused by the climate crisis, are associated with the ability of zoonotic diseases, such as that of the RNA virus known as Covid-19, to evolve, allowing for the sudden jumps between vectors and hosts (Burroughs, 2002; Estrada-Peña et al., 2014). Increasing human populations and activities coupled with the changing climate and environmental characteristics have disrupted normal human and host species interactions through increased decreased biological diversity and increased contact rates (Estrada-Peña et al., 2014). Loss of biological diversity can lead to fewer interspecies interactions which normally act as natural stop-gap measures to prevent the spread of disease. Instead, intraspecies interactions can increase, leading to more pathogen spread. This has the potential to increase pathogen burdens in hosts and change in pathogen lifecycle developments, further increasing the possibility of pathogen mutation (Burroughs, 2002; Estrada-Peña et al., 2014). Increased human populations and migration

patterns have led to increased human and animal interactions though, which has led to the potential for mutated pathogens to “jump” species, infecting new host types as a means of survival (Estrada-Peña et al., 2014). Though the direct pathogen development path for Covid-19 is still undergoing exploration, it did take advantage of a fluctuating environment to come out of a biological stasis and develop into the pandemic that society still experiences to this day (Baric et al., 1997; Gould & Eldredge, 1972; He et al., 2020; Yewell, 2021). Because the effects of climate change include a rapidly changing environment constituting habitat loss, climatic extremes, landscape change, decreased biological diversity, and increased human migration rates, and these are also the factors from which punctuated equilibrium disease type events emerge, it is assumed for this study that climate change was a major factor in the emergence of the Covid-19 pandemic.

The punctuated equilibrium event of Covid-19 is a rapidly evolving biological situation that could have spill-over effects into human institutions and organizations. This has the potential to then cause flux in the social environmental landscape, generating punctuated equilibrium events in this space too, as society learns to adapt to new ways of life. How can we expect individuals to respond to such events? Are the responses indicative of short-term or long-term behavioral and value changes? If punctuated equilibrium events have effects on societal behaviors and values, how do institutions and organizations adapt to these new needs while continuing to address long-standing goals? How do we teach future generations how to navigate a current crisis while preparing them to manage in the face of future uncertainty? Understanding the answers to these questions helps to inform societies about how to successfully adapt to changing needs through responsive individuals, governance institutions, and organizational structures. With the pandemic still on-going, the total effects of Covid-19 on society have yet to

be determined. However, early studies suggest that these disruptions have sparked changes not just institutionally or organizationally, but also inherently within individuals, affecting both their behavior and their value structures. What other changes will occur as a result?

Given that climate change presents pressing challenges that will continue to create adaptation and mitigation necessities in every aspect of life, sustainability should be at the forefront of considerations for any society. However, sustainability inherently implies maintaining stasis and stability within environments. Thus, ironically, while sustainability is necessary to address the effects of climate change, it is inherently the antithesis to a punctuated equilibrium event. Perhaps, if it had been addressed properly prior to the onset of the Covid-19 pandemic, the environmental flux that allowed the coronavirus to mutate into the monster that it did may not have occurred (Stampa et al., 2020). Therefore, sustainability is necessary to avoid events such as these in the future. Additionally, how we handle the disruptions and potential behavioral and value changes from the Covid-19 pandemic to get back to a potential stasis will hold implications for policy, society, and organizational philosophy, and thus in educating future members of society on mitigation and adaptation methods and the importance of sustainability in general. As explored by Romanelli & Tushman (1994), punctuated equilibrium modeling can be used to “predict patterns” of “fundamental... transformation.” If addressed correctly, attitude and behavioral shifts caused by Covid-19 can be used to navigate the complexities of punctuated equilibrium events in order to persevere with long-term goals and solutions in the face of issues such as climate change.

## **Historical Examples of Value and Behavioral Shifts Following a Disease-related Punctuated Equilibrium Event**

These theories of punctuated equilibrium have been conceptualized in major disease events throughout history, being tested both biologically and socially. For instance, the Black Death pandemic of the fourteenth century was brought about after a period of rapid population growth in Europe. This era of growth was so pronounced that Europe outgrew both its housing and food generation capacity. In addition, there was very little in the way of sanitation or adequate healthcare (Hays, 2005). Large numbers of people were living in close proximity without proper nutrition, healthcare, or the ability to properly remove or dispose of their wastes (Hays, 2005). This population growth was a notable flux in a previously steady environment which opened the door for both a biological and social evolution. Applying the punctuated equilibrium model, this environmental shift could be thought to be the catalyst that enabled the Black Death microorganism, the societies of which it plagued, and even the individuals within those societies to come out of evolutionary stasis, as they were forced into dramatic and continual adaptations for survival.

These forced adaptations from the Black Death pandemic can be seen through the effects that rippled throughout the population globally. This is particularly true for Western Europe. Prior to the onset of the Black Death, wages were depressed, prices were high, and people were starving. Landlords lacked the incentive to change since their supply of labor and the consumption of their goods was stable (Hays, 2005). However, the Black Death microorganism caused a mass die-off event and landlords and employers found themselves with a sudden and dramatic shift in the market to which they were forced to respond by lowering prices, increasing wages, and increasing their production efficiencies. In fact, the period following the Black Death

was marked by improved laborer conditions (to the point that it practically ended serfdom), a larger variety in available products, and “a remarkable period of technological innovation” (Hays, 2005, p.49). Additionally, this decline in landlord and employer influence coincided with a redistribution of power. At the time, power was generally controlled by those with land, but an increased laborer position post-pandemic depressed the economic control wielded by those in authority, forcing governments to diversify their income streams. The church’s influence was also somewhat weakened due to a loss of their clerics to the plague, a lack of training for the clerics’ replacements, and a loss of income that they too had been generating from land ownership (Hays, 2005).

With the social and political dynamics of society in upheaval following the Black Death, it can be generally assumed that societal value patterns could have also experienced a fluctuation from their previous environment. For instance, despite the decrease in the church’s overall influence and authority, there was a noted increase in religiosity during this time (Hays, 2005). Since it is commonly thought that people derive feelings of security and certainty from religion (Jost et al., 2014; Saroglou, 2002), it can be reasonably assumed that piety would increase during a period of great uncertainty (Wichman, 2020).

Furthermore, religiosity and authoritarian values are positively correlated, with authoritarianism referring to the preference for “social conformity over individual autonomy” (Federico et al., 2021, p. 1436). Therefore, the noted shift in piety could have generated a shift in authoritarian values. In fact, it has been suggested that authoritarianism is antecedent to religiosity (Federico et al., 2021). Thus, higher levels of religiosity would generally indicate higher authoritarianism. Since religiosity increased during the period of the Black Death, it could be reasonably assumed there may also have been an increase in authoritarian values during this

time as well. However, as previously discussed, there was a decrease in authority power during this time due to the ineffectuality of leaders in protecting their people from the fall-out of the plague, both economically and in health (Hays, 2005). This decrease in authority power but potential increase in authoritarianism may be explained by the idea that authoritarian values are not entirely synonymous with trust in authority. If authoritarians do not perceive the authority in power to be legitimate, those with authoritarian values could turn against those in power believing that they are “undermining the original, established authority” (Altemeyer, 1996, p.219). This makes sense when considering that authoritarianism refers to the concept of social conformity. This would indicate a preference for “in-group authority” while demonstrating “hostility towards those who threaten relevant forms of normative order” (Federico et al., 2021, p. 1437). It is possible that those who held power positions in society at the time of the Black Death were considered “out-group” members due to their inability to provide stability or a normative order, or simply, because they were not experiencing the plague at the same rates as their subjects. Present day studies have highlighted that pre-existing issues within governance structures only become intensified with disaster-type events and often cause people to turn away from authority (Amri & Drummond, 2020). So, while there was a decrease in trust in authority powers noted during this time, it is entirely possible that authoritarian values may still have increased with the documented increase in piety.

Studies specific to authoritarianism increases caused by the Black Plague are difficult to find due to limited data on the subject. However, increases in religiosity are not the only indicator that authoritarianism could have increased during this time. There was also social turmoil that erupted in the 14<sup>th</sup> century from attempts to root out the sinners who caused the Black Death (Hays, 2005). Notably, the Catholic Church blamed those practicing Judaism for the



cause of the Black Death, leading those of the Christian faith to avoid Jewish people altogether, even refusing to bury the Jewish dead (Banerjee et al., 2020). This “othering” of those who are perceived to be threats to the social order is common amongst those who espouse authoritarian values (Altemeyer, 1996; Federico et al., 2021; Passini, 2017).

The behavioral trends of increased religiosity and authoritarianism could also be seen in the cholera outbreaks of the 19<sup>th</sup> century, stemming from similar perceptions caused by fear. Though cholera never achieved a pandemic level status, as an epidemic, its mortality rates neared that of the Black Death’s as it proved fatal to nearly half of its victims (Hays, 2005). As the theory of Terror Management postulates, when people are confronted with high rates of mortality, there is a “potential for overwhelming terror” (Rosenblatt et al., 1989, p. 682). It is thought that this could be particularly true for societies that have typically enjoyed lower mortality rates due to a disconnect with “mortality salience” and extreme pressures for survival (Evers et al., 2021). Being confronted with sudden bouts of mortality then brings a terror that is then processed through the feeling of being threatened by those who are perceived to be acting outside of societal norms. Thus, fear generates in-groups of those abiding by the “correct” norms, the norms that keep them safe and out of harm’s way, and out-groups of those who are causing the disruption to security (Feldman & Stenner, 1997).

Indeed, the speed and severity of the cholera symptom onset and subsequent deaths served to raise considerable fear amongst the affected populations in Europe (Hays, 2005). Adding to the general fear was the inability for scientists to determine the root cause of the disease. The number of scientific achievements developed in the field of medicine during 19<sup>th</sup> century had led people to believe that cures were available for almost every ailment (Hays, 2005). So how was it possible that cholera’s contagiousness had escaped scientific explanation?

The violence of the outbreaks coupled with the inability to diagnosis the cause led to the belief that the cause of cholera was spread by levels of religiosity and morality. Some theorists of the era such as Lemuel Shattuck concluded that cholera was a punishment for deviating from moral obligations that could only be avoided through piety (Hays, 2005). This led to people limiting their interactions with those less pious than themselves. Since immorality was associated with the sin of laziness or personal failure at this time, this led many to believe the poverty-stricken were to blame. Other theorists such as bolstered this belief with their conclusions that cholera was a disease of the poor and the dirty (Hays, 2005).

The intolerance of those who were not upholding the virtues of society through cleanliness increased throughout the outbreaks leading to a wave of xenophobia. As cholera was endemic to India, many in European communities began to view Indian culture as unclean and thus a threat to their own health. British officials in India began cracking down on Indian cultural practices, turning the Indian people into scapegoats so that the British government may continue their practice global economic practices unimpeded by the need to quarantine or provide better sanitation systems (Hays, 2005). This dogmatic intolerance stemming from extreme anxiety of threat from those not upholding the virtues of society has been a noted association with authoritarianism in society (Rokeach, 1960; Wilson, 1973).

The creation of in-groups and out-groups due to perceived social threat was also seen in the Spanish Flu of the early 20<sup>th</sup> century which could also indicate an increase in authoritarian values following that pandemic. However, studies have identified another social attitude shift and behavioral change stemming from this pandemic. Here, a notable decline in social trust was measured in Spanish Flu survivors as well as in their descendants (Aassve et al., 2021). Societies with low social trust have been correlated with higher levels of collectivism, lower economic

well-being, fewer democratic governance structures, and more reliance on secondary government support (Allik & Realo 2004; Berigan & Irwin 2011; Gheorghiu et al., 2009; Realo et al., 2008). Just like increases in authoritarian values, this shift in attitude is noted by increases in risk aversion and compliance with social norms (Zhu et al., 2020). Not only does this follow the general trends seen in the Black Death pandemic and the cholera outbreaks, this is also in line with an expanded Theory of Social Change, Cultural Evolution, and Human Development by Greenfield (2009) which predicts that “during a period of increasing survival threat and decreasing prosperity, humans will shift toward the psychology and behavior typical of the small-scale, collectivistic, and rural subsistence ecologies” (Evers et al., 2021 p. 108).

The decrease in social trust and increased out-group “othering” due to heightened fear is common amongst the modern disease-type events. As stated by Banerjee and colleagues (2020), “hate mongering has always been the inevitable accompaniment of a biological disaster” (p. 104). For instance, the anthrax attacks of 2001 generated a high level of confusion and uncertainty that led many to be unsure about their exposure risk. Many believed the government to be mitigating panic through downplaying the severity of the attacks, leading to a general distrust of others. The Ebola epidemic of 2014 suffered much of the same distrust but was also noted by xenophobic attitudes towards those from the African nations. Following these events and the SARS-CoV1 epidemic, the MERS outbreak in 2015 was then noted by those in the Middle East becoming risk averse, avoiding public spaces altogether (Esterwood & Saheed, 2020).

While there are not enough pandemic events in history to determine causal relationships between the disease event and the exact shifts in behavior and values, higher religiosity, authoritarianism, and collectivism values emerging post-pandemic can be expected from these

historic correlations. Thus, if the Covid-19 pandemic follows the general trends from its disease-type punctuated equilibrium predecessors, current societies can expect changes in societal attitudes and behaviors. This shift in societal attitudes could be considered another example of the punctuated equilibrium model as a change in the environment facilitated an adaptation opportunity in behaviors and attitudes necessary for survival.

### **How Does the Covid-19 Pandemic Fit the Punctuated Equilibrium Model?**

Just like its historical counterparts, Covid-19 meets not just the biological evolution side of the Punctuated Equilibrium Model by rapidly evolving to changes in a fluctuating environment (Baric et al., 1997), but that too of the humanities (Romanelli & Tushman, 1994). The ongoing pandemic situation has caused disruptions in nearly every aspect of life, triggering mass adaptation events in individuals, societies, organizations, and governance institutions. As noted by Salon et al., “Disruptions in our lives present opportunities to learn and practice new ways of doing things and to reevaluate old choices and habits. The COVID-19 pandemic has been perhaps the largest disruption event in modern human history. Nearly every human on the planet has been forced to modify their habits to adjust to the pandemic, creating an opportunity for long-term change” (2021, Abstract). In other words, a disruption in our environment caused a major shift away from the status quo in society, forcing the population to adapt and evolve to a new “normal”. This environmental disruption and subsequent, evolutionary adaptation in way of life meets the conceptual basis for the punctuated equilibrium model in every field of study.

### **The Covid-19 Pandemic’s Significance and Impact on the World**

Already, the Covid-19 pandemic is demonstrating patterns of market disruption similar to its disease-event predecessors, rapidly shifting the economic landscape of many countries. For instance, it was discovered that the loss from the worldwide tourism industry alone was ten times

that of the loss experienced during the 2008 recession (Altuntas & Gok, 2021). This estimate was worse for developing nations where estimates of tourist arrivals were diminished by 60% - 90% (Altuntas & Gok, 2021). Indonesia was one such country where it was predicted that they would suffer a 30%-50% GDP loss from their transportation and tourism sectors alone (Malahayati et al., 2021). It was thought that the agricultural sector could provide a buffer system to this economic loss by absorbing the otherwise unemployed. However, the worldwide agricultural sector did not escape the negative repercussions of Covid-19 either. An example response to this could also be seen in the Indonesian agricultural sector where, just like in the Black Death plague, the Malahayati et al., (2021) modeling predicted a major land use change resulting from the pandemic as farmers would need to change their crops as they adapted to changes in demand, input and labor availability (Hays, 2005). Additionally, the preventative measures and labor shortages affected the worldwide supply chain, causing disruptions in nearly every country. This impaired production capabilities on both ends, affecting farmers' abilities to get necessary inputs as well as deliver outputs to their customers (Poudel et al., 2020). In fact, the United Nations World Food Programme (WFP) estimated that 130 million people would face food scarcity issues by the end of 2020 due to the extent of the supply chain shortages and agricultural disruption. This doubled the pre-pandemic estimate of the same measure (United Nations World Food Programme, 2020). The supply chain disruptions did not just affect the agricultural sector though. Production capability was hindered in every other sector as well. Without government assistance, it was expected that about a third of business would cease operations if the preventative measures such as shutdowns continued to affect the supply chain (Altuntas & Gok 2021). Due to the decreased productivity, the United Nations Conference on Trade and Development (UNCTAD) predicted that there would be a 5%-15% decrease in worldwide

foreign direct investment, greatly affecting the service and manufacturing sectors (United Nations Conference on Trade and Development, 2020). A loss of foreign direct investment decreases economic growth, further depressing the employment sector and disposable income levels of a society.

Operationally, organizations were forced into punctuated equilibrium events in their structure to adapt to the demands of the Covid-19 pandemic on their workforce and their industries. Normal work routines became a thing of the past as the workforce was labeled into categories such as “frontline” or “essential” versus “non-essential” (Kniffin et al., 2021). As with most economic downturns, this led to cost-cutting where some of the workers who were originally laid-off or deemed “non-essential” were let go permanently (Kniffin et al., 2021). Prior work has shown that this decreases employee morale and leads to a decrease in company loyalty (Trevor & Nyberg, 2008). Furthermore, this has been proven to erode company culture, leading to competition and acidity amongst the surviving workforce (Sirola & Pitesa, 2007). To keep the company operating smoothly, mental health became a necessary condition for managers to consider in terms of their workforce. Routine social interactions that seemed menial were suddenly proven to be invaluable after the onset of the Covid-19 pandemic. For instance, handshakes are a simple but necessary human contact point for many people and the lack of them generated lost social connections (Kniffin et al., 2021; Schroeder et al., 2019). Additionally, the pandemic exacerbated the speed at which firms transitioned to remote work, drastically changing management operations (Kniffin et al., 2021). This also led to a decrease in overall workforce morale as work from home limited informal coworker chats and isolated people in their homes, leading to increased feelings of loneliness (Kniffin et al., 2021). Studies on virtual meetings have shown that they lack in “communication richness” and are problematic for coordination and

conflict reasons (Kniffin et al., 2021; Martins et al., 2004; Mortensen & Hinds, 2001). Experts have predicted that the work-life-balance under which industrialized countries have operated for the past century will need to be reconsidered going forward (Grossmann et al., 2022).

### **The Impact of the Covid-19 Pandemic on Individuals Through Observed Changes in Attitudes or Values**

With such an upheaval witnessed in the institutional side of social environments, there are more than likely associated value, attitude, and behavioral shifts to be witnessed amongst the individuals in society as well. Indeed, studying the various pandemics of the past led Banerjee and colleagues (2020) to conclude that these value changes are more important and longer lasting than any other effect experienced throughout the duration of the disease on markets and governance structures. Thus, studying these potential changes and their resultant effects will be invaluable for societies everywhere. However, the exact effects on behavior are still unknown to the global community as the pandemic is still unfolding. This was the conclusion of a worldwide, expert panel in 2020, through a study known as “the World After Covid Project” (Grossmann et al., 2022). This project found very little agreement for exact predictions of societal change across the surveyed group of experts (Grossmann et al., 2022). However, the study did determine five cohesive themes of predictions in the experts’ responses. Negatively, experts echoed themes witnessed in past disease related punctuated equilibrium events by naming increases in intolerance of others and political conflict as probable effects of the Covid-19 pandemic. However, positively, these experts identified greater societal solidarity and “appreciation for social connectedness”. Furthermore, they agreed that both positive behavior shifts could allow opportunities for structural changes in governance institutions to emerge (Grossmann et al., 2022).

