

COOPERATION AND COMPETITION ARE AFFECTED BY PERSONAL VALUES,
BUT NOT BY MORTALITY SALIENCE OR EXTINCTION DUE TO
ENVIRONMENTAL POLLUTION

by

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A thesis submitted to the Graduate Council of
Texas State University in partial fulfillment
of the requirements for the degree of
Master of Arts
with a Major in Psychological Research
August 2022

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ACKNOWLEDGEMENTS

There are many teachers and professors that I would like to thank.

Thank you, Ms. Stef Paramoure, for motivating me to pursue scientific research from a very young age.

Thank you, Ms. Lindsay Ratcliffe (soon to be Dr. Ratcliffe), for opening my eyes to learn about the natural environment and its crisis.

I would like to thank Dr. William Kelemen for his wise advice, “pick a thesis topic that will be relevant in 10 years from now.” Thanks to these great, magical words, I realized what I had to do.

Special thanks to Dr. Joseph Etherton who accepted to be my thesis advisor when I was abruptly left without one. Thanks to his aid and encouragement, I stayed ahead of the game.

I appreciate each of the members of my thesis committee, Randall Osborne, and Christi Townsend, for their cooperation in this research topic, which should be considered a multidisciplinary matter.

Finally, thanks to my family for having made who I am and will be.

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LIST OF ABBREVIATIONS

Abbreviation	Description
BIV	Brief inventory of values
CCPS	Cooperation and Competition Personality Scale
CD	Commons Dilemma
ELE	Extinction of life on Earth condition
MS	Mortality salience condition
DP	Dental pain condition.

ABSTRACT

Many environmental scientists are predicting that the environmental pollution in the Anthropocene will lead to negative consequences, so it is becoming increasingly urgent to address human behaviors that affect Planet Earth. Among factors that likely contribute to delayed climate change mitigation efforts are psychological factors, including the lack of cooperation in addressing the cause, and the competition for diminishing resources. Personal values of self-transcendence (pro-social) and self-enhancement (pro-self) seem to be related to attitudes and behaviors of cooperation and competition. Furthermore, when faced with threatening negative scenarios, self-enhancing competitive values and attitudes may increase, although upon contemplating one's own mortality, pro-social cooperative values and attitudes may increase. Examining the interactions between personal values and effects of perceived negative scenarios may improve our understanding of barriers to effective responses to climate change. In the current experiment, after measuring participants' self-enhancement and self-transcendence values with Stern's Brief Inventory of Values, participants wrote about dental pain, their own death, or extinction of life on Earth, to prime them into one of these negative scenarios. Following a series of distracting tasks, participants' levels of cooperation and competition were measured using the Cooperation and Competition Personality Scale (CCPS) and a commons dilemma task. Results indicated that the hypotheses regarding the negative scenarios were not supported because the negative primes seemed to have no effect on the outcome variables. However, there was support

for the predicted relationships between self-transcendence and cooperation and between self-enhancement and competition. These results suggest that personal values are more predictive of individual's behaviors than surrounding negative scenarios, therefore it may be more important to focus environmental communication research on individuals and their values than on presenting the facts to the public.

I. INTRODUCTION / LITERATURE REVIEW

A. Introduction

Anthropogenic, or human-caused, environmental pollution contributes to the destruction of ecosystems and crops, the destabilization of climates, extreme weather phenomena, floods due to rising sea levels, and several factors harming the health of many organisms on Earth, including humans themselves (McClintock, 2010). The effects of human-caused pollution became evident since the industrial revolution (between 1760 and 1840) (Shaftel et al., 2020) and they have escalated to the present day (Bettencourt et al, 2007; Leiserowitz & Craciun, 2006). The main contributors of this problem include deforestation (Veron et al., 2009), Carbon Dioxide emissions from fossil fuel combustions and industrial processes, the unsustainable farming of livestock, and the transportation of certain foods (Ribas et al., 2017). The measures that are needed to address this crisis are not being implemented, to the point that even if all countries followed the Paris Emissions Path, the average world temperature would still increase by at least three-degrees Celsius (Spratt and Dunlop, 2017). There is consensus among climate scientists that slowing or reducing the consequences of climate change will require significant changes in human behaviors, such as the reduction of deforestation and carbon dioxide emissions (Spratt and Dunlop, 2017).

This is an important issue that humanity must face, but there may be psychological factors impeding climate change mitigation efforts, which could help prevent further damage to planet Earth. Some of these actions could be reducing meat consumption, building more sustainable habitats, ending deforestation, reducing single-use items, and more investment in the development of green energy. Such actions may

require humans to cooperate with each other to modify and adopt better systems and behaviors.

B. The Climate Crisis

Climate is “the long-term pattern of oceanic and atmospheric conditions at a location... described by statistics, such as means and extremes of temperature, precipitation, and other variables...” (National Oceanic and Atmospheric Administration, 2021). Climate change, then, is the change of these recurring weather patterns over long periods of time (e.g., increase in average temperatures over the course of decades). According to the National Oceanic and Atmospheric Administration, recent climate change has included not only a 1 degree Celsius increase in global temperature from 1901 to 2020, but also associated changes including rising sea level, and changes in weather patterns including drought and flooding. Local climate change may occur gradually and naturally throughout time (e.g., due to volcanic eruptions, changes in solar radiation, hurricanes, or other natural disasters). As mentioned by Lindsey and Dahlman (2021), it may sound strange to think of global climate change, since the planet seems so big and sustains such a diverse array of locations. Indeed, not all places are warming up equally, but when averaging all the temperatures across the planet, it is evident that anthropogenic climate change is an unprecedented phenomenon that is changing the Earth’s composition at an alarming rate and increasing the average world temperature twice as fast as natural rate (Lindsey & Dahlman, 2021). The consensus among environmental scientist is that the principal causes of this unnatural change are human actions.

The manufacturing and distribution of man-made products, like a single-use water bottles, consumes energy and creates environmental pollution, which leads to changes in

the climate (Hill, 2020). The root of the problem, then, is human-generated environmental pollution, not “climate change.” Furthermore, the term “environmental pollution” describes the situation more accurately, since it recognizes that the problem is caused by a byproduct of human actions. Meanwhile, climate change implies that the subject is the climate, thereby, the change is the climate’s fault, which is a misconception that can make humanity feel less responsible. Unfortunately, the term “climate change” has become more popular.

It is important to address the issue of environmental pollution because it is already affecting humanity. For example, the Non-Communicable Disease Alliance reported in 2018 that air pollution is the cause of 24% of strokes, 25% of ischemic heart diseases, 29% of lung cancer, and is so broad that 91% of the world’s population lives in areas with air that should be considered unsafe to breathe (Renshaw et al. 2018). To corroborate these statistics, the World Health Organization reports that each year seven million deaths occur due to household and ambient air pollution and that 91% of people live in areas where the air quality exceeds WHO guideline limits (World Health Organization, 2022). These statistics show that ambient pollution is not something that might affect future generations, but rather it is something that is affecting the present generation. Today, some scientists have concluded that irremediable environmental damage has been done, to the point that within a few decades (approximately by 2050), humanity will witness catastrophic irreversible environmental changes (Veron et al., 2009; Huckelba & Van Lange, 2020). If humanity keeps going down this path, then the future will look even worse than what it already is: Extreme weather patterns (e.g., lethal heat waves, floods, and droughts) will become even more prevalent, making Earth a

harsh place for humanity to live in (Gibbens, 2021). Ribas and colleagues (2017) predicted that meeting the extent of decarbonization needed to prevent a two-degree Celsius increase in global temperature would be difficult even if drastic climate policies were adopted in 2020. A two-degree Celsius increase in world temperature would likely result in the destruction of more than 90% of coral reefs worldwide, lowered agricultural production, food insecurity issues, an increase in extreme weather patterns like cyclones, melting of arctic sea ice, and an increase of two to five meters in sea levels (Spratt and Dunlop, 2017).

Humanity has a long way to go, and the necessary changes are not being implemented, according to the climate action plan released by the National Aeronautics and Space Administration (NASA). In their most recent report, the NASA highlights the need to increase energy efficiency, increase the use of renewable energy, reduce greenhouse gas emissions, protect water resources, eliminate waste, prevent pollution, and other measures (NASA, 2021). As a result of humanity's attachment to the known system (Fletcher, 2018; Gifford et al., 2009) and tendency to follow habits (Huckelba & Van Lange, 2020), though, not enough is being done to combat climate change. Humanity is faced with the dilemma of choosing between immediate gratification (i.e., continuing with the already established system that disregards the problems of unsustainable levels of consumption, and if need be, compete for the few resources left), or delayed communal gratification (i.e., making the effort of constructing a system that considers environmental metabolism, and cooperate in the effort to preserve a healthy fertile environment for the future) (Huckelba and Van Lange, 2020). The literature leaves the reader wondering whether it is possible to change humanity's behavior. To answer

this dilemma, it is necessary to understand how scenarios and personal social values influence attitudes and behaviors of cooperation and competition, which in turn influence climate change mitigation.

C. Psychological Factors Affecting Climate Change Attitudes and Behaviors

There are several personality traits that may predispose an individual towards more climate protective behaviors, including open-mindedness (Duchi et al., 2020), not holding strong spiritual beliefs (Lifshin et al., 2016), holding liberal ideologies (Leiserowitz et al., 2018), and having higher levels of self-transcendence in terms of or personal social values (Stern & Guagnano, 1998). It would not be feasible to include all psychological factors that may be relevant to climate-related behaviors, though, so the current study focuses on personal social values, situational characteristics, and the interaction between the two.

First, to motivate people to cooperate in the fight against anthropogenic climate change, it is necessary to understand how personal factors, like personal social values of self-transcendence and self-enhancement, may impact behavior. Self-transcendence values, held more strongly by people with more pro-social behaviors, are values that put the wellness of the community above the commodity of the self (Stern & Guagnano, 1998). These values and attitudes are more likely to be found in more collectivistic societies, which are societies that prioritize the opinion of the community over the independence of the individual, forming a tighter community (Hofstede, 2001; 2015). On the other hand, self-enhancement values, held more strongly by people with more pro-selfish behaviors, are values that put one's own gain and wellness above the interests of the community (Stern & Guagnano, 1998). These values and attitudes are more likely to

be found in more individualistic societies, where the independence and personal freedom of the individual is prioritized over community and social restrictions (Hofstede, 2001; 2015).