The negative predictions have been supported by early, emerging trends, confirming the opinions resulting from the Grossmann et al. (2022) study and converging with the themes experienced in historical disease type punctuated equilibrium events. As discussed previously, Banerjee et al., (2020) states, “hate mongering has always been the inevitable accompaniment of a biological disaster” (p.102), and indeed, the intolerance towards others has seemingly increased, or at least become more openly and coherently developed to target specific groups within the society currently experiencing the Covid-19 pandemic. Just as the Catholic Church offered those of the Jewish faith as the scapegoat of the Black Death Plague in the 14<sup>th</sup> century, conservative political pundits began to stigmatize those of Asian descent as perpetrators of the Covid-19 pandemic. Though the World Health Organization has specific disease naming procedures to avoid prejudicial or stigmatizing nomenclatures, Covid-19 still came to be known colloquially amongst certain portions of the American public as the “Wuhan Virus,” “Chinese Flu,” or “Kung Flu” (Reny & Baretto, 2022). Furthermore, misinformed reports surfaced that accused China chiefly of manufacturing the virus in a lab and then secondly of purposefully leaking the virus as a bioweapon (Banerjee et al., 2020). This led to an intolerant “othering” of those perceived to be of Asian descent and led to a decrease in consumption of Chinese food and other goods (Banerjee et al., 2020). Anti-Asian crime rates rose too with an increase of Asian-Americans reporting instances of being attacked both verbally and physically due to their race (Reny & Baretto, 2022). The xenophobia was quickly extended to include any migrant population, however, with politicians from so-called western nations calling for halts in immigration as the migrants could be “carrying and spreading” Covid-19 (Banerjee et al., 2020). This is, of course, very reminiscent of the sentiment recorded during the cholera outbreaks as well (Hays, 2005). Just like in the time of cholera too, the perception that the poor are disease-



ridden and to be avoided at all costs has also been exacerbated with societies like that of India's experiencing an increase in social class "othering" and disharmony (Banerjee et al., 2020).

Prior work on "othering" as a result of a pandemic behavioral response has led to ambiguous results. Until the outbreak of Covid-19, it was difficult to say with certainty that out-group "othering" was truly caused by the emergence of the disease, or instead simply by a behavioral immune system that presents as xenophobic attitudes. For instance, Zhu et al., (2020) explored the idea that the behavioral immune system led some members of society to increase their risk aversion and adopt more collectivist tendencies such as obedience and conformity to norms. Some experts believe that these tendencies demonstrate an increase of both authoritarianism and collectivism as a result of disease type punctuated equilibrium events (Fincher et al., 2008; Murray et al., 2013). Indeed, as previously explored, an increase in intolerance of others is symptomatic of an increase in authoritarianism and a decrease in social trust which could be indicative of more collectivism in a society as well. Zhu et al., (2020) explored that these behavioral responses may instead be due to elements of the Parasite Stress Theory that states out-groups develop instead as an evolutionary response mechanism to diseases whereby those outside the social norm may present a biological threat to adaptation possibilities. While it could be that a deeper, more biological response is responsible for the out-group "othering" experienced during pandemics, the exploration of that explanation is not supported by the data that Reny & Baretto (2022) analyzed for their separate study. In fact, they determined that there was a direct link to Anti-Asian xenophobia and subsequent emotional and behavioral responses emerging from the framing of the Covid-19 as being Chinese in origin by political elites (Reny & Baretto, 2022). Another study conducted in the United Kingdom and Ireland found similar results in which an increase of fear and perceived crisis was positively correlated

with an increase nationalism and anti-immigrant sentiment (Hartman et al., 2020). While the intolerance being experienced in the Covid-19 pandemic may be indicative of something more biological, or simply as pre-existing xenophobia being brought out by fear, historical records suggest that this most recent disease-type punctuated equilibrium event is once again developing similar trends in its effects on society. Indeed, Banerjee and colleagues (2020) fear that the stigmatization and discrimination that is currently developing in our society due to the onset of the current pandemic could outlast the Covid-19 virus “by years.”

Thus, it is a very real possibility that if the current pandemic does follow the historical trends, and the currently emerging patterns of intolerance are symptomatic of Covid-19’s effect on society, a relevant assumption could be made that societies will see an increase in both authoritarianism and collectivism following this punctuated equilibrium event. Research shows that though authoritarianism is developed through socialization processes that take place in the early years of an individual’s life, there are certain events that may trigger its level of apparentness in an individual’s behavior, thus bringing an individual out of behaviorally evolutionary stasis and forcing an adaptation. Generally, these triggering events requiring adaptation are characterized by fear, threat, risk-perception, and uncertainty (Hartman et al., 2021). This is due to the idea that perceived threats translate to feelings of limited control and that subjection to social norms and conformity provide feelings of control (Deason & Dunn, 2022; Manzi et al., 2015). Supporting this hypothesis that the Covid-19 pandemic has led to an emergent increase in authoritarianism as a behavior is the study conducted by Hartman et al. (2021). After extensively reviewing literature regarding causes of increasing authoritarianism attitudes, this study explored the idea that the perception of threat and the resultant existential crisis generated by the Covid-19 pandemic would further result in an increase in authoritarianism

values (Hartman et al., 2021). Through data collected from the Republic of Ireland and the United Kingdom, they found a statistically significant, positive correlation to Covid-19 threat generated anxiety and authoritarianism (Hartman et al., 2021). Hartman and colleagues also concluded that this relationship was more than likely demonstrated through a visible rise in both nationalism and anti-immigration in the United Kingdom. A similar study from Deason and Dunn (2022) conducted on samples from the United States and Poland confirmed the same results: there has been a noted rise in authoritarianism, and it is due to the Covid-19 pandemic.

Though slightly different than authoritarianism, collectivism is a behavioral characteristic that is also defined by social conformity and normative rules for a given society. It has long been known that collectivist societies do tend to mitigate disease related threats since these societies tend to be more insular, keeping their in-groups in and their out-groups out (Reny & Barreto, 2022). The way these cultural tendencies have been affected by the Covid-19 pandemic are not as well explored in existing literature as that of the authoritarianism indicators. However, assumptions of these effects may be hypothesized based on the known relationship between authoritarianism and collectivism as well as the relationship collectivism indicators have with adaptation to pathogens. This can be theoretically explored through the idea that societies evolve just as a species would biologically; when something threatens an organism's existence, it needs to respond through adaptation or face the threat of extinction. Here is where the old adage, *only the strong survive*, applies. Individualist societies are correlated with higher pathogen prevalence and were demonstrated through the example of the Covid-19 pandemic to be less capable of managing their disease-responses compared to their collectivist counterparts (Fincher et al., 2008). Research has already demonstrated a correlation with risk-perception and an increasing preference for cohesion and conformity to norms as a means to mitigate perceived lack of control

and existential threats (Deason & Dunn, 2022; Hartman et al., 2021; Manzi et al., 2015). These are factors that are also indicative of increasing levels of collectivism as well. In fact, authoritarianism and collectivism are generally positively correlated (Deason & Dunn, 2022; Hartman et al., 2021; Manzi et al., 2015). Thus, just based on the research that authoritarianism will see a rise following the Covid-19 pandemic, it can also be assumed with relative authority that collectivism will also see a rise. However, if society is viewed as an organism, and the research that individualist societies do not mitigate or adapt to disease-type events as well as their collectivist counterparts holds true, it is also logical to assume that collectivism will rise in the post-Covid-19 era as individualism was proven to be a maladaptive element in those societies (Fincher et al., 2008). Indeed, what is apparent thus far in society is that the Covid-19 pandemic changed many of attitudes and beliefs into “moral imperatives,” thus allowing for easier creation of “out-groups.” Just as in the Black Death or cholera, those who do not hold the same beliefs and values are morally corrupt and therefore not to be associated with for they may increase the spread of disease (Hays, 2005). Higher rates of mortality salience along with internalized convictions about responsibilities and rights during the pandemic led people to entrench themselves in their beliefs, for better or worse. This view of value systems as moral imperatives may have consequences for society as time progresses into the future, towards the “new normal” (Weder et al., 2022).

Historical records and the bulk of literature primarily focus on the potential for reactive behavioral responses that increase social tensions and decrease harmony amongst the variety of groups within the global community. However, the social and behavioral experts interviewed through the Grossmann et al. (2022) study did indicate a few positives that could be emerge as adaptations to a new version of “normal” in society as well. While increased intolerance is

generally associated with increased social conformity and out-group “othering” common in both authoritarianism and collectivism, both attitudes also reflect a desire for social cohesion, solidarity, and unity (Deason & Dunn, 2022; Hartman et al., 2021; Manzi et al., 2015). Additionally, willingness to conform to authority and social normative standards may allow for governance structures to change adaptively and be deployed more successfully due to an increase in societal acceptance and support mechanisms (Grossmann et al., 2022). The Covid-19 pandemic did highlight gaps of inequities in our societies, and emergency response efforts were often lackluster in application, leading many to be demonstrably dissatisfied with the current state of affairs in their respective countries (Arora, 2020). Disruption does lead to innovative new approaches, and Covid-19 has invariable led to disruptions in every aspect of society. Thus, an opportunity is present globally for governance structures and organizations to make the disruptive changes necessary to meet social standards and address the present societal equity gaps while attitudes and behaviors could be trending in their favor.

The aforementioned trends have been explored through studies conducted on adult populations and it is important to note that the consequences of the effects of the Covid-19 pandemic on adolescents may be altogether different as they are still in the developmental stages of maturation. Therefore, it is critically important to also understand how the younger generations will react behaviorally since they will one day inherit the social systems through which we currently operate. Historical records of other disease type punctuated equilibrium events do not generally discuss the effects of the pandemics on the younger members of society. However, Aassve et al. (2021) did conclude that the decline in social trust developed by those who experienced the Spanish Flu was also witnessed in their descendants. So far, this trend has been evidenced in decreased institutional trust and cultural connections made in higher education

(Calderone & Fosnacht, 2022). The generation of society that was just blossoming into adulthood was severely impacted by the pandemic in a way that will affect their attitudes and behaviors for years to come, though we may not yet know for sure how. The main feature of emerging adulthood is generally characterized by the establishment of autonomy. However, emerging adults in the Covid-19 pandemic experienced a loss of autonomy, direction, and increased uncertainty (Germani et al., 2020). This could further indicate psychological maladjustment that will hinder their well-being and successful management of other punctuated equilibrium events in the future (Germani et al., 2020). Understanding how the Covid-19 pandemic affected emerging adults is therefore of utmost importance if society is to prepare them for being future leaders.

### **The Importance of Sustainability**

“Sustainability can be said to ‘always rings twice’: the first ‘ring’ is an alert of its absence, which probably determined the explosion of the pandemic crisis (and its consequences and impacts), while the second ‘ring’ is presenting an opportunity to change the current development model” (Stampa et al., 2020, p. 1). Before the evolution of the Covid-19 pandemic, climate change (arguably) posed the highest threat to societies across the globe. In fact, as previously discussed, it is more than likely the fluctuating environmental conditions caused by climate change that allowed for Covid-19 to evolve into a pandemic. However, the disruptions caused by the punctuated equilibrium of the pandemic did not usurp climate change in threat level, but merely posed a more immediate need to be addressed due to its high mortality rate. Climate change still looms large over the global community and while it took a “back-seat” in policy creation to the pandemic over the last two years, it is more necessary than ever to be

addressed for the mitigation and adaptation to other potential punctuated equilibrium events erupting from the dramatic changes in the global environment (Stark, 2020).

### **Historical Efforts in Sustainability**

In 1827, Joseph Fourier concluded that the Earth's atmosphere functioned as an insulator, trapping solar radiation that allowed for the planet to remain heated (Casper, 2010). Twenty-nine years later, Eunice Newton Foote added onto this theory determining that it was a combination of CO<sub>2</sub> and water vapor that created this insulation, thus discovering the *Greenhouse Gas Effect* (Wake, 2020). Three years after Foote's discovery, Joseph Tyndall claimed the discovery for the historical record with his own research, though, in truth, he merely just confirmed that of Foote's findings (Casper, 2010). Then, in 1896 Svante Arrhenius determined that by extracting CO<sub>2</sub> from the atmosphere, the Earth could be cooled. He further concluded that human-led industrial activity could induce a warmer atmosphere through the burning of coal. By 1908, Arrhenius' studies led him to believe that human activity would generate enough CO<sub>2</sub> to prevent another ice age (Casper, 2010).

However, even with the knowledge of anthropogenic climate change, it was not until 1982 that "sustainable development" was officially addressed by the global community in the World Charter for Nature as a response to a changing environment. Another five years passed until the concept of "sustainability" was truly, coherently defined. In 1987, the U.N. Brundtland Commission issued a report titled, "Our Common Future." In it, they described sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on Environment and Development, 1987). Following these developments, multiple global bodies were created to address the issues of a warming climate (Hák et al., 2016). Despite these steps forward in environmentalism, no

cohesive measures on how sustainability could precisely be addressed were issued. This description did not come until nearly 30 years later (nearly 200 years after Fourier's initial discovery) when the U.N. created the 17 Sustainable Development Goals (SDGs) in 2015.

This resolution was adopted by 193 countries and called for the world acting together “to shift the world onto a sustainable and resilient path...(to) stimulate action over the next 15 years in areas of critical importance for humanity and the planet” (United Nations, 2015). The 17 SDGs and their totaled 169 targets are meant to encompass every aspect of life that is affected by or can affect the outcomes of climate change and are as follows:

1. End poverty in all its forms
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality and women's empowerment
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry, innovation, and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land



16. Peace, justice, and strong institutions

17. Partnerships for the goals (United Nations, 2015).

Prior to this development, various guidelines and standards existed around the world, but they differed by country, region, and focus. The SDGs served to standardize a global set of goals and provide a framework of actionable items with which the goals could be achieved. (Hák et al., 2016). Flexibility was worked into the framework so that each country could properly apply them to their own situation, choosing which goals mattered most to their development as climate change causes and effects are not experienced ubiquitously across the globe (Biermann et al., 2017). This standardization in goals also allows for a standard methodology by which to assess sustainability efforts across the world (Hák et al., 2016).

This standardization also makes the SDGs an ideal candidate by which to assess the impact of the Covid-19 pandemic on sustainability worldwide, as they allow for commonalities in efforts and populations across the globe.

### **History of Sustainability Attitudes**

As explored, this study assumes the emergence of the Covid-19 virus was likely due to a flux in the environment caused by climate change, thus making sustainability imperative to mitigating any future punctuated equilibrium disease-type events. However, support for sustainable development efforts rests heavily on the social normative attitudes and beliefs present in a given community. The anecdotal idea developed following the initial shutdowns that framed the Covid-19 pandemic as a possible positive relief to an ever-warming planet was an assumption made without consideration for peoples' general attitudes on sustainability (Awuh et al., 2021). To better understand what effect the most recent pandemic had on societal sustainability, the general concern for the environment must first be assessed.

“Environmental concern is usually defined as an individual’s insight that humans endanger the natural environment combined with the willingness to protect nature... individuals react in three distinct ways to environmental problems: having rational insight into the problem, being willing to act, and being emotionally affected by environmental degradation” (Franzen & Meyer, 2009, p. 5). Historically general demographic predictors of environmental support include age, race, sex, income level, education, and residential location (McMillan et al., 1997). However, more recent studies have also found correlations to behaviors found at the individual levels as well. For instance, a study on adults in Germany and the UK found that those with authoritarian tendencies were typically unsupportive of sustainability efforts, sometimes to the point of aggression (Fritsche et al., 2012). This was thought to be a result of sustainable development disrupting the status quo, and therefore the social normative values that are the main focus of those with authoritarian attitudes (Fritsche et al., 2012). This is a reasonable assumption based on prior discussions that associate authoritarianism values with stricter adherence to social norms. Another study on which personality indicators are present in the development of environmental attitudes was conducted in China. It found that social trust was imperative for environmentalism and support for sustainable development projects (Yan et al., 2021). Social trust is a component of collectivist and individualist tendencies and as such, needs to be understood to fully understand the drivers of sustainable attitudes.

### **Worldwide Effects of the Covid-19 Pandemic on Sustainability Efforts**

Following the initial shutdowns across the globe in which human activity was forcefully decreased, there was evidence of environmental health returning to a natural balance. Anecdotally for sustainability efforts, the Covid-19 pandemic was portrayed throughout the various medias as a moment of respite for the Earth in which it could heal from the wounds of

human-led, industrial activity. Opportunistically, it was also portrayed as a moment of reflection for environmental efforts through which society could evaluate the weaknesses and strengths of their climate change responses, generating more effective, future results (Awuh et al., 2021). This was echoed by Salon et al.'s belief that the pandemic created "an opportunity for long-term change" (2021, Abstract). While opportunities did present themselves for the field of sustainability following the emergence of the Covid-19 pandemic, the initial healing the Earth experienced was only temporal, brought on by an unsustainable situation in which human-activity was removed altogether. Sustainable development efforts were deeply affected by the onset of the pandemic, and in some cases, presented with more challenges to overcome.

This is particularly evidenced through the lens of the SDGs. At their inception in 2017, a target deadline was set for the year 2030. Pre-pandemic, the global community was found to be woefully short of meeting any of their objectives though (Hughes et al., 2021). The onset of the pandemic did not alleviate this situation either as studies show that the emergence of Covid-19 has caused irreparable harm to sustainability progress (Hughes et al., 2021). In all, 7 of the 17 goals, that of *SDG1: No Poverty*, *SDG2: Zero Hunger*, *SDG4: Quality Education*, *SDG8: Decent Work and Economic Growth*, *SDG10: Reduced Inequality*, and *SDG12: Responsible Production and Consumption* were all explicitly setback by the punctuated equilibrium generated by the Covid-19 pandemic. The other 10 goals could be considered to be indirectly affected by the pandemic due to a redirection of funding, halting of sustainable development projects, and a diversion of focus (Mukarram, 2020). However, even worse for sustainability efforts, the pandemic did not just set progress back, it also created new challenges to overcome in order to achieve any of the 2030 targets (Hughes et al., 2021). For instance, current estimations claim that the Covid-19 pandemic will cause at least three fewer countries to never meet the objectives

established in SDG 1, *Zero Poverty*, and that there will be 48 million more people experiencing poverty globally by 2030 instead (Hughes et al., 2021). Similarly, SDG 8, *Decent Work and Economic Growth*, was setback by the number of layoffs, skill shifts, supply chain disruptions, and productivity losses. Studies linked the observable, beneficial drop in CO<sub>2</sub> levels to job loss and decreased economic activity, which hampers sustainable development in the long run (Ibrahim et al., 2021). This makes poorer nations particularly vulnerable by increasing the possibility for societal conflict, further hindering sustainable development efforts in every way (Hughes et al., 2021).