An individual with pro-social behaviors and self-transcendent values may be more likely to engage in altruistic and cooperative behaviors, while someone with pro-selfish behaviors and self-enhancement values may be more likely to engage in what may be considered selfish or egoistic behaviors, like competition (Lu et al., 2013; Jokerman and Duell, 2005). Composite Personal Social Values are also considered in the current research, since some researchers in the past, like Sagiv and others (2011) and Schwartz and Bilsky (1990), one of the founding fathers of this literature, have considered self-transcendence pro-social values and self-enhancement pro-self values as opposite ends of the same continuum. Therefore, these researchers measure the factors separately and afterwards merge them by subtracting the scores of the values to create a factor that could be called Composite Personal Social Values. A common tool used to assess personal social values of self-enhancement and self-transcendence is the Brief Inventory of Values (BIV) developed by Stern and Guagnano (1998). Meanwhile, the Social Value Orientation questionnaire, developed by Murphy and others (2011) measures participants' pro-socials and pro-self behaviors.

Second, certain characteristics of a situation can make an individual more frightened and alarmed, and thus engage in impulsive behaviors that are more competitive and less cooperative, even when it would be more convenient for him / her to act in a more cooperative fashion (Bruin et al., 2019). Some of these situational characteristics may be complexity and uncertainty of the scenario (e.g., dealing with a

novel unprecedented situation instead of well-known situations), a sense of little control, higher numbers of people involved in the situation, and past negative experiences that relate to the scenario (e.g., having experienced lack of cooperation among others in similar scenarios) (Bruin et al., 2019). These characteristics may provoke some individuals to compete for the diminishing resources and not cooperate to preserve the environment.

Third human choices and actions may be influenced by personality variables, by situational variables, and also by their interaction. One such interaction has been termed the “Scrooge effect” (Jonas et al., 2002). Higher levels of self-enhancement values and pro-self-behaviors are associated with less cooperation; however, when people with more pro-self than pro-social behaviors are primed with the thought of their own death, they seek to strengthen their social relations, thus they behave in a manner that is as altruistic as people with higher amounts of pro-social behaviors, which may be to achieve a sense of symbolic immortality (Zaleskiewicz and others, 2015; Joireman and Duell, 2005).

This interaction suggests that messages can be interpreted differently by different individuals, since the characteristics of a situation are judged based on personal frames (Kahan & Braman, 2006), or personal values. While a message may motivate one individual to take action and cooperate in the effort, the same message may alienate an individual with opposing values. Understanding these patterns of behavior will help in the construction of a message that will motivate more individuals to help the environment by advocating for climate-friendly policies.

Humanity’s reactions towards the environmental situation can be represented by a Commons Dilemma, or tragedy of the commons. In such scenarios, first described by

Hardin (1968), each individual involved chooses between taking from a common pool of resources for his / her own benefit or leaving resources in the pool so that they regenerate and not get exhausted, which would cause everyone involved to lose. This relates to the current environmental situation in which countries and companies choose between exploiting the limited resources for their own immediate gain or consuming in a sustainable manner that permits the natural recycling of resources to occur and preserve the natural climate. In such situations, people that focus on the threats of competition may defect (take the option that enhances their personal present gain), while people that focus on the benefits of cooperation may cooperate (take the option that foregoes present gain in hopes of enhancing the common good and their own future) (Peysakhovich & Rand, 2016).

Considering the immense threat that the climate crisis casts on humanity's present and long-term wellbeing, there is surprisingly little research on the psychology of how people respond to the threat of environmental pollution, climate change, and the global loss of biodiversity. Personality traits that are likely to be relevant in differentiating people who are more versus less inclined to environmentally friendly behaviors would include self-transcendence and self-enhancement personal social values. The perceived status of the situation is also likely to affect the behavior of an individual. The current study aims to fill the gap in the literature by observing behaviors of cooperation and competition between people with different personal social values when presented with scenarios invoking different negative primes. Specifically, this project seeks to answer: How do situations and personal social values affect cooperation and competition in people? Answering this question is important to develop a message that will motivate

people to cooperate in the shift towards climate change mitigation instead of selfishly competing for the diminishing resources.

D. The Current Experiment

The design constructed to answer this question was influenced by Joireman and Duell (2005) who compared pro-social against pro-self participants when prompted to think about their own death or dental pain. Thinking about their own death put the participants in a mortality salient state of mind, while dental pain served as a control condition to ensure that the results obtained were not due to any general negative prime, but specifically to mortality salience. In the 2 x 2 independent groups experimental design, after completing a Social Value Orientation questionnaire to classify participants as pro-socials or pro-selves, participants wrote about dental pain or their own death to prime them into the corresponding condition. The dependent variables, measured with the BIV, were levels of self-enhancement, self-transcendence, openness to change, and conservation. The results showed that in the control condition of dental pain, pro-social participants showed more self-transcendence values over self-enhancement values, compared to pro-self participants, who presented more self-enhancement values over self-transcendence values. Yet, in the mortality salience condition, values presented were similar; this was called the Scrooge effect, which states that when thinking about one's own death, an individual adopts a more altruistic behavior (Joireman and Duell, 2005). While Stern and Guagnano (1998) found that self-transcendence values correlate with caring about the environment, Joireman and Duell (2005) found that self-transcendence and self-enhancement values are correlated with social value orientations, which are related to environmental concern. Although, more recent research has suggested that

cooperation and competition are distinct independent measures that should not be combined (Lu et al.,2013), and thus it is possible that self-enhancement and self-transcendence should not be treated as opposites, either, as done by Joireman and Duell (2005).

The current study will utilize different ways of measuring the dependent measure because, although the results by Joireman and Duell (2005) were significant, there is a risk of alpha inflation in their results because they only used half of the items from the BIV questionnaire to measure altruism outcomes and disregarded the other items. The current study will use the more modern measures of the Cooperative and Competitive Personality Scale (CCPS). Lu and colleagues (2013) created the CCPS, which measures cooperation and competition as distinct independent dimensions. Upon comparing the CCPS measures of CCPS-cooperation and CCPS-competition against the results from other instruments, Lu and colleagues (2013) found that there was correlation between the CCPS and (1) cooperation and competition behaviors exhibited in a commons dilemma game, (2) pro-social and pro-self classifications of participants by a Social Values Orientation questionnaire, and (3) the values measured by the scale created by Schwartz and Bilsky (1990), thus confirming the concurrent validity of the CCPS scale as a measure of cooperation and competition. They also found that cooperation and competition should be treated as distinct and independent (rather than direct opposites) from each other, since their measures did not correlate.

Besides the CCPS, a commons dilemma (CD) game will be employed in the current study. In a CD, participants choose between taking from the common resource, running the risk of depleting it and making everyone involved lose; or not taking from the

common source, running the risk of staying behind in the competition against the other players involved. Zaleskiewicz and partners (2015) performed a similar study to the one by Joireman and Duell (2005), but with different outcome measures, and obtained similar results. After administering the negative prime manipulations, Zaleskiewicz and partners (2015) used a dictator's game to measure participants' altruism levels. Afterwards, a self-satisfaction questionnaire was also employed to measure participants' satisfaction with their own behaviors during the game. Tarditi and colleagues (2020) demonstrated the use of a CD and its relation to messages of environmental threats. They explained that a CD is more appropriate than other social dilemmas when considering end-of-the world scenarios.

There are two ways to measure the outcome of a CD: (1) Comparing cumulative CD results by adding the points taken in each decision throughout the game, with lower scores indicating more general cooperation for the well-being of the group (less points taken from the pool for oneself). (2) Comparing CD slopes by calculating the average slope of points taken throughout the game, with more negative slopes indicating more concern for the well-being of the group upon seeing a greater threat (at the beginning of the game, the participant may choose to take more points than later in the game because, at first, the common resource pool seems to have a lot of points, but as the game progresses the points left in the common resource diminish, at which point more cooperative players may reduce the amount of points that they take).

To determine whether the outcomes observed are provoked by any mere negative situation (like dental pain), or by any thought of death of oneself, or specifically by thoughts of end-of-the-world, it is important to include a general negative prime

condition and a mortality salience condition, besides the end-of-the-world condition. Mortality salience conditions are conditions in which the participant is presented with something that primes him / her to think about his / her own death or mortality. Cox, and colleagues (2019) reviewed different ways of conducting research in the realm of Terror Management Theory, including optimal methods of administering the manipulation of mortality salience to participants. For instance, studies that used an explicit prime were effective only when participants were distracted between the administration of the condition and the measure of the dependent value. Previous studies have typically used two distractors, such as a Positive and Negative Attitude Scale (PANAS) questionnaire and a crossword puzzle (Cox et al, 2019; Greenberg et al., 1994). The PANAS questionnaire was developed by Watson and others (1988) and it is a well-known instrument in psychology used to measure participants' overall mood in the recent past.

Mortality salience or any other negative prime can also be primed in an implicit manner, such as hidden words in the environment or in a crossword puzzle (Maxfield et al., 2007; Cox et al., 2019). Research results have suggested that implicit primes do not require a neutral distractor after the administration of the manipulation because participants do not become aware that their behaviors are product of the manipulated environment, and therefore attribute the thoughts to themselves rather than discounting them as external factors (Cox et al., 2019), which would lead them to counteract the effects.