Of additional concern was the halt in progress of sustainability information development also caused by the Covid-19 pandemic. Sustainable development is guided by programs of study worldwide that conduct field research, analyze climate related data, and disseminate their information for utilization in policy making and development plans. This knowledge development and sharing is invaluable for ensuring proper mitigation and adaptation efforts and combatting misinformation caused by greenwashing (Leal Filho et al., 2021). During the shutdowns of the Covid-19 pandemic, many sustainable development projects were halted or had their funds redirected (Leal Filho et al., 2021). Indeed, even the largest global event on the environment, the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) was postponed in 2020 due to the inability to conduct a conference with social distancing measures (United Nations Framework Convention on Climate Change Climate Press Release, 2020).

However, the emergence of the pandemic did not proceed without at least a few benefits to the global community. Most importantly, the pandemic did highlight the need for adaptive capacity building within all governance structures and organizations (Hörisch, 2021). When

faced with an extreme crisis, institutions worldwide were forced to rapidly evolve to meet the extreme demands of Covid-19. Weaknesses in the various systems and inequality gaps in society were suddenly highlighted as places of crisis vulnerability, forcing governments and organizations to innovate new ways to address all needs (Hörisch, 2021). Finding and subsequently abandoning inefficiencies was not just good strategy, but in many ways, a necessity as disruptions in the worldwide economy forced societies everywhere to reevaluate resource allocation (Hörisch, 2021). If this trend is allowed to continue, it could protect the global community from further disruptions with prepared and adaptive measures to cope with similar punctuated equilibrium type events.

### **Effects of the Covid-19 Pandemic on Sustainability Attitudes**

The Covid-19 pandemic punctuated a general stasis in society worldwide that caused massive disruptions for which society was forced to continually adapt and evolve. The disastrous effects on population numbers and societal relationships were hard to overcome, but some silver linings were evidenced through small environmental gains made possible through a decreased level of human interaction. These gains included decreased carbon footprints, increased wildlife activity, and better water quality across the globe (Awuh et al., 2021). These effects were typically temporal in nature and experts warned of their reversal once societies increased activity back to pre-pandemic levels of interaction. However, they did serve to demonstrate the extreme anthropogenic effect of society on the environment (Awuh et al., 2021). Coupled with the internalization of attitudes and behaviors as “moral imperatives” during the Covid-19 pandemic, this new understanding of human effects on the environment may provide the potential for increasing sustainability support through the internalization of the concept as a moral priority (Weder et al., 2022).

Important to note too is the concept that sustainability does not just include beneficial environmental behaviors and decreased environmental effects; it also encompasses innovations in adaptive capacity to all punctuated equilibrium effects, including those of pandemics but also that of major structural changes within an organization. Sustainability is necessary not just to protect the environment, but that too of social and operative normalcy in all fields. Thus, the Covid-19 pandemic allowed for increased awareness not just in the obvious anthropogenic effects on the environment, but in the needed level of flexibility for society to adapt appropriately to punctuated equilibrium events (Awuh et al., 2021). This carries the potential for changing behaviors and attitudes in favor of more sustainable values in society altogether.

For instance, while some of the environmental gains made during the initial phases of the Covid-19 pandemic were temporal in nature, they did highlight the anthropogenic nature of environmental degradation. Coupled with the internalization of behaviors as moral imperatives, individuals began to see certain habits (such as mask wearing, hand washing, but also reduced consumption) as moral responsibilities (Weder et al., 2022). Furthermore, lockdowns and restrictions forced individuals to reassess their behaviors and habits, forcing many to find alternatives. These alternatives included cooking more at home due to restaurant closures, cycling because of limited public transportation, and decreasing consumption in general due to global supply chain disruptions. All of these were inherently sustainable practices and promoted individual action towards the SDGs (Weder et al., 2022). In surveying a population from Austria, Weder et al. (2022) found that a significant portion of their sample recognized the importance of these new habits not just for themselves, but for sustainability efforts in general, and planned to keep the habits in the years after the Covid-19 pandemic either ends or becomes endemic. Weder et al. (2022) also found that respondents felt a moral obligation to committing to these activities

and just as mask wearing and hand washing became moral imperatives, so too had these sustainable activities.

As previously explored, coupling behaviors and morality is a hallmark of authoritarianism attitudes and shares similarities with collectivism as well. In studying punctuated equilibria disease-type events of the past, both of these behavioral trends have shown themselves to rise in the wake of their disruption. Thus, it is entirely plausible that these behaviors will present themselves in the wake of the Covid-19 pandemic as well. These shifts in individual behaviors and attitudes will need to be addressed appropriately by institutions and organizations if they are to continue cultivating a dynamic culture that is able to appropriately respond to changes in society and societal needs.

### **The Punctuated Equilibrium in Higher Education Caused by the Covid-19 Pandemic**

Higher education is one of the foundations in society by which we internalize social developments and values (Leal Filho et al., 2021). However, the monumental shifts generated by the Covid-19 pandemic in society reverberated through every institution, including that of higher education. A 2020 conducted by the International Association of Universities found that 98% of respondents felt that teaching and learning was affected by the Covid-19 pandemic (Marinoni et al., 2020). Indeed, the Covid-19 pandemic generated shocks to the educational system structure that caused upheavals so severe, the traditional mechanics of classroom management were rendered nearly useless. This was generally due to forced adaptation methods and mitigation techniques such as online learning and school shutdowns (Pokhrel & Chhetri, 2021). In many cases, the virtual platforms needed for the transition lacked the development in infrastructure needed to handle the shocking influx of demand for services. Teachers and students alike learned to use E-learning instruments in real time while also attempting to overcome non-conductive

learning environments like that of personal homes (Pokhrel & Chhetri, 2021). For some, this switch allowed for greater engagement rates like those of physically disabled students or growth mindset learners. However, for others like fixed mindset learners or those who lacked access to the tools necessary to access the E-learning tools, this development proved to be a major detriment to educational efforts (Doucet et al., 2020).

Even before the onset of the Covid-19 pandemic, psychological issues amongst students in higher education institutions were already a point of concern. Pressures to perform combined with newfound independence, social dynamics, financial strains, and the need for personal management skills put an immense amount of stress on college-age students. Higher levels of stress have been found to be associated with lower psychological well-being, leading further to lower performance academically (Akin-Odanye et al., 2021). The Covid-19 pandemic exacerbated all of these issues. A 2021 study conducted by Akin-Odanye et al. (2021) found that finances were the number one stressor after the on-set of the pandemic. However, this stressor affected other aspects of the students' lives including by fracturing inter-personal relationships with those outside of the immediate family and increasing the concern for missing academic milestones.

Psychological well-being was not the only exacerbated impact the Covid-19 pandemic had on pre-existing issues in higher education though. Education gaps, like that experienced between rural and urban educational systems were widened during the pandemic (Calderone & Fosnacht, 2022). Lower investment rates in rural areas are generally associated with higher poverty and lower graduation rates (Calderone & Fosnacht, 2022). Indeed, any effect of the pandemic was exacerbated amongst the population of student bodies belonging to demographics experiencing higher rates of poverty. These effects were further echoed amongst disability and



BIPOC demographic populations as well (Calderone & Fosnacht, 2022). Due to the increased effect of educational disruption on this population, it is possible that the education gap between those historically underserved and lacking in resources and those who can afford higher education will grow in the years after the Covid-19 pandemic (Calderone & Fosnacht, 2022). It is also possible that this will have continued, reverberating effects into the social achievement gap as well, which will only serve to hinder generational wealth and access to higher education institutions in the future (Goudeau et al., 2021).

This disruption extended itself into the operational side of higher education as fluctuating student enrollment numbers led to uncertainty in overhead costs, increasing the potential for layoffs (Calderone & Fosnacht, 2022). Loss of cohesion in operational strategy has the potential to continue these effects in the long run for academic institutions as cultural connections to the institution were sent into a state of upheaval or never allowed to grow in the first place. A lost sense of connection has been found to leave students more vulnerable to mental, social, and academic stressors (Calderone & Fosnacht, 2022).

Loss of cohesion in operational strategy is problematic for social trust mechanisms as well. Social trust is the foundation on which many organizations are able to facilitate relationships within organizations to meet its strategic goals through collective effort (Calderone & Fosnacht, 2022). The noted lack of cultural engagement with the student body and faculty following the onset of the Covid-19 pandemic has affected the social trust bonds of higher education institutions (Calderone & Fosnacht, 2022). This decrease in social trust was evident after the onset of the Spanish Influenza pandemic of the early twentieth century and did allow more collectivist and authoritarian behaviors to prevail. It is possible that this same phenomenon will lead to a student body that espouses these same behavioral trends, which will ultimately lead

to a change in institutional culture. Thus, higher education institutions must be aware of the potential social change that has evolved since the emergence of the Covid-19 pandemic in order to continue facilitating a shared culture that engages students and faculty in a way that allows the institution to fulfill their operational strategy and goals.

However, the chaos caused by the Covid-19 pandemic did have its benefits in the emergence of new strategies that shook the foundations of higher education institutions, allowing them to adapt to changing demands in the modern era with a new system of management that allowed for flexibility in structure. Additionally, the potential for widening social gaps forced global communities to address inequities in education faced by societies and provide solutions and innovation that would allow individuals to overcome such issues (Yerel et al., 2021). So, while the Covid-19 pandemic did send the world into a state of disruption and uncertainty, it is possible that the benefits will allow higher education institutions to rebuild with a different culture and discipline that is more adaptive and capable of meeting needs in the future (Yerel et al., 2021). Whether intentional or not, this flexibility in structure and addressing of social needs meet the UN SDGs (specifically SDG 4: Quality Education) and further the possibility of cultural sustainability through adaptive capacity (Leal Filho et al., 2021).

### **The Impact of the Covid-19 Pandemic on Teaching Sustainability in Higher Education**

The overall effects of the Covid-19 pandemic on society and higher education institutions did have implications for the topic of sustainability. For instance, evidence reflects the shutdown of many field projects worldwide due to social distancing constraints. This included environmental project field data collection which is essential to communicating climate change status and necessary actions and are often conducted by academic communities (Leal Filho et al., 2021). Since higher education institutions do lay the foundations of socialization by which

society internalizes cultural shifts and values of importance, sustainability values rely heavily on the effectiveness of teaching in these institutions (Leal Filho et al., 2021).

“Education for sustainable development is the process of equipping students with the knowledge and understanding, skills and attributes needed to work and live in a way that safeguards environmental, social and economic wellbeing, both in the present and for future generations” (United Nations World Summit, 2005). To emphasize this point, a study by McCowan (2016) determined that higher education was essential to any progress made towards the UN SDGs. As previously mentioned, the effective adaptation and flexible facilitation of education in the face of the chaos and disruption caused by the Covid-19 pandemic does meet the SDG 4: Quality Education set by the UN in 2015. While this goal was set back by the onset of the pandemic, it is possible that the adaptations made to meet the shifting demands of the pandemic will result in more effective results in this goal by 2030 (Leal Filho et al., 2021). However, more work must be done to continue to underline the importance of sustainability in all institutions and organizations worldwide if the global community is to meet their 2030 commitments. Education does allow for innovation in design and capacity-building. It also has the potential for increasing the efficiency of modeling and generation of new ideas through increasing knowledge bases and collective thinking. Additionally, with appropriate content and application of pedagogical methods, the necessity and ethics of sustainability in the face of the climate crisis could prove invaluable to meeting global commitments (Leal Filho et al., 2021).

This is particularly true of students in the field of business due to the relative contribution of businesses to the climate crisis (Stubbs & Cocklin, 2008). Just as the results of climate change will not be ubiquitous across the globe, the novelty of the SDG goals is that they can be applied in a manner of ways that is relevant to the state in which they are being deployed (Biermann et

al., 2017). However, this flexibility could also be a weakness. Thus, it is critically important to educate future leaders about the SDGs and their importance in all fields. To this end, the Principles for Responsible Management Education was developed in 2020, recognizing the importance of corporate social responsibility being taught in business school curriculums (Principles of Responsible Management Education [PRME], 2020; Westerman et al., 2020).

Student engagement should be of particular interest to those in the field of business ethics when teaching corporate social responsibility and sustainable development. As this field garners more interest and industries shift to incorporate more sustainable activities and modeling, educating future business leaders on corporate social responsibility could become a key competitive advantage for schools (Lozano & Barreiro-Gen, 2021). Students who can successfully navigate the coming industry changes for the betterment of the firm and society could become integral hires in the future. As such, educators should place interest in focusing their lesson plans on addressing sustainable development.

While there is no global standard for corporate social responsibility, the U.N. Sustainable Development Goals (SDGs) established in 2015 are a common framework used by firms worldwide to measure their sustainable development efforts. There are 17 goals in total, addressing the Triple Bottom Line (TBL) of People, Planet, and Profit. To achieve these goals, the U.N. proposes a collaborative governance structure in which every aspect of society participates “to shift the world on to a sustainable and resilient path... (to) stimulate action over the next 15 years in areas of critical importance for humanity and the planet” (United Nations, 2015). One of the levels of society specifically addressed by the U.N. as a critical pathway to achieving these goals is education. To this end, the U.N. also created the Principles for Responsible Management Education (PRME) initiative, recognizing the need for effective

sustainable business education (Principles for Responsible Management Education, 2020). However, as noted by Westerman et al. (2020), “it remains an open question as to how individuals will respond to these sustainable development goals and what factors may predispose them to support (or not support) the SDGs” (p. 3). As explored by Westerman et al. (2020), to fully integrate this collaborative governance model, society must first be met at their own knowledge development level. This will help enlighten educators on their audience’s knowledge gaps, intrinsic and extrinsic biases, and interests. Educators can then decide how best to address their audience’s needs.

Climate change affects every aspect of life, and businesses will have to address at least some concerns to simply mitigate the associated hazards and risks. While the risks have been primarily localized to specific regions, it is thought that there will be no area spared from at least some concerns. Everything from insurance rates to employee retention will be, or has already been, affected. In order to compete and succeed in the market, business graduates must prepare for the realistic opportunities and obstacles faced in their industries so that they may appropriately plan and subsequently provide solutions.

Additionally, demand trends show that younger consumers prefer goods and services provided by businesses that at the very least attempt to mitigate their so-called “footprint” by participating in activities that support the common good (Boston College Center for Corporate Citizenship, 2021). To be innovative and stay ahead of the trends, business students should be aware of common sustainability goals so that they can more appropriately place their focuses and direct corporate interests.

Finally, while it is the hope of every business to capitalize on market opportunities and mitigate market risks in order to generate returns, it should be in any business’s interest to also

support their community. Regardless of a moral aspect, studies have shown that increased community engagement helps in employee retention and satisfaction (Boston College Center for Corporate Citizenship, 2021). It also assists in operation functionality as it builds a level of trust in the community (Calderone & Fosnacht, 2022).

## **The Effects of the Covid-19 Pandemic on Sustainability Attitudes in Higher Education**

### **Settings**

The Covid-19 pandemic has invariably affected sustainability efforts worldwide, but it has also potentially provided opportunities for innovation and SDG target attainment that were not previously possible due to the extreme disruption needed to implement them. In other words, had the Covid-19 pandemic not caused the necessity of innovative and extreme adaptation, it is possible that these social shifts never would have occurred due to the negative consequences associated with the level of disruption needed. The stasis of the status quo across all societies was not conducive towards comprehensive sustainable development. The Covid-19 pandemic, though disastrous, punctuated that equilibrium and presented a unique opportunity to improve efforts in the field of sustainability worldwide. It also highlighted the importance of sustainability across all industries as it demonstrated just how disastrous non-adaptive static models can be in the face of crises. As discussed, this level of disruption also carries the potential to dramatically shift attitudes and behaviors. So, while the onset of the pandemic has caused a punctuated equilibrium shift that allowed innovative solutions to emerge, society must learn to address the attitude and behavioral shifts if all of its participants are to be engaged on future adaptations and goals in the name of sustainable development.

As previously noted, higher education is a fundamental institution in our societies by which we internalize social norms and knowledge conducive to maintaining and improving societies

(Leal Filho et al., 2021). Additionally, as noted, not only will educators have to contend with the direct impacts the Covid-19 pandemic has had on students' education in general, but they will also have to address the potential shifts in priorities and preferences in students' interests caused by changes in behavior and attitudes, thereby impacting the level of student interaction and engagement with subject materials. This is true for all fields of study, but due to the necessity of sustainable practices in further addressing punctuated equilibriums caused by climate change, educators will be forced to adapt specifically to changing attitudes and behaviors on the topic of sustainability in higher education.

Data is still being compiled on the full impacts the Covid-19 pandemic has had on sustainability attitudes in academia, but preliminary studies have shown that there has been a shift in sustainability attitudes in general. These shifts are important to understand because they will be the foundation on which educators build the internalization of sustainable values and goals within their respective student bodies. As explored, historical events and preliminary studies of attitude and behavioral shifts in the wake of the Covid-19 pandemic indicate the potential for more collectivist, religious, and authoritarian societies worldwide (Fincher et al., 2008; Hays, 2005; Murray et al., 2013). The ramifications of this for sustainability attitudes in higher education could be profound. Views on sustainability may have become internalized as a moral imperative, thus becoming a new social norm (Weder et al., 2022), or they may have fallen to the wayside in lieu of retreating into the stability of pre-pandemic social normative structures (Fritsche et al., 2012). Whatever the behavioral response may be, educators do have a responsibility to prepare their respective student bodies for success with the knowledge and capability of dynamically addressing the issues present in society. As the potential for punctuated equilibrium events only becomes more likely in the face of the climate crisis, it is imperative that

educators understand the status of sustainability attitudes within their student bodies so that they may cover knowledge gaps or weaknesses and foster students' strengths in the field of sustainability.

### **The Effects of the Covid-19 Pandemic on Sustainability Attitudes in the Field of Business for Higher Education**

The importance of sustainability to the world, as a subject matter in higher education, and as of extreme importance to organizations and businesses has been previously discussed, as has the effect of the Covid-19 pandemic on each of the aforementioned matters. The final point of interest is therefore the most nuanced: what effect has the Covid-19 pandemic had on sustainability attitudes in higher education specific to the field of business? Like much of the other literature, this data is still in the process of being compiled as the pandemic is on-going. However, some trends do appear to be emerging in business sustainability, and educators are responsible for preparing their respective student bodies for the coming changes.

Prior to the onset of the Covid-19 pandemic, many of the implemented strategies for organizational sustainability ignored the cultural value dimension aspect. This made it difficult for employees to fully embrace the mission of sustainability as the concept was not incorporated as an intrinsic value. Ultimately, this results in sub-par outcomes for the strategies (Lozano & Barreiro-Gen, 2021). However, just like other aspects of society, the external threat and subsequent disruption posed by Covid-19 demonstrated the overall need for sustainability in organizations, as they were forced out of their status quo and left in a dynamically shifting world. Inclusion of sustainability as necessary to corporate activities allowed for better internalization of sustainability as a shared, corporate value (Lozano & Barreiro-Gen, 2021). This shift in attitude is markedly different from prior thinking, and business students must be prepared for this new



social normative structure. Thus, understanding where students' preferences for sustainability lie and what other attitudes and belief systems may or may not preclude them to support these business trends is imperative to preparing them for success in whatever industry they choose.