E. Research Questions and Hypotheses

The goal of this research is to explore the effects of personal social values and negative scenarios on behaviors and attitudes of cooperation and competition in order to

understand the relatively slow response in addressing climate change. This issue will be examined by comparing attitudes and behaviors of cooperation and competition between participants with different levels of self-transcendent and self-enhancement values when presented with one of the negative primes employed, which include the control condition of dental pain (DP), mortality salience (MS), and extinction of life on Earth due to environmental pollution (ELE). Hypotheses being tested are:

1. More seemingly uncertain and threatening scenarios (i.e., situations that depend on multiple factors and individuals' decisions instead of situations in which one has full control, or situations that are novel and more impactful instead of situations that are easy to manage, and with which one has experience) lead to a reduced sense of control and therefore more impulsive behaviors (Cox et al., 2019; Bruin et al., 2019). Therefore, as the scenario is perceived as more uncertain, novel, and threatening, participants will exhibit greater levels of competition. Therefore, the greatest amount of competition will be observed in ELE and the least in DP.
2. Composite Personal Social Value scores (higher scores indicating an inclination towards self-transcendence values over self-enhancement values) will be positively correlated with measures of cooperation.
3. Composite Personal Social Value scores (lower scores indicating an inclination towards self-enhancement values over self-transcendence values) will be negatively correlated with competition.
4. The interaction between personal social values and the effects of the different negative primes will result in different levels of cooperation and competition:

- Since self- transcendence values relate to caring for the environment, higher levels of self- transcendence will be especially more likely to cooperate under the ELE condition.
- Meanwhile higher levels of self-enhancement will be correlated with exceptionally little cooperation in ELE.
- The Scrooge effect will be present when comparing MS and DP, since people with high Composite Personal Social Values will cooperate more in DP than people with low Composite Personal Social Values; yet cooperation between the two will be matched in the MS condition. This effect will not appear when comparing ELE and DP, though, because it is not possible to achieve symbolic immortality if everyone is dead and no one is left to remember one's final good deeds (i.e., end of the world scenarios are a threat to symbolic immortality, as explained by Lifshin and others (2016)).

II. METHODS

A. Participants

After IRB approval, data was gathered between April and November of 2021. A total of 239 undergraduate participants at or above the age of 18 were recruited using the Sona recruiting system at Texas State University and through professors' motivation, offering extra credit for participation. After exclusions, based on exclusion criteria explained in the results, 136 participants remained in the sample to be analyzed. The sample demographics are expected to match the demographics of the student population at the Texas State University's social sciences bachelor's program. The sample analyzed included 22 males, 113 females, and one non-binary or no answer. The average age was 21.75 with a standard deviation of 4.55, a skewness of 2.80, and a kurtosis of 8.45. No other demographic data was collected.

B. Materials and Procedures

The survey was first pilot tested using students from a psychology research methods class to ensure that it was comprehensible and not too long. Afterwards, participants for the current research study were recruited separately. All parts of the experiment were completed through an online questionnaire. Participants accessed the Qualtrics questionnaire after agreeing to the online consent form. The procedure sequence was as follows.

1. Personal Social Values

Participants' personal social values of self-transcendence and self-enhancement were measured using the BIV. The BIV was first developed by Stern and Guagnano

(1998). Following Joierman and Duell (2005), in the current study, only items measuring self-transcendence and self-enhancement were administered.

The measures of self- transcendence and self-enhancement are subject variables (variables that come from the participants and not the manipulation). While self-transcendence values refer to a person's value for others or for the community, self-enhancement values refer to a person's value for oneself or one's own personal goals and achievements. The BIV asks participants to rate on a 7-point Likert scale how much each of the six listed values are guiding principles in their lives (1 = opposed to my values, 7 = main guiding principle):

1. A world at peace, free of war and conflict (self- transcendence).
2. Influential, having an impact on people and events (self-enhancement).
3. Authority, right to lead or command (self-enhancement).
4. Social justice, correcting injustice, care for the weak (self- transcendence).
5. Wealth, material possessions, money (self-enhancement).
6. Protecting the environment, preserving nature (self- transcendence).

Half of the questions measure self-transcendence and the other three self-enhancement, as labeled above. The labels in parenthesis are for demonstration; participants did not see them when taking the survey. To create a continuous scale of the two personal social values combined (Composite Personal Social Values), self-enhancement scores were subtracted from self-transcendence scores, thus more negative scores indicate greater self-enhancement values, compared to self- transcendence values. Scores could range from – 18 to 18.

2. Negative Prime Writing Prompt

Participants were randomly assigned (via a Qualtrics automated randomization function) to one of the three conditions. The three levels of this independent variable consisted of dental pain, mortality salience, and extinction of life on Earth. The prime was administered by asking participants to write at least four sentences for each of the two writing prompts. Similar procedures have been employed in terror management theory research, as described by Cox et al. (2019). These prompts were:

- a. Focusing on the setting and the people in it, what do you see when you think about ____ What does the scene look like? What do you hear? Describe the scene with as much detail as you can. Write at least 4 or 5 sentences.
- b. Focusing on your emotions and thoughts, what do you feel when you think about ____ What sensations do you experience? How does the thought make you feel? Write at least 4 or 5 sentences.

The blank space was filled with “severe dental pain,” “your own death,” or “the death of all life on Earth due to environmental pollution,” depending on the condition that participants had been assigned to.