As explored, the dynamic nature that is required for this type of adaptive capacity building is at odds with the general trends in attitude and belief changes that have emerged in societies after other punctuated equilibrium disease-type events. If these trends hold and societies (and particularly those members of societies who are emerging adults) are more collectivist, religious, and authoritarian, sustainability may be perceived to threaten the accepted social normative structure and may therefore be rejected, especially in fields such as business that tend to view sustainability as a hindrance rather than an opportunity (Lozano & Barreiro-Gen, 2021). The goal for educators then is to frame sustainability in such a way as to demonstrate its importance to the students' business goals, to accept adaptation as a new social normative structure, and to internalize sustainability values as moral imperatives rather than habits.

### **Goals of the Current Study**

Westerman and colleagues (2020) conducted an exploratory study of business students' preferences in the SDGs investigating "the relevance of endogenous and exogenous predictors" (p. 4). The endogenous factors explored were that of individualism-collectivism, authoritarianism, and religiosity. The exogenous factors were then that of students' location. A sample of 262 students was studied and the results indicate that authoritarianism and religiosity were positively related to preference for people and prosperity SDGs (SDG 1 -10) and negatively correlated to planet SDGs (11-15) and peace and partnership SDGs (16-17). Westerman et al. (2020) also found that students attending school in a high poverty area such as that of Appalachian state have a higher preference for people and prosperity SDGs while those

attending school with observable climactic threats such as that of Hawaii have a higher preference for that of planet SDGs.

Because the work of Westerman et al. (2020) was conducted pre-pandemic and shifts in the endogenous factors post-pandemic have been noted, this research attempted to explore whether those shifts have also impacted that of students' SDG preference. The effects of climate change are expected to increase the probability of disaster-type events, so predicting endogenous factor shifts will assist educators in better understanding their audiences. This will then better assist educators in determining how best to teach students about sustainable development.

Thus, this current body of work builds on the prior work of Westerman et al. (2020). For ease of comparison, the same survey sample from Appalachian State University collected in 2018 was used as the pre-pandemic baseline. The same survey used in that study was then re-distributed among current students for the post-pandemic sample. The same endogenous factors of individualism-collectivism, authoritarianism, and religiosity were studied. However, because data from Hawaii was not collected in this study, the endogenous factor of location could not be studied. The methodology used in the current study included the same measures as the previous work, with the addition of cluster analysis to determine which factors are interrelated in an exploratory effort to enhance prediction capabilities.

### **Hypotheses**

*H<sub>1</sub>: The Covid-19 pandemic is correlated with an effect on personality indicators, noted by a shift in attitudes and behaviors between the pre- and post-pandemic data.*

From historical observations, there is an indication that attitudes and behaviors do shift in the wake of punctuated equilibrium disease-type events. Thus, the first hypothesis to be tested was to see if there was a general pandemic influence noted at all in the data. Evidence of a

significant difference between the pre- and post-pandemic datasets should be correlated to the personality indicators.

*H<sub>2</sub>: The Covid-19 pandemic is correlated with an effect on SDG preference indicators, noted by a shift in average rankings between the pre- and post-pandemic data.*

The SDGs encompass a variety of topics and interests, and as such, are potentially given preferential focus based on an individual's value sets. As previously explored by Westerman et al. (2020), there is evidence that sustainability preferences can be predicted using personality indicators. Thus, if attitudes and behaviors have shifted, it is possible that there is a correlated shift in preferential importance of sustainability values as well.

*H<sub>3</sub>: There is a difference in attitude and behaviors between business student respondents and non-business school respondents.*

*H<sub>4</sub>: There is a difference in attitude and behaviors between business student respondents and non-business school respondents and this is correlated with differing SDG preferences.*

If business students really are different from their peers, educators within the business school of thought will have to cater to personality indicators and subsequent drivers specific to their body of students.

*H<sub>5</sub>: The People and Prosperity SDGs (SDG1-SDG10) are correlated with authoritarian, religiosity, and collectivist attitudes and therefore will be the most affected grouping of SDGs by the Covid-19 pandemic.*

The People and Prosperity SDGs encompass concepts such as good health and well-being, jobs, hunger, poverty, and equality (amongst others). Because all of these aspects were greatly affected by the onset of the Covid-19 pandemic, it is reasonable to assume there may be an obvious shift in their relative preferential importance for individuals in the post-pandemic dataset. As explored by Westerman et al. (2020), no evidence was found that individualism or collectivism determined SDG preference. However, due to the historical trends seen following punctuated equilibrium disease-type events whereby collectivism is thought to increase, it is possible that this attitude shift could be correlated with a shift in SDG preference too.

*H<sub>6</sub>: Certain demographic statistics are correlated with specific SDG preferences, regardless of the pandemic effect.*

It is possible that sustainability preferences are correlated with specific demographics of people regardless of any attitude shifts correlated with the Covid-19 pandemic. This could be of interest in determining the relative importance of the SDGs that will not generally be affected by external factors. In other words, these preferences have already been inherently internalized and therefore are immune to external shocks.

## **Methodology**

### **Data Collection**

A voluntary, revealed preference survey was distributed amongst students enrolled in marketing classes at Appalachian State University. No extra credit or other incentives were provided to students for participation in the survey. It was provided to students at the midpoint of their semester to be taken either during class time or online outside of class. This survey asked participating students to rank the SDGs from most important to least important (lower rankings indicated higher importance). It then asked a series of personality-type indication questions 13 of which were on their preference for working for a green organization, six of which were on their preference for working for a company with a green human resources department, 12 of which were to determine the students' level of authoritarianism, six of which were to determine the students' level of individualism or collectivism, two of which determined the students' proclivity towards religion, two of which were political affiliation indicators, and three of which were general demographic determinants including sex, age, and race. One additional question was included for an attention measure, asking the students to move a line item to the 11<sup>th</sup> ranking in the SDG list. Any student who missed this attention question was automatically disqualified for consideration in the sample.

## **Predictor Variables**

### ***Exogenous Predictors***

**Individualism/ Collectivism and SDG Preference.** As explained by Westerman et al. (2020), “to explain individual ethics, values, and decision-making, prior studies have used Hofstede’s (1980) cultural dimensions” (Westerman et al., 2020, p. 4). Their prior work also goes on to say, “comprehending difference in values is key to understanding differences in national and international management practices and provides the foundation for building an effective approach to business education” (Westerman et al., 2020, p. 4). The Hofstede indicators in particular were used due to their connectivity between cultural values and economic activity. This is an important connection to make if attempting to distinguish the importance an individual places on goals relating to the TBL.

The dimensions of this factor were measured using a 6 item five-point Likert-scale response (from 1 = “strongly disagree” to 5 = “strongly agree”) developed by Yoo et al. (2011). The six items each corresponded to one question asked on the survey and are as follows:

1. Individuals should sacrifice self-interest for the group
2. Individuals should stick with the group even through difficulties
3. Group welfare is more important than individual rewards
4. Group success is more important than individual rewards
5. Individuals should only pursue their goals after considering the welfare of the group
6. Group loyalty should be encouraged even if individual goals suffer

Those participants who answered with a high degree of agreement were considered to be collectivist in nature. In contrast, those who answered with a high level of disagreement were considered to be individualistic.

Many studies have explored the preparedness for pandemics along these same cultural dimensions, finding that individualist countries are generally unprepared in comparison to their collectivist counterparts. The United States does rank highly in individualism. However, during the pandemic, individuals were asked to isolate themselves into smaller groups. On the one hand, this isolation coupled with a perceived lack of response by the government could have led to more individualistic tendencies in the population. However, as the isolation was done as a measure of collective good, it is possible that it is the collectivism instead that increased.

**Authoritarianism and SDG Preference.** Authoritarianism was studied as an indicator of preference because of its presence in individuals indicating a higher need for control in uncertain situations. Individuals displaying authoritarian values tend to orient themselves to security in a state regime or that of an authority figure, seeking to manage fear and threats through social dominance (Sibley et. al, 2007). Generally, these individuals have an aggressively defended desire to preserve the status quo in the face of change.

The prior work conducted by Westerman et al. (2020) utilized the work of Passini (2017) and Schwartz (2007) that studied authoritarianism through benevolence and universalism values. If an individual tended towards benevolence, it was thought that authoritarianism was exerted due to concern for those close to the individual. Conversely, those tending towards universalism applied their concern for all of humankind.

Again, the dimensions of this factor were measured with a 5-point Likert-scale (from 1 = “strongly agree” to 5 = “strongly disagree”), but 12 statements were used to determine the

strength of this factor as a personality indicator in an individual. The statements were developed using the scaled developed by Funke (2005) and were as follows:

1. What our country really needs instead of more “civil rights” is a good stiff dose of law and order.
2. What our country really needs is a strong determined chancellor who will crush evil and set us on our right way again.
3. Obedience and respect for authority are the most important values children should learn.
4. The real keys to the “good life” are obedience, discipline, and virtue.
5. The withdrawal from tradition will turn out to be a fatal fault one day.
6. Being virtuous and law-abiding is in the long run better for us than permanently challenging the foundation of our society.
7. There is no such crime to justify capital punishment.
8. It is important to protect the rights of radicals and deviants in all ways.
9. The days when women are submissive should belong strictly in the past. A “Woman’s Place” is wherever she wants it to be.
10. It is good that nowadays young people have greater freedom to make their own rules and protest against things they don’t like.
11. People should develop their own standards about good and evil and pay less attention to the Bible.
12. Homosexual long-term relationships should be treated as equivalent to marriage.



For items 1-6, high values, indicating the responding individual strongly agreed with the statement corresponded with a high degree of authoritarianism. For items 7-12, the opposite was true, with low values instead signifying a high degree of authoritarianism.

**Religiosity and SDG Preference.** Individuals who demonstrate a high religiosity have been empirically shown to develop their moral beliefs through a religious authority. As explored by Westerman et al. (2020), “theories of moral development and related empirical research suggests that people’s religious beliefs are based more on authorities and rules”. Conversely, those who indicate less religiosity tend to derive their moral judgments from self-reflection, independent of authority. As such, those with a tendency towards religiosity often look to guidance from an authority figure. This would indicate that people who test high in religiosity would demonstrate an SDG preference that would mirror that of their source of moral authority.

To test this factor, two questions were asked:

1. Would you say you are a religious person?
2. How important is religion in your life?

These questions were developed as an adaptation from the World Values Survey (Inglehart et. al, 2014). A five-point Likert-scale was again utilized. For question 1, how religious are you, the values on the scale ranged from 1 = “definitely yes” to 5 = “definitely not”. For question 2, how important is religion in your life, the values on the scale ranged from 1 = “extremely important” to 5 = “not at all important.”

### *Preference for Corporate Social Responsibility in Career as Predictors*

**Green Organization and SDG Preference.** The propensity of an individual to want to work for an organization espousing “green” principles may correspond with a specific SDG preference. As such, participants were asked to gauge their interest in working for an organization via 13 exploratory statements for which responses were required.

These statements completed the phrase, “I would prefer to work for a company which...” and were as follows:

1. Publishes an environmental policy.
2. Has specific targets for environmental performance.
3. Publishes an annual environmental report.
4. Uses an environmental management system.
5. Applies environmental considerations to purchasing decisions.
6. Provides employee environmental training.
7. Makes employees responsible for company environmental performance.
8. Uses lifecycle analysis.
9. Has management which understands/ addresses issue of sustainable development.
10. Systematically reduces fossil fuel use.
11. Systematically reduces toxic chemical use.
12. Systematically reduces consumption of unsustainable products.
13. Applies the same environmental standards at home and abroad.

The dimension of this factor utilized the same 5-point Likert-scale as previous personality indicators (from 1 = “strongly agree” to 5 = “strongly disagree”). Here, low values indicated a

strong preference to work for an organization that incorporates green policies into their management practices.

**Green Human Resources and SDG Preference.** Similar to the Green Organization survey questions, preference for a Green Human Resources could correspond with specific SDG preferences, thereby providing another personality indicator by which SDG preference could be predicted.

Just like the Green Organization survey questions, the six Green Human Resources statements for which responses were required completed the phrase, “I would prefer to work for a company which...”, and were as follows:

1. Sets green goals for its employees.
2. Provides employees with green training to promote green values.
3. Provides employees with green training to develop employees’ knowledge and skills required for green management.
4. Considers employees’ workplace green behavior in performance appraisals.
5. Relates employees’ workplace green behaviors to rewards and compensation.
6. Considers employees’ workplace green behaviors in promotion.

The dimension of this factor utilized the same 5-point Likert-scale as previous personality indicators (from 1 = “strongly agree” to 5 = “strongly disagree”). Here, low values indicated a strong preference to work for an organization that incorporates green policies into their management practices.

### ***Political Predictors and SDG Preference***

Individuals identifying as liberal tend to have strong emphasis on environmental preservation. This would tend to indicate that a liberal self-identification would correspond with a strong preference for those SDGs focused on preserving earth systems. Similarly, those identifying as conservative have historically aligned with policies that promote resiliency in the population and finances. As such, a self-identification as conservative could indicate a personality that demonstrates a preference for the People and Prosperity SDGs such as SDG 1-11.

To test this factor, two questions were asked:

1. Where would you place your political views on the following scale?
2. Generally speaking, do you consider yourself a Republican, a Democrat, or an Independent?

For question 1, “where would you place your political views”, a 7-point Likert-scale was used ranging from 1 = “extremely liberal” to 7 = “extremely conservative”. For question 2, “do you identify as a Republican, a Democrat, or an Independent”, only 3 response possibilities were offered: 1 = “Republican”, 2 = “Democrat”, and 3 = “Independent”. Low response values to question 1 would indicate a liberal leaning individual which would more than likely correspond with individuals also responding as 2s to question 2.

### ***Demographics and SDG Preference***

General demographic questions were included to determine age, race, and sex. These survey questions explored both the possibility that personality indicators had inherent demographic biases as well as the potential for SDG preferences to be determined by

demographics. This information also allows for a determination of similarity in sample populations across the two studies.

## **Data Cleaning**

### ***Removal of Variables***

The survey was administered through Qualtrics, a software platform that offers research solutions to organizations. This includes building and collecting survey data. As such, some variables were included that were deemed unnecessary for the purposes of both the prior work of Westerman et al. (2020) and this current study. Variables deleted from the dataset include the following:

1. Status (a dichotomous variable with 1 = survey still in progress, 0 = survey completed)
2. Progress (percentage of completion)
3. Finished (a dichotomous variable with 1= yes and 0 = no)
4. Recorded Date (a replication of the variable “EndDate” indicating when the survey was completed)
5. Distribution Channel (all responses were provided anonymously)
6. User Language (all responses were provided in English)
7. Email (as responses were provided anonymously, the email of the respondents was not needed)

One variable, “Major”, was removed only after the students were broken into groups of those in the business school and those not in the business school at Appalachian State University.

### ***Removal of Survey Response Data Entries***

In addition to the attention question, there were other disqualifications for consideration in the final study sample. The survey contained a timer, measuring the amount of time it took each student to answer the survey questions. When cleaning the data, a threshold of 4.5 minutes – 1.5 hours was set. Any students outside of this threshold on either end was not included in the study sample. The threshold times were set subjectively, with consideration for how long it would take to rank the 17 SDGs and answer 33 total survey questions with enough thought to be answering appropriately. After the dataset was cleaned of the data entries that did not answer the attention question or meet the time threshold, data lines containing “null”, or blank, answers for entire sections were removed. If an entire survey section was blank, it was thought that the data entries would influence some data points but not others. However, if only one question in a section was missed, the data entry was kept because it’s overall influence on the entire data would be relatively small. After the null answers were removed, any answers where the rankings were not moved from their original positions (still reading 1-17) were then removed. A threshold of 5 was set to this end. Fewer than five SDG ranking movements would indicate that 2/3rds of the SDGs were left in their original, numerical order, indicating that they were more than likely not ranked with much thought. While it is possible some students may have preferred the SDGs in that order, the probability of that occurring was considered to be rare enough that these data lines were considered to be inaccurate and therefore could be potential biases in the sample if included.

After the data was thoroughly cleaned, the pre-pandemic sample size included 187 participants and the post-pandemic sample size included 126. This differed from the original

study by Westerman et al. (2020) which contained a sample total of 212 after their cleaning process of the same pre-pandemic data.

### ***Modification of Survey Response Data Entries***

Though R code contains a command `na.omit()` to remove any cell with a blank or “N/A” entry, the code would do so by removing the entire data entry line. Once the dataset was inverted into the necessary format, this would mean that an entire indicator would be deleted from the analysis. Thus, fake variables were included in any cell missing a data entry so that the analysis would not be hindered by its omission. For a missing cell in the Age category, the average age of the dataset was used. This was done 9 times throughout both datasets. For the Political Affiliation category, a fake variable of 4 was used as this was outside the 1-3 scale of pertinent data and thus would not affect the overall numbers within that scale. In all, two missing cells were updated with 4s across both datasets. Similarly, to Political Affiliation, Race and Sex also both got fake variables that fell outside of the scale used to collect the data. In each case, only two cells within the respective categories were updated to include the fake variable.

### ***Addition of Variables***

Two dichotomous variables were added to the dataset. The first was a pre-pandemic and post-pandemic indicator. A 0 would represent sample data collected pre-pandemic and a 1 would represent post-pandemic. Similarly, the students were grouped by business school and non-business school. A non-business school student would be designated with a 0 while a business student would be designated with a 1.

### ***Authoritarianism Data Entry Reversal***

Because the authoritarianism questions were split in two groups with high values indicating authoritarianism in one and low values indicating authoritarianism in the other, one of the groupings needed to be reversed before the data could be combined and analyzed. Thus, the grouping indicating high values as authoritarian were reversed. This process had to be done manually as there was no coding in Excel to do it. As such, the data entry was checked over three more times to ensure accuracy.

### **Data Analysis**

#### ***SDG Groupings***

The work of Westerman et al. (2020) broke the SDGs into three groupings similar to the work of Swain (2018). The three groupings were SDGs 1-10 (people and profit SDGs), SDGs 11-15 (planet SDGs) and SDG 16 and 17 (Peace and Partnership SDGs) (Westerman et al., 2020).

**SDG People and Prosperity.** The first ten SDGs encompass no poverty, zero hunger, good health and wellbeing, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry innovation and infrastructure, and reduced inequality. These goals focus their efforts on improving the lives and welfare of people through individual health and economic improvements.

**SDG Planet.** SDGs 11-15 are oriented to the sustainability of Earth Systems and promotes global synergy. These goals are spatially broader in their targeting, focusing their efforts on planetary health. They include support for climate action, life below water, life on land, sustainable cities and communities, and responsible consumption and production.



**SDG Peace and Partnerships.** SDGs 16 (peace, justice, and strong institutions) and 17 (partnerships for the goals) focus efforts to decrease conflicts and corruption through increased governance system partnerships, ensuring equity across global borders.

### *Calculating and Combining Variable Measurements*

**SDG Rankings.** The SDG rankings were broken into three SDG groupings. The average of each ranking was then calculated per participant. For instance, if SDG group 1, people and profit SDGs were ranked 1-10, their rankings would be added together and divided by 10 to find their average ranking via the Excel average function. This was repeated for SDG groups 2 and 3 respectively. If one of the groupings averaged higher than another, this was determined to be the preferred SDG grouping for that individual participant.