3. Distractors

After the writing prompt, Participants completed two distractor tasks: five word-search puzzles, and a PANAS questionnaire developed by Watson and others (1988). The PANAS served purely as a distractor, while the word search task served as, both, a distractor (Sienkiewicz et al., 2015) and a way to further prime the condition in an implicit manner (Maxfield et al., 2007).

As illustrated in Illustration 1, the word-search puzzles contained hidden words related to the assigned manipulation (highlighted in blue). Participants were asked to find and highlight the neutral set of words (highlighted in green). The words are highlighted below for the sake of demonstration, though in the questionnaire, the words were not highlighted. In the first word search puzzle, participants were asked to find the randomly selected neutral target words: distinct, verdict, advertisement, mansion, computer, inaudible, and storm. While looking for the target words, participants should have vaguely glanced at the hidden words, reinforcing the assigned condition in which they were placed, but even if participants did not notice any of the hidden words, this task would have still been useful as a distractor.

1. DP

BIRCO **DISTINCT** O **DENTAL** AINAUR
 OTOBOGAN **VERDICT** RAQUETYATE
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COMPUTER **CAVITY** ING **INAUDIBLE**
 THLISTERNIT **STORM** ORAQO

2. MS

BIRMS **DISTINCT** O **FUNERAL** INAUR
 OTOBOGAN **VERDICT** RAQUETYATE
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COMPUTERCATYIAINGINAUDIBLE
THEBONESITSTORMORAQO

3. ELE

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TRIIDEDFUTURIMANSIONSDING
COMPUTERCATYIAINGINAUDIBLE
THEWRLDENDITSTORMORAQO

Illustration 1. First Word Search Puzzle from each Manipulation

The other distractor consisted of a 36-item PANAS questionnaire, to which participants responded using a 5-point Likert scale. Participants indicated the extent to which they had felt each listed emotion or experience (e.g. interested, excited, guilty, proud, strong) in the past two weeks.

4. Outcome Measure: Cooperative and Competitive Personality Scale

The CCPS included a total of 23 items, which participants rated on a 7-point Likert scale, ranging from 1 (“do not agree at all”) to 7 (“totally agree”). Ten of these items measured CCPS-competition and the other 13 measured CCPS-cooperation. The statistic used was average of item scores rather than summation item scores because of the unequal number of questions measuring each factor. The average of items that measured cooperation was calculated to obtain each participant’s average score of CCPS-cooperation, and likewise, the average of items that measured competition was calculated to obtain each participant’s average score of CCPS-competition. Higher scores indicated

more endorsement of the corresponding factor. The scale was derived from Lu and colleagues (2013), who validated the scale and found correlation between its results and the results of a CD as well as the personality values developed by Schwartz and Bilsky (1990), which were also used to develop the BIV by Stern (1998). Participants rated their degree of agreement with respect to each of the items, which were presented in random order (see Illustration 2).

1. *Items measuring cooperation (general)*

- . In order to succeed at work, a person must cooperate with their partners.
- . I believe work performance could be benefitted more from cooperation than competition.
- . I believe having a good partner at work enables you to triumph over all your opponents.
- . A person must rely on the help of other team members in order to achieve good results.
- . Initiation and completion of any work is inseparable from the help and cooperation of team members.

2. *Behavioral tendencies of cooperation (behavior)*

- . At work I would usually consider the interests of both parties.
- . I can usually consider multiple views when I handle tasks.
- . At work, I can usually stand in other team members' shoes to consider their interests.
- . When working together with team members, I am willing to listen to others' opinions often, even though I might not agree with them.
- . When working with others on a communal task, I am able to integrate the views of others.

3. *Feelings for cooperation (affect)*

- . Working with team members makes me happy.
- . At work, I like collaborating with team members.
- . I enjoy working with other team members to achieve common success.

4. *Items measuring competition (general)*

- . Even in a group working towards a common goal, I still want to outperform others.
- . My self-worth could be validated only if I outperform others in the group.
- . Sometimes I consider appraisals as an opportunity to prove that I am smarter than others.

5. *Beliefs about competition (cognition)*

- . I like competition because that it gives me a chance to discover my own potential.
- . I like challenges that are brought by competing with other team members.
- . I like competition because that it allows me to play my best.

6. *Feelings for competition (affect)*

- . Being outperformed by other members in the group annoys me.
- . I would be very sad if I lose in sport contests.
- . I will be jealous when other team members get rewarded for their achievements.
- . I cannot stand being beaten in an argument by other team members.

Illustration 2. CCPS Items

5. Manipulation Check

After the CCPS and before the CD (i.e., between the two outcome measures), participants were asked to briefly state what had been the writing prompt assigned to them at the beginning of the questionnaire. This was done to ensure that participants had paid attention and still remembered.