**Predictor Variables.** The 5-point Likert-scales utilized in the predictor variable collection was put through a process similar to the SDG rankings. Across each set of questions for each predictor, an individual's response was added and then averaged by the number of questions using the Excel average function. For instance, for individualism/ collectivism, the 5-point scaled answers were averaged across all 6 questions for every individual participant. This created an individualism/ collectivism master column containing the average response value for each individual participant. This process was then replicated for every multi-question predictor variable.

Since the demographic predictor variables only had one question, these columns did not need to be averaged. And their values were considered as is without any data combination or manipulation.

## **Descriptive Analysis**

Excel's Descriptive Analysis tool was used to run simple, descriptive statistics on the non-demographic variables and indicators. These descriptive statistics included the mean, median, and mode along with other statistics that were not utilized. The means of each non-demographic variable and indicator were then compared across time (pre-pandemic vs. post-pandemic), by schools (Non-WCOB vs. WCOB), and then by schools over time (pre-pandemic non-WCOB vs. post-pandemic non-WCOB and pre-pandemic WCOB vs. post-pandemic WCOB).

This was done to get an initial idea if there were obvious differences between different groupings for analysis purposes. For instance, by studying the descriptive statistics, it was able to be determined that business students ranked SDG 7 (Affordable and Clean Energy) 1.24 ranking positions lower (less important) on average post-pandemic than they did pre-pandemic. Similarly, post-pandemic WCOB students ranked SDG 1 (No Poverty) half a ranking position higher (more important) on average than post-pandemic non-WCOB students. While this analysis did not provide reasons or assign significance to the variables and indicators, it did provide an idea of data trends.

## **Cluster Analysis**

The independent or predictor variables were run through a Variance Inflation Factor test in R Studio testing for multicollinearity. The test determined that multicollinearity was present amongst five of the predictor variables. This indicates that some of the variability present in these independent variables could potentially be explained by a relationship with at least one of the other five independent variables. This confounds the data analysis and makes it difficult to

determine the influence factor of a single predictor variable on its own. As such, linear regression modeling could not be conducted, and different avenues of data analysis needed to be explored.

Cluster analysis was the chosen methodology. While this method is unable to de-confound the data, it can group personality indicators with like factors by doing a final partition of the variables into groupings by distance to a centroid, or common point. This would not only group a potential SDG preference indication with certain personality indicators, but also predict business student personality types based on groupings of the personality indicators. This could assist in determining other attributes that may be helpful for educators in the future as well.

K means was the chosen clustering methodology due to its straightforward approach to partitioning: the shorter the distance between data points, the more similar they are. The distance between the points is determined through Euclidian distancing as demonstrated through the following equation:

$$D(x_a, x_b) = \sqrt{\sum_{j=i}^n (x_{ja} - x_{jb})^2}$$

Where distance is a function of  $x_a$ , the input figures, and  $x_b$ , the determined centroids,  $j$  is the data property, and  $i$  is the number of observations.

In order to run an effective K means cluster analysis, the optimal number of clusters must first be determined. This was done through the silhouette methodology. This technique judges the fitness of clusters by the variance of the factors involved on a scale of -1 to +1. The closer to +1 an object is, the better suited it is to its designated cluster. This is determined through the following equation:

$$s(i) = \frac{b(i)-a(i)}{\max\{a(i),b(i)\}}$$

Where  $a(i)$  is the average distance between  $i$  and the rest of its cluster and  $b(i)$  is the lowest average distance between  $i$  and any other cluster.

R Studio cloud was used for the calculations due to its ease of use and cloud computing capabilities.

First, the Excel data was inverted so that the predictor variables were at the start of each row and the individual results headed each column. The file was converted to CSV format and uploaded to R Studio Cloud. There, the R coding packages broom, cluster, cluster.datasets, clustree, clValid, corrplot, cowplot, datasets, dendextend, factoextra, FactoMineR, Formula, fpc, FunCluster, GGally, ggforce, ggfortify, ggiraphExtra, ggplot2, ggraph, graphics, grDevices, Hmisc, kableExtra, knitr, lattice, MASS, methods, Nbclust, pillar, pvclust, readr, stats, survival, tidyr, and utils, were installed to the library in order to run the cluster analysis. The coding for kmeans was utilized to generate the cluster analysis, and the fvis\_cluster code was used to generate a visual of the cluster mapping. The coding sequence for the cluster analysis is as follows:

```
>PreWholeSDG1_scaled <- scale(PreWholeSDG1)
```

Enter

```
> View(WHOLE)
```

```
> x=WHOLE[,2:314]
```

```
> X <- scale(x)
```

```
> pamk.best <- pamk(X)
```

```
> cat("number of clusters estimated by optimum average silhouette width:", pamk.best$nc, "\n")
```

number of clusters estimated by optimum average silhouette width: 2

```
> K2<-X
```

```
> K2<-kmeans(X, centers = 2, nstart = 25)
```

Enter

```
>Str(k2)
```

```
>Fviz_cluster(k3, data = ____)
```

Where code line 1 scales the data, code line 2 allows for a visual check to see if the data was scaled properly, code line 3 specifies which rows and cells to include in the analysis (row 1 was excluded as it simply contained cell names), code line 4 is a re-scaling of the dataset for good measure after the top row was excluded, code line 5 determines the optimum number of clusters via the silhouette methodology, code lines 6 and 7 establish the K means clustering methodology, code line 8 returns the data results, and code line 9 visualizes the data results in a graphic chart.

## **Cluster Analysis Results**

### **Run 1**

The most comprehensive dataset containing all SDG ranking preferences, pre- and post-pandemic indicators, and school indicators, was the first to be run to test:

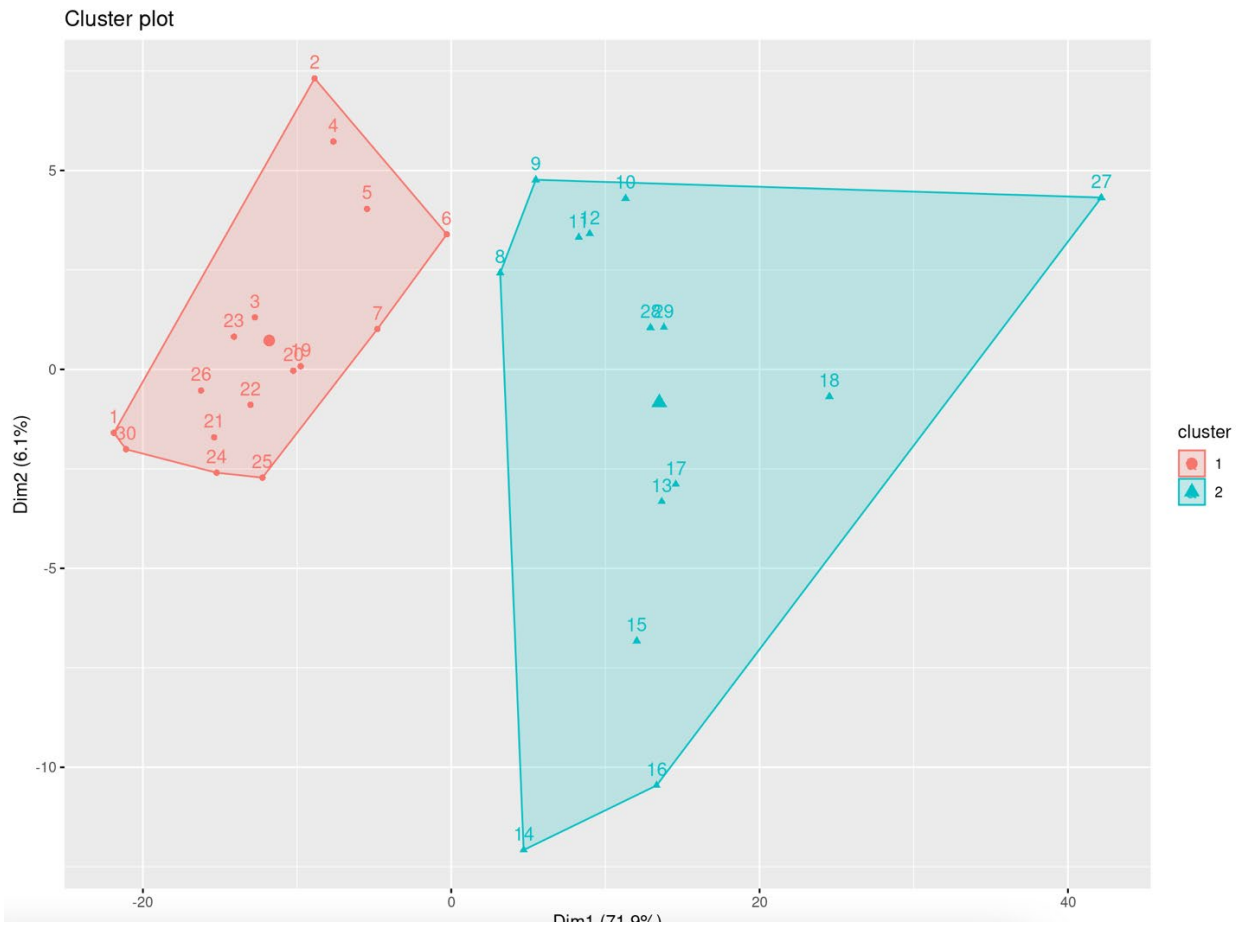
- *H<sub>1</sub>: The Covid-19 pandemic is correlated with an effect on personality indicators, noted by a shift in attitudes and behaviors between the pre- and post-pandemic data,*
- *H<sub>2</sub>: The Covid-19 pandemic is correlated with an effect on SDG preference indicators, noted by a shift in average rankings between the pre- and post-pandemic data,*

- *H<sub>3</sub>: There is a difference in attitude and behaviors between business student respondents and non-business school respondents,*
- *H<sub>4</sub>: There is a difference in attitude and behaviors between business student respondents and non-business school respondents and this is correlated with differing SDG preferences.*
- *H<sub>6</sub>: Certain demographic statistics are correlated with specific SDG preferences, regardless of the pandemic effect.*

The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 1**

*Cluster Analysis of all Variables and SDGs*



*Note.* 1 = the pre-pandemic binary variable, 2-18 = SDG1-17 preference respectively, 19 = preference for working for a green organization, 20 = preference for working for a green HR, 21 = the authoritarianism variable, 22 = the individualism/ collectivism variable, 23 = religiousness variable, 24 = religion importance variable, 25 = liberal or conservative variable, 26 = political affiliation, 27 = age, 28 = sex, 29 = race, and 30 = school indicator binary variable.

Cluster 1, shown in red, contains the variables for the pandemic, preference for SDGs 1-6, preference for working for a green organization, preference for working for a green HR, authoritarianism, individualism/ collectivism, religiosity, religious importance, liberal/ conservative, political affiliation, and school indicator. Cluster 2, shown in blue, contained the variables for SDG 7-17 preference, age, sex, and race.

The cluster analysis determined that preference for SDGs 1-6 is related to the timing of the data collection, either pre- or post-pandemic. This indicates a shift in preference in these variables that correlates with the emergence of the punctuated equilibrium of the Covid-19 pandemic. This supports *H<sub>2</sub>: The Covid-19 pandemic is correlated with an effect on SDG preference indicators, noted by a shift in average rankings between the pre- and post-pandemic data.*

Additionally, this cluster analysis determined that preference for working for a Green Organization, preference for working for an organization with a Green HR, authoritarianism, individualist/ collectivist tendencies, religiosity, religious importance, and political ideology is also related to the timing of the pandemic data. This indicates that there was a shift in these variables pre- and post-pandemic onset. This supports *H<sub>1</sub>: The Covid-19 pandemic is correlated with an effect on personality indicators, noted by a shift in attitudes and behaviors between the pre- and post-pandemic data* and *H<sub>3</sub>: There is a difference in attitude and behaviors between business student respondents and non-business school respondents.*

Furthermore, the cluster analysis did determine that the binary indicator for school (either business school or non-business school) was also related to the preference for SDGs 1-6. This supports *H<sub>4</sub>: There is a difference in attitude and behaviors between business student respondents and non-business school respondents and this is correlated with differing SDG preferences.*

Due to the clustering of preferences for SDGs 7-17 and the demographic statistics of age, sex, and race, there is some evidence that, *H<sub>6</sub>: Certain demographic statistics are correlated with specific SDG preferences, regardless of the pandemic effect,* may be true, but more cluster analyses would solidify the support for this particular hypothesis.

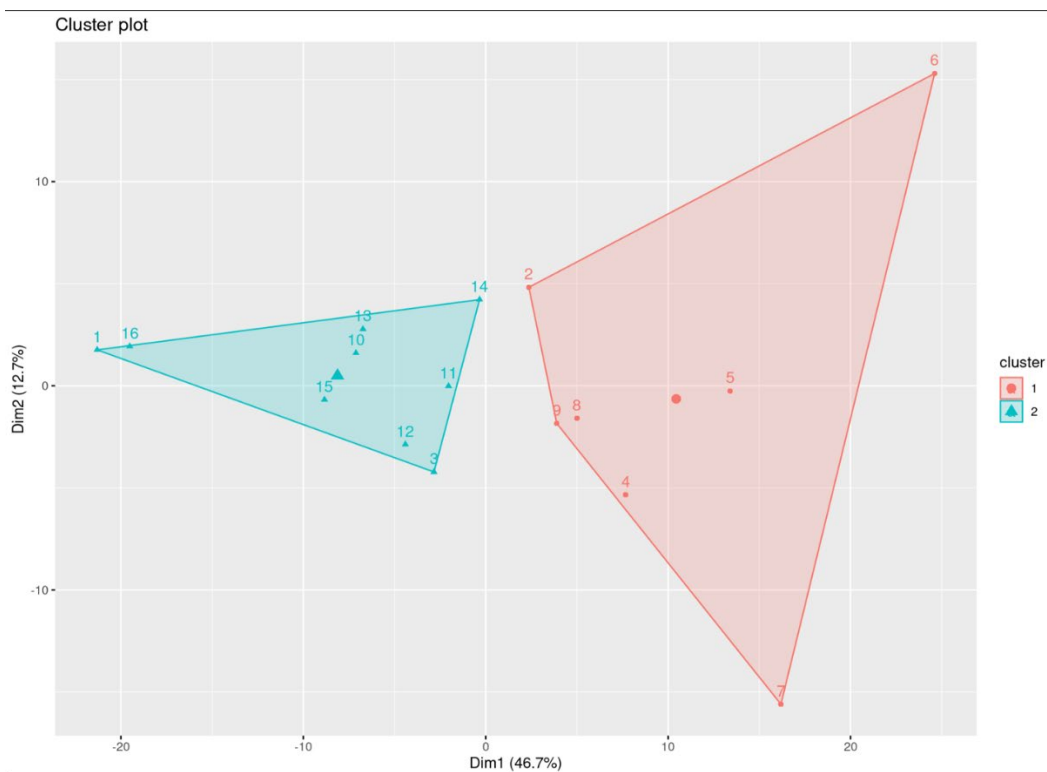


## Run 2

Because there were 30 variables in the initial clustering, it seemed prudent to break down each cluster into its own cluster analysis to determine if more relationships could be determined. Cluster 1 was the first to be re-clustered. Again, the silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

### Figure 2

*Cluster Analysis of the Variables Clustered in Cluster 1 from Cluster Run 1*



*Note.* Cluster 1 from Cluster Run 1 included the variables of the pandemic, preference for SDGs 1-6, preference for working for a green organization, preference for working for a green HR, authoritarianism, individualism/collectivism, religiosity, religious importance, liberal/conservative, political affiliation, and school indicator, where 1 = the pre-pandemic binary variable, 2 - 7 = SDG1- 6 preference respectively, 8 = preference for working for a green organization, 9 = preference for working for a green HR, 10 = the authoritarianism variable, 11 = the individualism/collectivism variable, 12 = religiousness variable, 13 = religion importance variable, 14 = liberal or conservative variable, 15 = political affiliation, and 16 = school indicator binary variable.

Here, it can be seen that within cluster 1, shown in blue, the variables that are most related are that of the pre- and post-pandemic indicator, preference for SDG 2, authoritarianism, individualism/ collectivism, religiousness, religion importance, liberal/ conservative, political affiliation, and school indicator. While the exact shifts cannot be determined from cluster analysis, this does further support  $H_1$  and  $H_3$ , *the Covid-19 pandemic is correlated with an effect on personality indicators and there is a difference in attitude and behaviors between business student respondents and non-business school respondents*, as the binary variable for the onset of the Covid-19 pandemic is correlated with some shift in these variables.

Furthermore, this clustering also provides evidence for  $H_4$ , *there is a difference in attitude and behaviors between business student respondents and non-business school respondents and this is correlated with differing SDG preferences*, respectively, as preference for SDG2, *Zero Hunger*, shifted in some correlation to the school indicator.

Additionally, SDGs 1, 3, 4, 5, and 6, are then to be more closely related to the preference of a student for working for a green organization or one with a green HR. Logically, if a respondent would prefer to work for an organization or HR that espouses green values, they would also demonstrate stronger preferences for specific sustainability concepts. It is interesting to note, however, that all of the SDGs in this cluster, shown in red, do fall within the first SDG grouping of *People and Prosperity*. This indicates that though sustainability preferences are stronger in relation to the desire to work with a green organization, the preferences are based on economics and equality rather than being environmentally focused in nature.

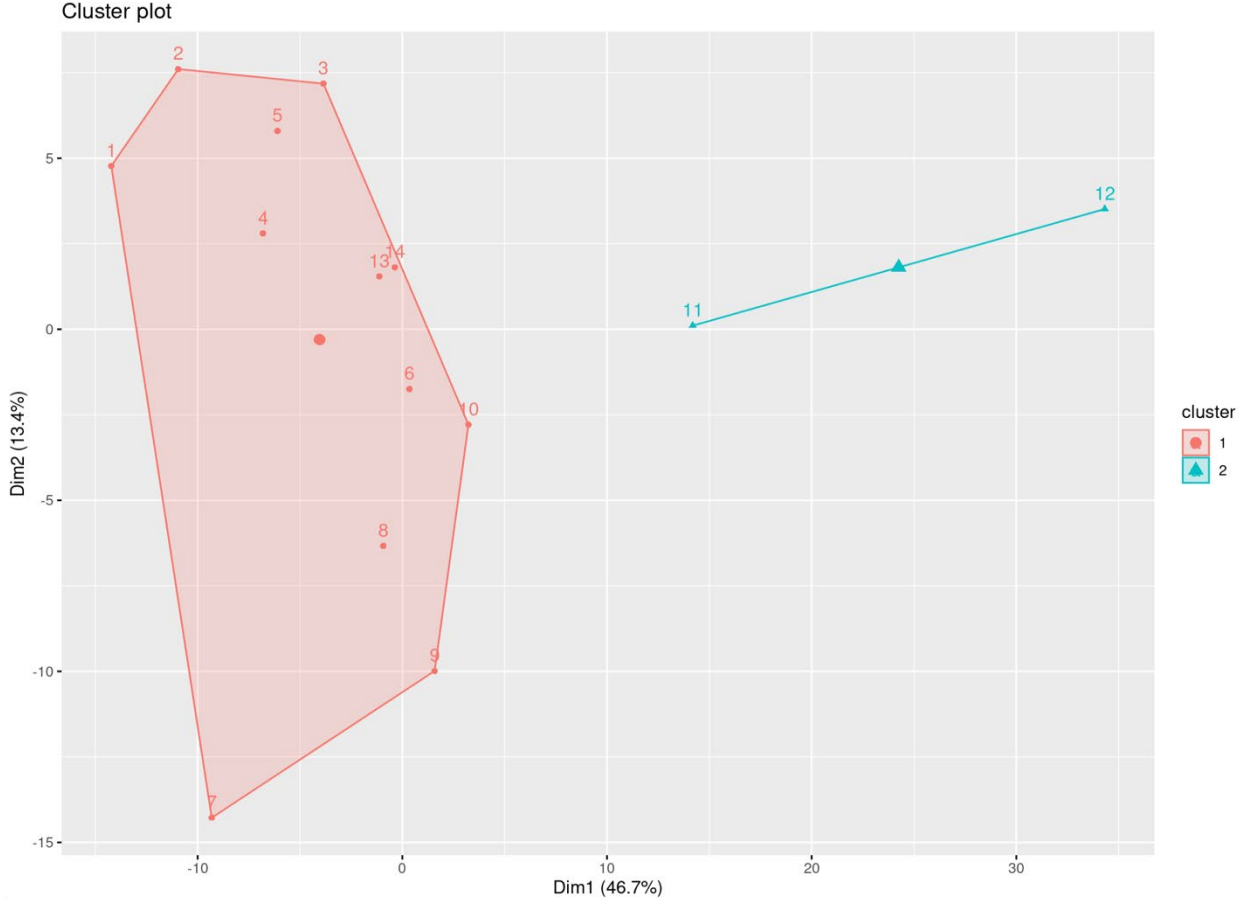
### **Run 3**

For this clustering, the original Cluster 2 from Run 1 was re-clustered just as Cluster 1 was to see if any other relationships could be determined from the smaller grouping of variables.

Again, the silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 3**

*Cluster Analysis of Cluster 2 from Cluster Run 1*



*Note.* Cluster 2 from Cluster Run 1 included the variables for SDG 7-17 preference, age, sex, and race. 1 - 11 = SDGs 7-17 respectively, 12 = age, 13 = sex, and 14 = race respectively.

In further support of  $H_6$ : *Certain demographic statistics are correlated with specific SDG preferences, regardless of the pandemic effect*, it appears that SDG17: *Partnerships for the Goals* is most related to age, as can be seen by cluster 2, in blue. Whether it is younger or older ages that support SDG17 more is for further examination, but the cluster analysis does determine these factors to be correlated.

In some support of  $H_6$  is also the grouping of SDGs 7-16 with the factors of race and sex. However, this is less reliable as it is possible that these factors were simply clustered together because they did not share similarities with SDG17 or age. In other words, the only similarity the factors in cluster 1, shown in red, may share is that they do not share a relationship with anything else. More clustering would need to be done to determine the strength of this clustering relationship.

#### **Run 4**

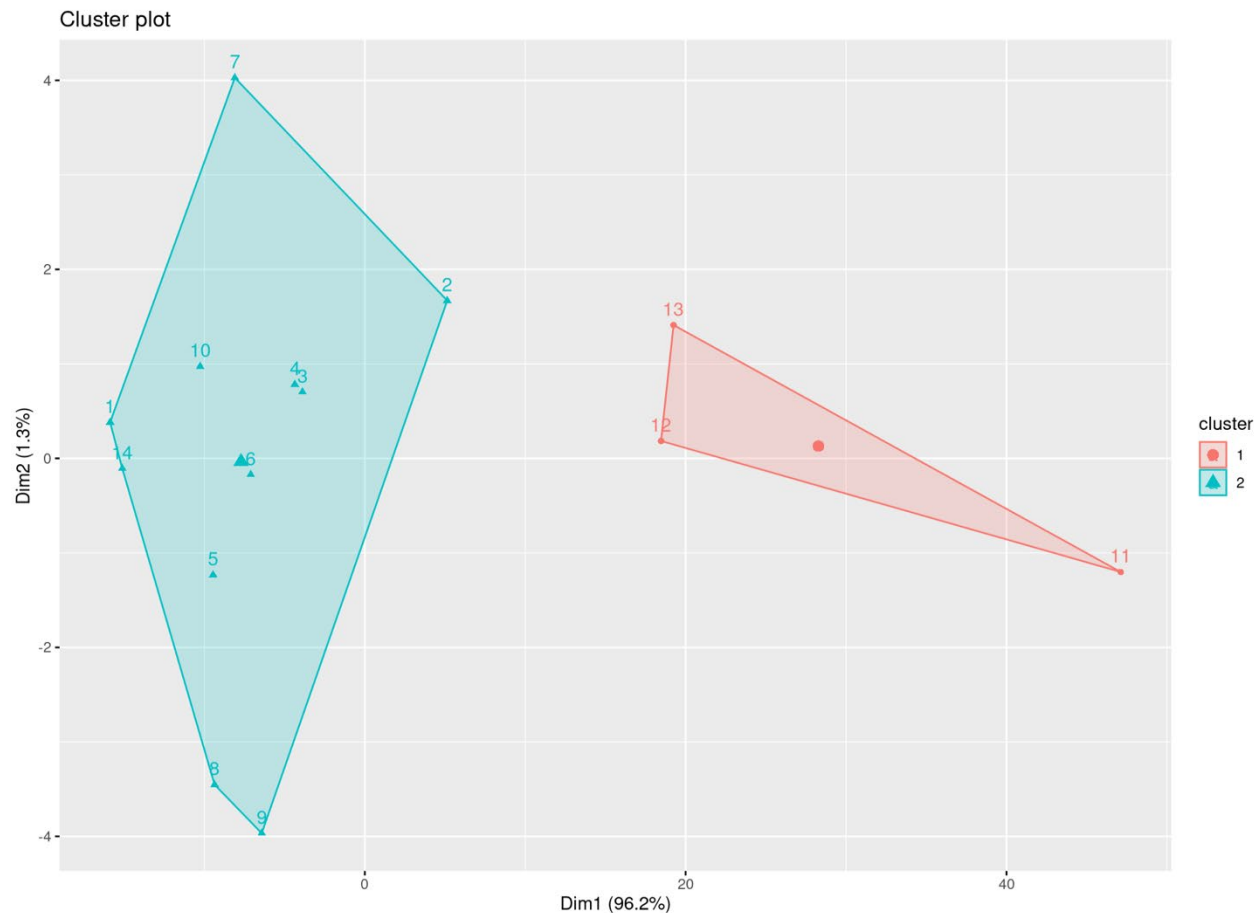
Due to the number of SDGs, and their similarity in nature to one another, there is a potential that the inclusion of all 17 may have confounded the data in the previous clustering runs. Since clusters are generated based on the proximal relationship variables have with one another, it is possible that the relative closeness of each of the SDGs might have generated further relative distances from indicators with which they may actually share a relationship. Thus, to simplify the relationships to determine if the same conclusions can be drawn, the same clustering analysis conducted in runs 1-3 were repeated with the specific SDG groupings, *People and Prosperity*, *Planet*, and *Peace and Partnerships*, to determine what, if any, relationship this has to the other variables.

The first SDG grouping is those goals which fall into the category of *People and Prosperity* with their focus and encompass SDGs 1-10. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 4**

*Cluster Analysis of All Explanatory Variables and SDG group 1, the People and Prosperity*

*Focused Goals*



*Note.* 1 = the pre-pandemic binary variable, 2 = SDG group 1 average preferential ranking, 3 = preference for working for a green organization, 4 = preference for working for a green HR, 5 = the authoritarianism variable, 6 = the individualism/ collectivism variable, 7 = religiousness variable, 8 = religion importance variable, 9 = liberal or conservative variable, 10 = political affiliation, 11 = age, 12 = sex, 13 = race, and 14 = school indicator binary variable.

This cluster analysis determined that the factors of age, sex, and race do not share a relationship with the average preferential ranking of the goals in SDG group 1 as these indicators are separated into their own cluster shown in red. Instead, preference for SDG group 1 does share a relationship with the onset of the Covid-19 pandemic, preference for working for a green

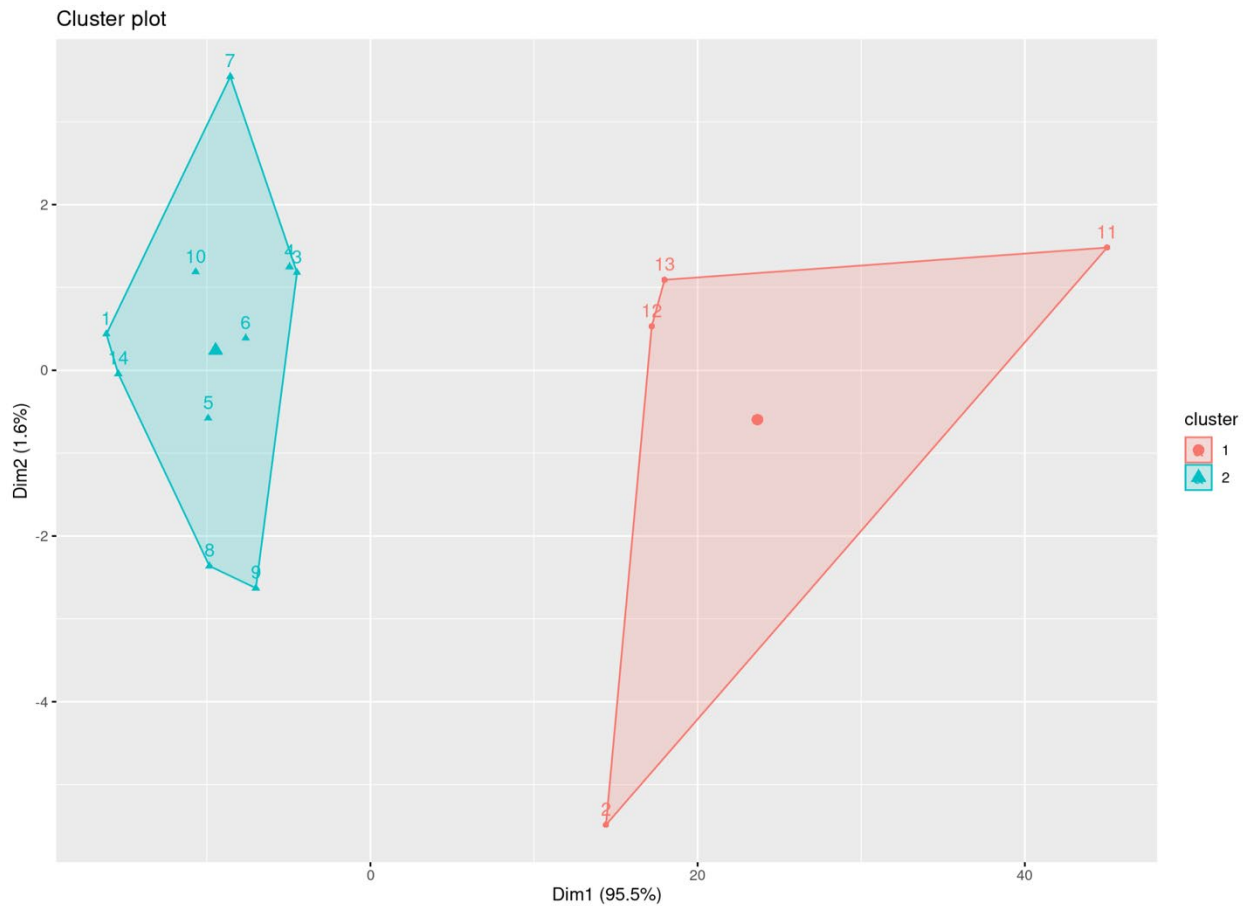
organization, preference for working for a green HR, authoritarianism, individualism/collectivism, religiousness, religious importance, liberal/ conservative, political affiliation, and which school the respondent attended. This supports the prior findings in cluster runs 1-3 that found support for  $H_1 - H_5$ , and  $H_6$ . The Covid-19 pandemic does share some relationship with a shift in personality indicators, religious preferences, political preferences, sustainability preferences, and/or SDG ranking preferences. Additionally, there is a potential difference in sustainability ideologies, personality indicators and/ or SDG preferences between the business students and non-business students. Finally, though preference for SDG group 1 does not share a relationship with the demographic statistics of age, sex, or race, this still supports the hypothesis that certain demographics have a relationship with certain SDGs. It just so happens that it is not the SDGs that are included in grouping 1.

#### **Run 5**

The second SDG grouping is those goals which fall into the category of *Planet* with their focus and encompass SDGs 11-15. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 5**

*Cluster Analysis of All Explanatory Variables and SDG group 2, the Planet Focused Goals*



*Note.* 1 = the pre-pandemic binary variable, 2 = SDG group 2 average preferential ranking, 3 = preference for working for a green organization, 4 = preference for working for a green HR, 5 = the authoritarianism variable, 6 = the individualism/ collectivism variable, 7 = religiousness variable, 8 = religion importance variable, 9 = liberal or conservative variable, 10 = political affiliation, 11 = age, 12 = sex, 13 = race, and 14 = school indicator binary variable.

In the first support of  $H_5$ : *The People and Prosperity SDGs (SDG1-SDG10) are correlated with authoritarian, religiosity, and collectivist attitudes and therefore will be the most affected grouping of SDGs by the Covid-19 pandemic*, this cluster analysis determined that there is not a strong relationship between the average preferential ranking for SDG group 2 and the pre- and post-pandemic indicator. This indicates that while there may have been some

relationship between these variables, it was not strong enough to generate a cluster. Thus, so far, preference for the goals in SDG group 1 were the most affected by the emergence of the Covid-19 pandemic. This will have to be confirmed in Run 6 when the relationships to SDG group 3 are tested.

Additionally, this indicates the strongest support of  $H_6$  yet, as the preference for SDG group 2 shared the closest relationship with the demographic factors of age, sex, and race, as shown in cluster 2 in red.

While cluster 1 in blue does not determine any relationship with the SDGs, it does confirm the relationships determined in prior cluster runs in which the pandemic is related to the personality indicators, preferences for working for a green organization or green HR, religiousness, religious importance, liberal/ conservative, political affiliation. It also reaffirms the general difference noted between those respondents in the business school and those who attend another school.

## **Run 6**

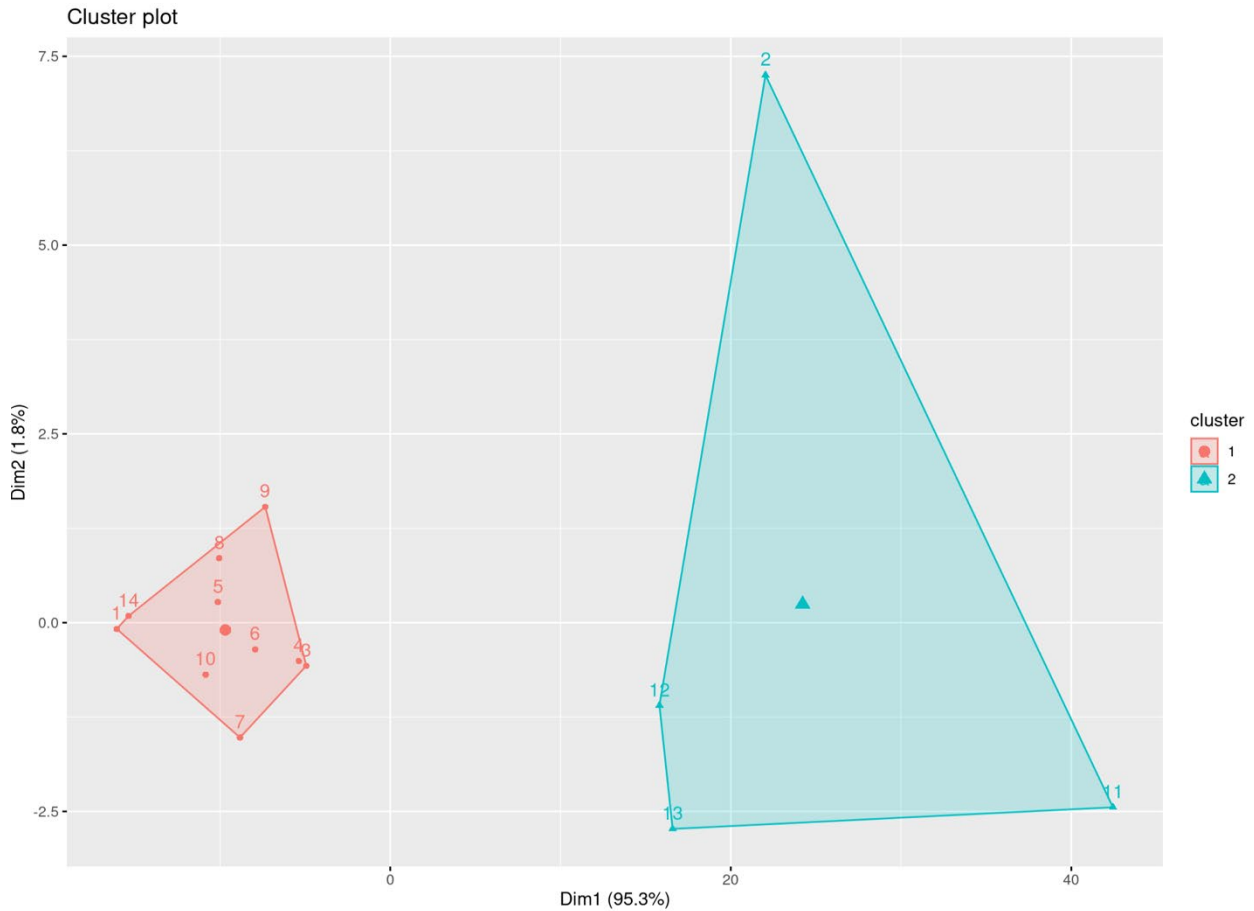
The third SDG grouping is those goals which fall into the category of *Peace and Partnership* with their focus and encompass SDGs 16 and 17. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:



**Figure 6**

*Cluster Analysis of All Explanatory Variables and SDG Group 3, the Peace and Partnership*

*Focused Goals*



*Note.* 1 = the pre-pandemic binary variable, 2 = SDG group 3 average preferential ranking, 3 = preference for working for a green organization, 4 = preference for working for a green HR, 5 = the authoritarianism variable, 6 = the individualism/collectivism variable, 7 = religiousness variable, 8 = religion importance variable, 9 = liberal or conservative variable, 10 = political affiliation, 11 = age, 12 = sex, 13 = race, and 14 = school indicator binary variable.

Again, in support of  $H_5$ , the preferential ranking for SDG group 3 does not share a strong relationship with the Covid-19 pandemic indicator. As such, SDG group 1 are the SDGs most affected by the emergence of the Covid-19 pandemic.