6. Outcome Measure 2: Commons Dilemma

To triangulate the measures of CCPS, participants completed a CD task consisting of a total of 15 decisions divided into three sections of progressively decreasing replenishing rates, similar to the one used by Tarditi and others (2020). Participants were instructed at the beginning of the task, "...you and other players will be sharing a common resource pool, which will begin with 1,000 points. In each trial, each player will be able to steal up to ten points from the common pool (the remaining points will remain in the pool). After each participant makes a choice, the pool will be replenished at varying extents and as a function of the players' decisions..." Participants were also asked to imagine, hypothetically, that "by accumulating as many points as possible, you will increase your chances of winning cash for yourself. Meanwhile, by maintaining the common resource pool above zero for as long as possible, you and all the players will increase your chances of winning the same amount of cash for yourselves and increase

your chances of having an area of Amazonian rainforest bought and preserved in your names.”

With each decision, participants indicated how many points they wanted to take (from zero to ten) from the common resource pool by moving a slider, such as the one shown in Illustration 3. As the task progressed, participants were informed that the common resource pool was progressively decreasing until it reached zero after 15 decisions.

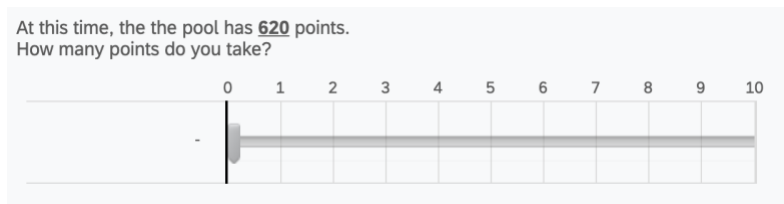


Illustration 3. Sample Item from Qualtrics Sliding Questionnaire

The current study considered both the cumulative CD and the CD slope. Cumulative CD results were obtained by adding the points taken in each decision throughout the game, which ranged from zero to 150, with lower scores indicating more general cooperation for the well-being of the group (less points taken from the pool for oneself). CD slope results were obtained by calculating the slope of the number of points taken throughout the game, which ranged from $- .67 \text{ ((0-10) / 15)}$ to $+ .67 \text{ ((10-0) / 15)}$, with more negative slopes indicating more concern for the well-being of the group because seeing a greater threat made the participant behave in a more pro-social manner.

7. Demographics and Perspectives of Climate Change

Lastly, participants were asked the basic demographic questions of age and gender, plus two 5-point Likert questions asking about climate change opinions, which

were developed for the current study, and a 5-point Likert question asking about political affiliation, as presented below.

1. What is your opinion on the possible dangers of climate change / environmental pollution?

- Would cause minimal unperceptive changes.
- Would cause a few changes.
- Would cause moderate changes.
- Would cause severe changes
- Would cause catastrophic damages.

2. What is your opinion on our understanding of climate change / environmental pollution?

- No scientific evidence
- Very little is known
- Little scientific evidence
- There is evidence
- Proven scientific facts

3. What is your political party affiliation?

- Democrat
- Leaning Democrat
- Purple / middle ground
- Leaning Republican
- Republican

III. RESULTS

A. Analytic Strategy and Assumption Checks

Linear multiple regression a priori power analysis was performed using G* Power software version 3.1.9.6. Given 2 predictors (personal social values orientation and negative priming), a moderately small effect size (Cohen's $f^2 = .06$), standard alpha error (.05), and a conventional power level of .8, the program indicated that 133 participants would be enough to find true significant results. A moderately small effect size was used, rather than the moderate effect size (Cohen's $f^2 = .15$) because of the high variability in responses that can be obtained when an individual thinks about death (Vail et al., 2012; Cox et al., 2019; Vess & Arndt, 2008). Furthermore, researchers have argued that it is more reliable to have slightly larger sample sizes than small sample sizes (Durlak, 2009; Funder & Ozer, 2020).

Participants were excluded if they did not complete the survey in a time that was within two standard deviations from the sample mean, if they wrote something that had no relation to the negative prime writing prompt, or if they failed the manipulation check. Two hundred thirty-nine participants were recruited, but after exclusions, the participants were reduced to 136, which was an adequate sample size.

It is important to note that participants were recruited between the months of April and December because research has shown that simple environmental factors, like weather, affect individuals' perception of climate change (Zaval et al., 2014). Recruiting participants in such a wide range of seasons could create a confounding variable.

Therefore, the month of participation was examined as a potential moderating variable;

however, no differences were observed, and so further analyses were conducted ignoring this factor.

Data was analyzed using moderated multiple regression through PROCESS SPSS macro version 3.5.2 by Hayes (2017) because one of the predicting variables was categorical while the other was continuous; The categorical negative prime was hypothesized to moderate the relation between participants' continuous measures of personal social values and their levels of CCPS-cooperation and CCPS-competition. CD results were exploratory and were expected to correlate with CCPS-cooperation or CCPS-competition.

Looking at the data of the 136 participants, both dependent variable distributions (CCPS-cooperation and CCPS-competition) met assumptions of normality. The distribution of CCPS-cooperation had a skewness and Kurtosis statistic of - 0.37 and - 0.08 respectively while the distribution of CCPS-competition had statistics of - 0.35 and - 0.51 respectively. Homogeneity of variance was verified with a non-significant result of a Levene's Test in both distributions.