In support of  $H_6$ , the strongest relationship SDG group 3 shares is with the demographic indicators of age, sex, and race. This is similar to the finding in cluster Run 3, where SDG17 was found to share the strongest relationship with race.

Furthermore, Run 6 again confirms the relationships determined in the previous runs in which the pandemic is related to the personality indicators, preferences for working for a green organization or green HR, religiousness, religious importance, liberal/ conservative, political affiliation. It also reaffirms the general difference noted between those respondents in the business school and those who attend another school.

### **Run 7**

Just as there was a potential for the strength of the relationship between the SDGs to confound the relationship their preferences may have with the other indicators, there is also a potential for the inclusion of the respondent data from both the business school and non-business school attendees to complicate the relationships between the personality indicators and the pandemic indicator. The pandemic indicator has been shown to share the same relative relationship with the school indicator as it does with the personality indicators and SDG group 1. Trying to determine the relationship between these two specific variables does not produce any logical results and may simply be due to a difference in the number of respondents from each student grouping pre- and post-pandemic. However, this gets more complicated when trying to determine the co-relationship they share with the other indicators. For instance, is the shift in authoritarianism due to this indicator's relationship with the emergence of the pandemic or with the shift in the number of respondents from each school?

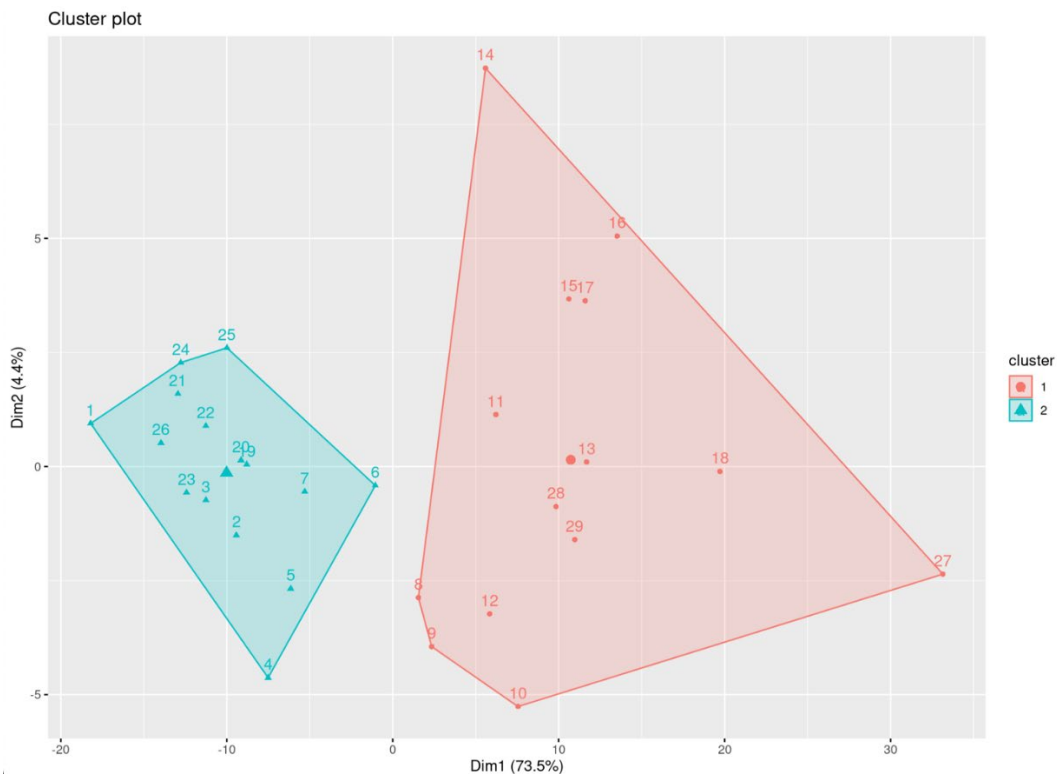
While personality indicator shifts are important to understand for educators regardless of field of study, this analysis is being conducted specifically to understand the shift in business

students' SDG preferences and personality indicators based on the relationship to the emergence of the Covid-19 pandemic. As such, the following runs will reiterate the previous cluster runs of 1 - 6 with just the data from the business students.

The first cluster run then will be testing the relationship of every SDG preference with all of the other indicators except that of the binary school indicator. Only business student respondent data will be used for this cluster run. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 7**

*Cluster Analysis of All Explanatory Variables for Business Students Only and All SDGs*



*Note.* 1 = the pre-pandemic binary variable, 2-18 = SDG1-17 preference respectively, 19 = preference for working for a green organization, 20 = preference for working for a green HR, 21 = the authoritarianism variable, 22 = the individualism/ collectivism variable, 23 = religiousness variable, 24 = religion importance variable, 25 = liberal or conservative variable, 26 = political affiliation, 27 = age, 28 = sex, and 29 = race.

Similar to the results found when running the whole data, Walker College of Business students' preferences for SDGs 1-6 were closely related to the variables of the timing of the survey (either pre- or post-pandemic), their preference for working for a Green Organization, their preference for working for an organization with a Green HR, their level of authoritarianism, individualism/ collectivism, religiosity, and political affiliation and ideology. Also similarly, students' preference for SDGs 7-17 are more closely related to the students' Age, Sex, and Race.

This confirms the findings from the previous cluster runs in which support for  $H_1$ ,  $H_2$ , and  $H_6$  was found. As demonstrated by cluster 1 shown in blue, the punctuated equilibrium of the Covid-19 pandemic is correlated with a shift in the preference to work for a green organization, the preference to work in a green HR, authoritarianism, individualism/ collectivism, religiousness, religious importance, liberal/ conservative, and political affiliation. The punctuated equilibrium of the Covid-19 pandemic is also correlated with a relationship to shift in preference for SDGs 1-6. Finally, as demonstrated by cluster 2 shown in red, certain demographic traits do share stronger relationships with preference for certain SDGs over others.

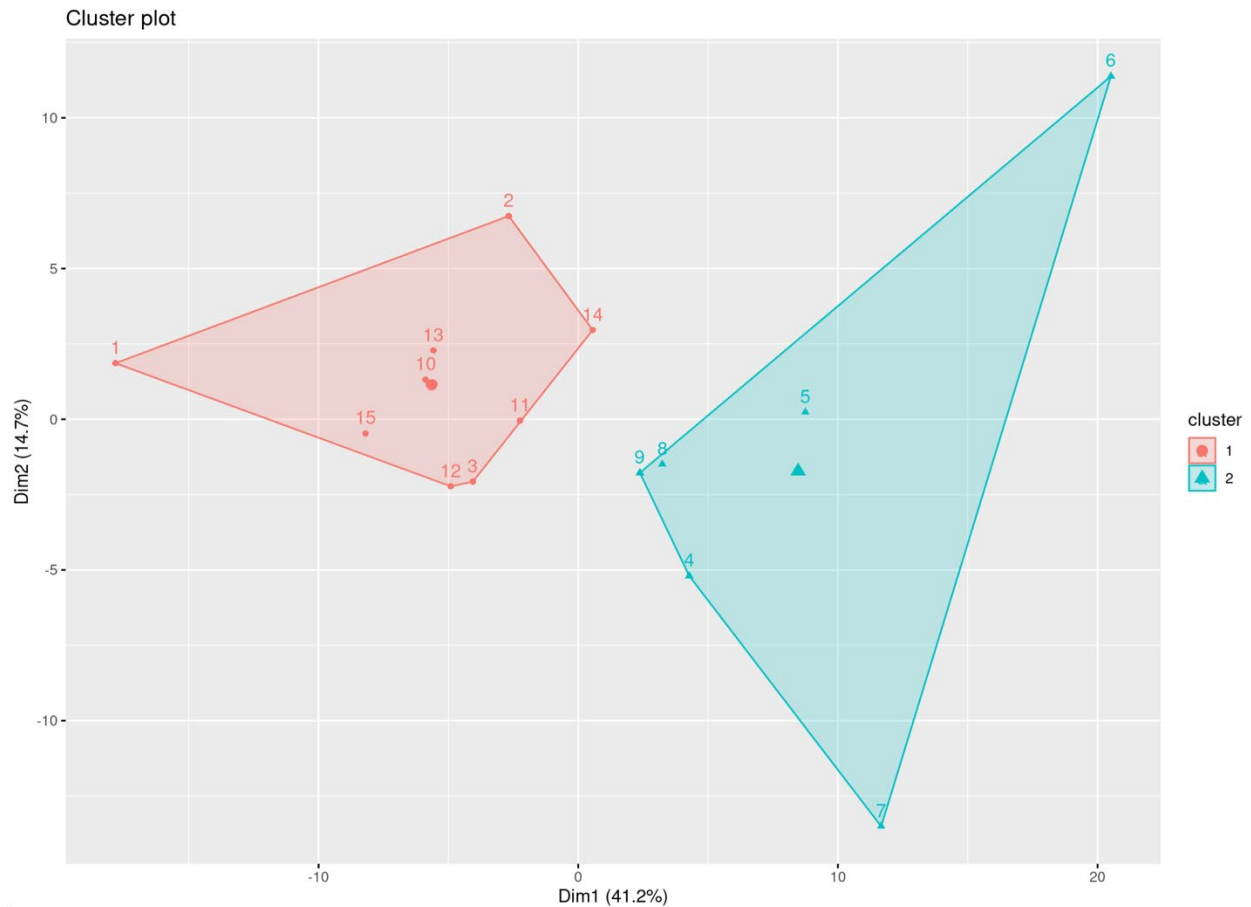
## **Run 8**

Just as was done in cluster Run 2, each of the clusters found in Run 7 will be run as their own separate analysis to determine the strength of relationships the indicators within the when they are simply run with each other.

78, Cluster 1 from Run 7 will be re-clustered first. Again, the silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 8**

*Cluster Analysis of the Variables Clustered in Cluster 1 from Cluster Run 7*



*Note.* 1 = the pre-pandemic binary variable, 2 - 7 = SDG1- 6 preference respectively, 8 = preference for working for a green organization, 9 = preference for working for a green HR, 10 = the authoritarianism variable, 11 = the individualism/ collectivism variable, 12 = religiousness variable, 13 = religion importance variable, 14 = liberal or conservative variable, and 15 = political affiliation.

Breaking the results down further, it was determined that Walker College of Business Students' preferences for SDGs 1 and 2 were more closely related to the personality indicators of authoritarianism, individualism/ collectivism, religiosity, and political affiliation and ideology and they all shared a mutual relationship with the emergence of the Covid-19 pandemic. This indicates 2 ideas. Firstly, business students' preferences for SDG1, *No Poverty*, shares a stronger

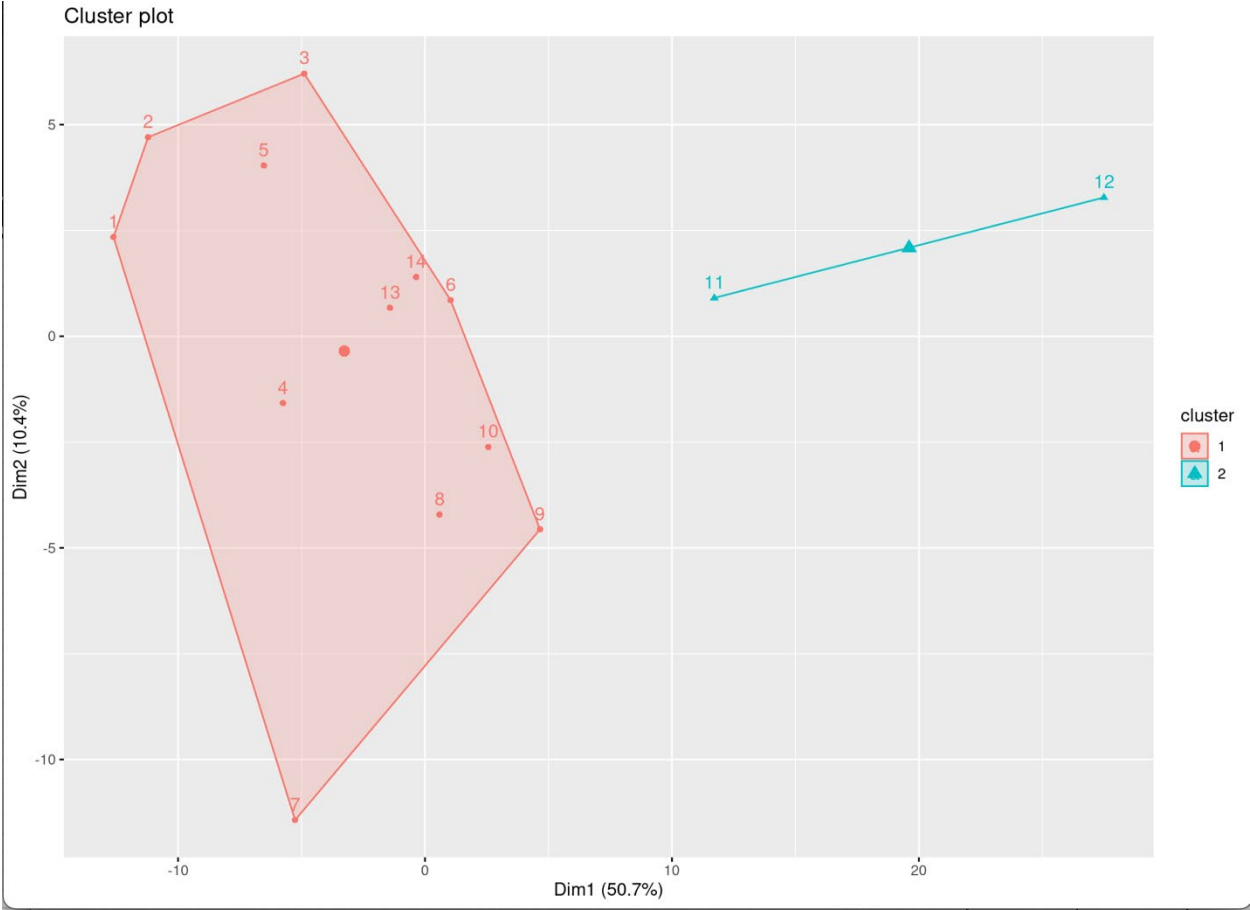
relationship with their preference for SDG2 and the personality indicators than their peers from other fields of study. Secondly, there was a shift in this preference and/or the personality indicators that prefer these SDGs during the pandemic. This supports both  $H_1$  and  $H_2$ .

**Run 9**

For this cluster run, Cluster 2 of Run 7 was analyzed further. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 9**

*Cluster Analysis of Cluster 2 from Cluster Run 7*



*Note.* 1 - 11 = SDGs 7-17 respectively, 12 = age, 13 = sex, and 14 = race.

It is important to note that school indicator was not included in the clustering of Run 3. Thus, the findings are almost exact of those of Run 3. The only difference between the two runs is that sample population is smaller in this cluster analysis due to the fact that non-business student entries were not included. As such, there are minor differences. However, the relationships determined here match that of those determined in Run 3. Notably, age shares the strongest relationship to SDG17. This is a strong support for  $H_6$ .

However,  $H_3$  and  $H_4$  are no longer supported. These results are almost identical to that of cluster Run 3 in which the school indicator was included. Thus, the relationship that indicator has with SDGs 7-17 is minimal and SDG preference for these goals may be undetermined by field of study.

### **Run 10**

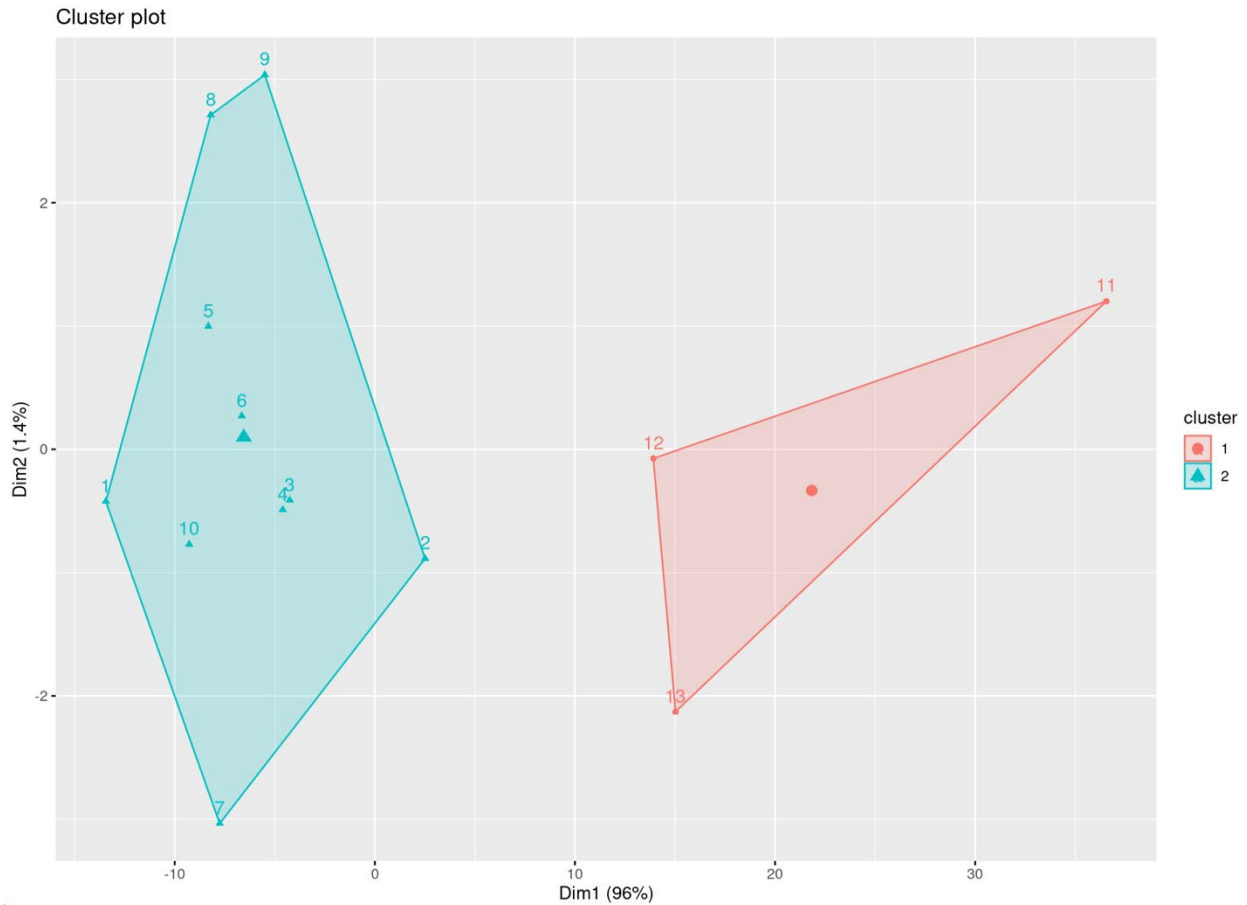
79, 81 The final set of clustering will then be to determine if the inclusion of all 17 SDGs confounded the relationship with any other variable(s) in the previous data runs specific to the business students' preferences. For the same reasoning as previously, the clusters are generated based on the proximal relationship variables have with one another. Thus, it is possible that the relative closeness of each of the SDGs might have generated further relative distances from indicators with which they may share a strong relationship. To simplify the relationships and determine if the same conclusions can be drawn as before, the same clustering analysis conducted in runs 4-6 were repeated with the specific SDG groupings, *People and Prosperity*, *Planet*, and *Peace and Partnerships*, on just the data from the business student respondents to determine what, if any, relationship this has to the other variables.

The first SDG grouping is those goals which fall into the category of *People and Prosperity* with their focus and encompass SDGs 1-10. The silhouette methodology determined

2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 10**

*Cluster Analysis of All Explanatory Variables for Business Students Only and SDG Group 1, the People and Prosperity Focused Goals*



*Note.* 1 = the pre-pandemic binary variable, 2 = SDG group 1 average preferential ranking, 3 = preference for working for a green organization, 4 = preference for working for a green HR, 5 = the authoritarianism variable, 6 = the individualism/ collectivism variable, 7 = religiousness variable, 8 = religion importance variable, 9 = liberal or conservative variable, 10 = political affiliation, 11 = age, 12 = sex, and 13 = race

As found in cluster Run 4, there is support for  $H_1$ ,  $H_2$ , and  $H_6$ . The pandemic indicator shares a relationship with the personality indicators, sustainability in the workplace preference



indicators, the religious indicators, the political indicators, and the preference for SDG group 1. This indicates that there was a potential shift in preferences after the emergence of the Covid-19 pandemic, and that this relationship is also indicative of a potential shift in personality indicators experienced during this same time period. Additionally, the demographic factors of age, sex, and race do not share a strong relationship with the preference for the goals in SDG group 1, also supporting the hypothesis that certain SDGs are determined more strongly by demographics than others.

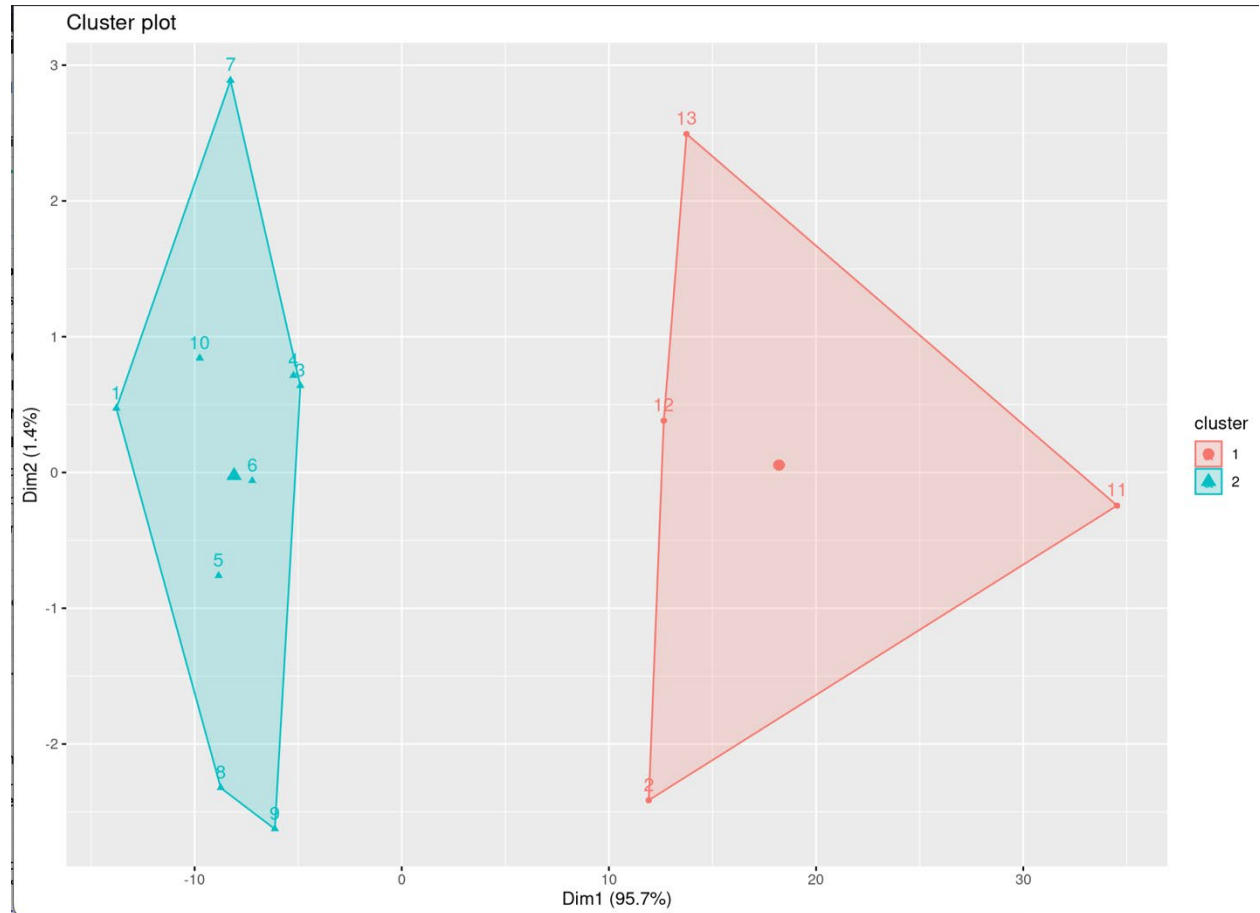
Again, however,  $H_3$  and  $H_4$  are no longer supported due to the fact that these results are almost identical to that of cluster Run 4 in which the school indicator was included. Thus, the relationship that indicator has with the SDGs in SDG group 1 is minimal and SDG preference for these goals may be undetermined by field of study.

### **Run 11**

The second SDG grouping to test for the business student respondents is those goals which fall into the category of *Planet* with their focus and encompass SDGs 11-15. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 11**

*Cluster Analysis of All Explanatory Variables for Business Students Only and SDG Group 2, the Planet Focused Goals*



*Note.* 1 = the pre-pandemic binary variable, 2 = SDG group 2 average preferential ranking, 3 = preference for working for a green organization, 4 = preference for working for a green HR, 5 = the authoritarianism variable, 6 = the individualism/ collectivism variable, 7 = religiousness variable, 8 = religion importance variable, 9 = liberal or conservative variable, 10 = political affiliation, 11 = age, 12 = sex, and 13 = race

This cluster run also supports  $H_6$  as demonstrated by cluster 2 shown in red. The preference for the goals listed in SDG group 2 share a stronger relationship with the demographic factors of age, sex, and race, than they do with any of the other indicators even just when just analyzing the data from the business student respondents.

Also similar is the support for  $H_1$  as demonstrated by cluster 1 shown in blue. The pandemic indicator does still share a strong relationship with the personality indicators, the sustainable organization preferences, the religious preferences, and the political preferences indicating that there was a shift in these indicators following the onset of the Covid-19 pandemic.

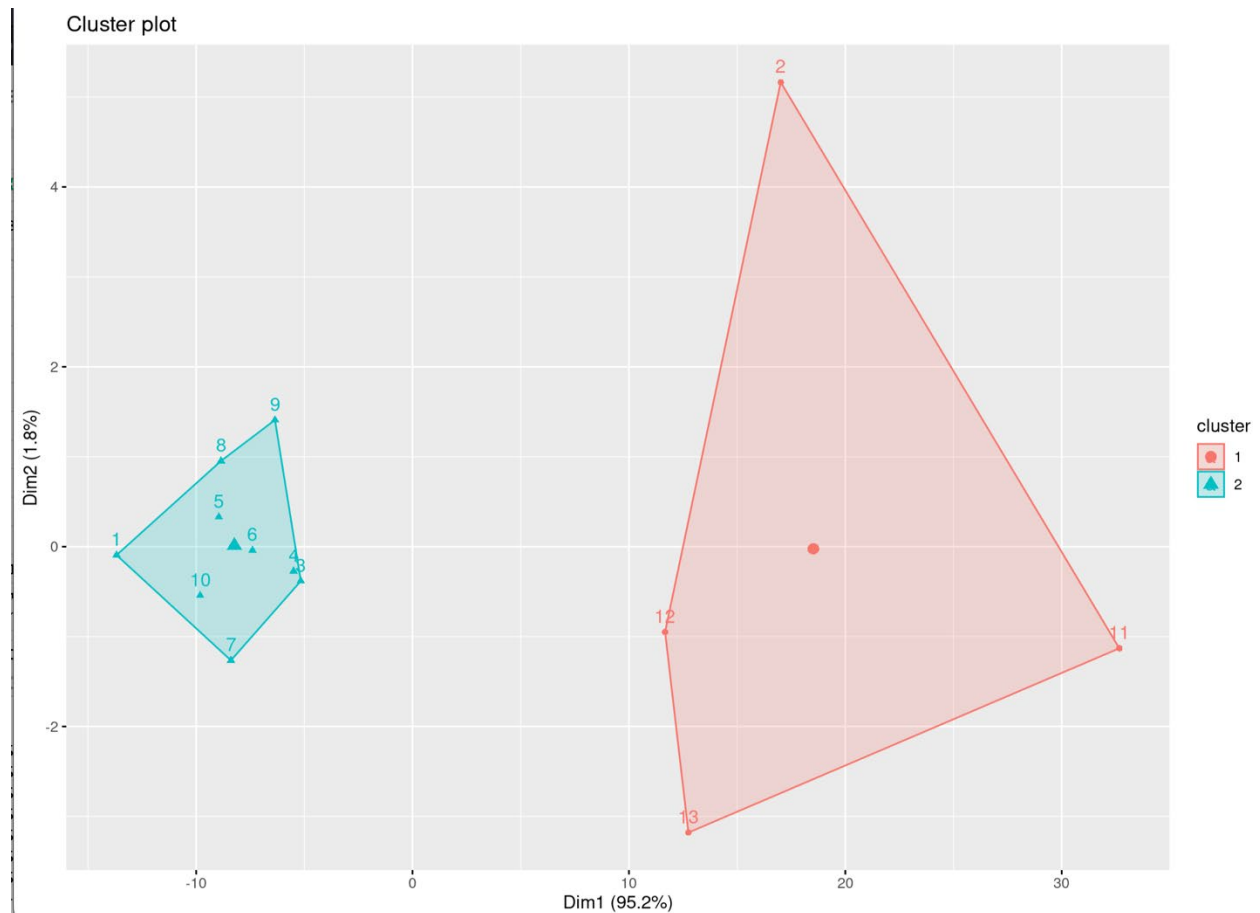
Additionally,  $H_3$  and  $H_4$  are again no longer supported as these results are almost identical to that of cluster Run 5 in which the school indicator was included. Thus, the relationship that indicator has with the preference for the SDGs in SDG group 2 is minimal and SDG preference for these goals may be undetermined by field of study.

## **Run 12**

The third SDG grouping to test for the business student respondents is those goals which fall into the category of *Peace and Partnership* with their focus and encompass SDGs 16 and 17. The silhouette methodology determined 2 clusters was the optimum size for K means clustering of this dataset and a visualization of this result is as follows:

**Figure 12**

*Cluster Analysis of All Explanatory Variables for Business Students Only and SDG Group 3, the Peace and Partnership Focused Goals*



*Note.* 1 = the pre-pandemic binary variable, 2 = SDG group 3 average preferential ranking, 3 = preference for working for a green organization, 4 = preference for working for a green HR, 5 = the authoritarianism variable, 6 = the individualism/collectivism variable, 7 = religiousness variable, 8 = religion importance variable, 9 = liberal or conservative variable, 10 = political affiliation, 11 = age, 12 = sex, and 13 = race.

In this final cluster analysis, the results of prior clustering attempts are re-confirmed.

Cluster 1 shown in blue confirms the findings that support  $H_1$ : the punctuated equilibrium event of the Covid-19 pandemic has a relationship to a change in the personality indicators including

the indicators of corporate sustainability preference, religious preference, and political preference. However, Cluster 1 also does not support  $H_2$  due to the fact that the indicator for preference for SDG group 2 goals is not included.

Cluster 2 shown in red demonstrates that there is a relationship between the demographic factors and the preference for the goals in SDG group 3. This supports  $H_6$  that demographic traits may share a stronger relationship with some SDGs than with others. It does, however, also confirm that  $H_3$  and  $H_4$  are no longer supported because these results are almost identical to that of cluster Run 6 in which the school indicator was included. Thus, the relationship that indicator has with the preference for the SDGs in SDG group 3 is minimal and SDG preference for these goals may be undetermined by students' field of study.

## Conclusions

This is an exploratory study and there are further analyses to be run with this dataset. However, the cluster analysis conducted here does demonstrate a few points of interest to direct those future analyses.

First and foremost, the punctuated equilibrium event of the Covid-19 pandemic does have a relationship with the various societal attitudes, behaviors, and values used as indicators for this study. The onset of the pandemic did shake society out of stasis and force it to adapt and evolve. Based on the evidence of this relationship in all 12 of the clusters generated for this study, there is more than likely a shift in personality indicators that will affect social normative structures throughout every level of society in the future.

Interestingly, the only difference between business students and non-business students is their SDG preference was for SDG 1: *No Poverty*. In business students, preference for this goal was determined to share a relationship with the pandemic indicator, preference for working in a green organization, preference for working for a green HR, authoritarianism, individualism/collectivism, religiousness, religious importance, political ideology, and political affiliation. While the non-business student population was not specifically analyzed for their specific SDG preferences, the removal of their data entries did generate this relationship with SDG 1 for the business students' data. The direction of the relationship cannot be determined at this point, but it is important to note that business students feel differently about this goal than non-business students, as determined, more than likely, by their personality indicators, attitudes, behaviors, and values.

Similarly, the cluster analysis conducted in this study indicates that age has a strong relationship in determining preference for SDG17: *Partnership for the Goals*. While it cannot be determined if it is younger or older respondents who have a stronger preference for this goal, it can be determined that this relationship was demonstrated more than once, indicating that it is a strong moderator for this goal.

Additionally, the cluster analysis showed that preference for SDGs 11-17 is more likely to share a relationship with the demographic traits of sex, age, and race, than it is with any other indicator of attitude, belief, or values. This may indicate that these goals are more internalized through demographic socialization than they are through intrinsic personality indicators for SDG group 1: *People and Prosperity*.

## **Discussion**

As with all studies, there are limitations to the analysis conducted. Primarily, the direction of the relationship between the variables cannot be determined through cluster analysis. While it is helpful for educators to see evidence confirming attitude, behavioral, and value shifts in their respective student bodies, the directional relationship is necessary to fully understand what measures to take to meet these shifts. Further studies should be conducted to determine this directionality. However, it is still noteworthy to see that all indicators have been affected in some way by the emergence of the Covid-19 pandemic, confirming that this was a punctuated equilibrium event that has generated mass adaptation efforts. As such, all institutions should mitigate the impact by adopting dynamic and adaptive approaches to organizational structures to prevent the level of external shocks from other punctuated equilibrium events.

Additionally, while this study can demonstrate a shift in attitudes between the two time periods studied, it does not prove the emergence of the Covid-19 pandemic was the direct cause of this shift. Subsequently, these shifts can only be considered correlations, and further studies will be necessary to determine causation.

Due to the nature of the Covid-19 pandemic being a punctuated equilibrium event, data collection was hindered by the unknowable future. In a perfect world, this study would have been conducted with a 1 for 1 data entry tracking so that a single sample could have provided the exact pandemic effect on their respective attitudes, behaviors, and values. The demographics of the two samples used were instead unsimilar. For instance, there were more female respondents



in the post-pandemic survey data than there was in the pre-pandemic. This may have skewed the results even within cluster analysis.

Additionally, there was an omission of one important survey question: *How important is sustainability to you in general?* A 5-point Likert scale could have been used for the answer. This would have helped determine if the survey respondents demonstrated preference for certain SDGs based on their perceived importance of sustainability and if this importance was determined by any attitudes, behaviors, or values.

In the future, this study could be conducted with a differences-in-differences method to attempt to control for the temporal and demographic differences. Additionally, an instrumental variable (IV) methodology could be used with one of the green corporation indicators to attempt a determination about perceived importance of sustainability. Without this IV, the desire to work for a green organization or a green HR could be complicated by unknown factors such as that of a respondent's wish to work for a modern corporation or one with good corporate social responsibility because these corporations are perceived to take care of their employees better.

## **Recommendations**

The emergence of the pandemic has also brought with it lessons to be learned. First and foremost, governance systems and organizations can, and will, adapt quickly to crises in profound ways when faced with survival situations (Hörisch, 2021). Secondly, the societies who experienced the brunt of the pandemic related issues, were also those that are in desperate need of capacity building to mitigate and adapt to issues in climate change (Hörisch, 2021). The disruption in society caused by the pandemic highlighted the inequality gaps that exist in the global society, demonstrating where efforts need to be dedicated most. Most importantly though, the punctuated equilibrium of the Covid-19 pandemic was not surprising to many in the field of virology (Baric et al., 1997). As previously discussed, a study conducted in 1997 by Baric et al. concluded that there was a strong possibility of an evolution in a coronavirus that could result in a pandemic. There were also warnings from the scientific community in regard to the increased risk of zoonotic diseases as changes in environments led animals to search for food in areas with heavy human interaction (Leal Fliho et al., 2022). These theories went unheeded though, and the Covid-19 pandemic is what resulted. Thus, warning signs in environmental trends should not, and cannot, be ignored in society without disastrous consequences (Hörisch, 2021).

The recommendations of this study are therefore twofold:

Firstly, organizations and institutions must be dynamic in structure, adapting quickly to any shock, internal or external, if they wish to survive in the face of punctuated equilibrium events. As these are thought to be more common in the future, this dynamic nature is imperative. Additionally, by simply increasing adaptive capacity within organizations and ensuring that

actors operating within the organization's purview are taken care of, sustainability is coming to fruition. Thus, the potential for sustainability to be internalized as a social norm is there.

Second, preparing emerging adults to meet these new social normative structures is imperative to meeting the first goal of dynamic, adaptive organizations and institutions. Understanding just how their behaviors, attitudes, and values shifted during the pandemic is then imperative to educators to be able to meet their current needs and that of future society's needs by equipping students with the skills necessary to use increased adaptive capacity to their advantage in future punctuated equilibrium events.

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## **Vita**

Chelsea Rose Gulliver was born in Georgetown, Grand Cayman, in the Cayman Islands to Marc and Sue Gulliver. She graduated from St. Mary's College of Maryland in St. Mary's City, Maryland in June 2013 with a degree in Economics focused on economic theory. In the fall of 2020, she entered Appalachian State University to earn a Master of Business Administration focused on sustainable business and interdisciplinary studies. During her degree, Ms. Gulliver commenced work towards a master's thesis. In December 2022, she was awarded the Master of Business Administration degree.

Ms. Gulliver is currently employed by the Rochester Institute of Technology as an economic and policy analyst working on a United Nations Environmental Programme Project studying the circular economy of consumer electronics in Ghana. She plans to pursue further education with a Ph.D. focused solely on sustainability in policy.

Ms. Gulliver is a member of Sigma Iota Epsilon and is an active environmentalist and photographer in her community. She resides in Rochester, NY.