In terms of the negative prime, random assignment to each condition resulted in groups of similar sizes ($n = 48$ in DP, $n = 52$ in MS, and $n = 36$ in ELE). The distribution of composite personal social values, measured with the BIV, was evenly spread with a skewness of just 0.16 with more participants leaning towards high levels of self-transcendence. More specifically, self-transcendence values had a skew of -0.39, while self-enhancement values had a positive skew of 0.22. This was expected because although the US is a very individualistic society (Hofstede, 2015), college students tend

to have different personalities and values than the average population, including having higher scores on conscientiousness and agreeableness (Hanel, 2016).

Reliability was found to be adequate for CCPS-cooperation (Cronbach's $\alpha = .847$) and CCPS-competition (Cronbach's $\alpha = .834$). Each of the items in both measures contributed similarly well to the strong reliability, suggesting that none of the items should be omitted. CCPS-cooperation and CCPS-competition measures were not significantly correlated (Pearson's $r = .15$), which suggests that they should indeed be treated as belonging to distinct non-correlated dimensions, as suggested by Lu and colleagues (2013). Although, contrary to the findings by Lu and colleagues (2013), the results of the CD, which were intended to triangulate the results of the CCPS, did not correlate with CCPS-cooperation, CCPS-competition, or any other measure in the experiment.

B. Primary Results

Negative Priming Manipulation

To evaluate the hypothesis that more uncertain and threatening scenarios would result in higher levels of CCPS-competition, an ANOVA was performed. It was assumed, based on the literature (e.g., Tarditi and colleagues (2020), and Leiserowitz and colleagues (2020)), that the thought of the annihilation of life on Earth (ELE) would produce the most uncertainty and threat, followed by death of oneself (MS), and followed by simple dental pain (DP). Resulting scores of competition, measured by the competition items from the CCPS, were compared between the three manipulations (ELE, MS, and DP). To triangulate these results, CD measures were also compared

between the three manipulations. None of the tests were significant (Tables 1 - 3). For a comparison of the means and standard deviations, see Table 4.

Table 1. Comparing Variance of Competition Measures using ANOVA

	SS	df	MS	F	<i>p</i>
Between Groups	10.35	2	5.17	0.05	0.953
Within Groups	14169.04	133	106.53		
Total	14179.38	135			

Table 2. Comparing Variance of Cumulative CD using ANOVA

	SS	df	MS	F	<i>p</i>
Between Groups	5707.81	2	2853.91	2.32	0.102
Within Groups	163630.54	133	1230.31		
Total	169338.35	135			

Table 3. Comparing Variance of CD Slopes using ANOVA

	SS	df	MS	F	<i>p</i>
Between Groups	11.52	2	5.76	0.75	0.473
Within Groups	1017.62	133	7.65		
Total	1029.15	135			

Although, when doing simple means comparisons, without considering statistical significance, the hypothesized patterns appear: as the situation was more uncertain and threatening, participants competed more and cooperated less (see Table 4). Furthermore, when looking at simple means comparisons, it would seem that in more uncertain and threatening scenarios participants were less attentive of the decrease in resources from the common resource pool, as demonstrated by the simple means comparisons of the CD slope, although in more uncertain and threatening scenarios participants also took fewer points for themselves from the common resource pool overall, as indicated by the

cumulative CD (Table 4). However, as noted previously, the mean differences were not significant because there was too much variability.

Table 4. Average of Outcome Measures Between Manipulations

Negative prime	Cooperation measure	Competition measure	Cumulative CD	CD Slope
ELE	67.64 (9.57)	39.67 (9.25)	59.89 (30.30)	-1.53 (3.28)
MS	68.65 (8.77)	39.13 (10.37)	72.48 (33.85)	-2.15 (2.52)
DP	69.58 (11.53)	38.98 (11.00)	76.00 (39.42)	-2.22 (2.60)

Note. The numbers outside the parentheses are the means and inside are standard deviations.

Composite Personal Social Values from BIV

To evaluate the relationships among personal social values, measured by the BIV, and degree of cooperation and competition, obtained from the CCPS items corresponding to each measure distinctively, correlations among these variables were computed, with the results presented in Table 5. Personal social values were combined to create a measure of each participant's composite personal social values by subtracting self-enhancement scores from self-transcendence scores, thus lower scores indicate greater self-enhancement values, compared to self-transcendence values. CCPS-cooperation and CCPS-competition measures were obtained by separately averaging the scores of the items from the CCPS that related to each of these two measures.

As can be seen from Table 5, Composite Personal Social Values did not significantly correlate with CCPS-cooperation, cumulative CD, or CD Slope, indicating a lack of association between Composite Personal Social Values construct and the three constructs mentioned. Yet, Composite Personal Social Values had a significant strong correlation with measures of CCPS-competition ($r = -0.365$, $p < .01$).

Table 5. Correlations between Composite Personal Social Values and Outcome Variables

Measure	R	<i>p</i>
CCPS-Cooperation	-0.011	0.915
CCPS-Competition	-0.365	0.002
Cumulative CD	-0.097	0.389
CD Slope	-0.076	0.305

Note. The table shows the correlation between the indicated measure and Composite

Personal Social Values measure. The correlations between the four mentioned measures are not shown.

Yet, just like cooperation and competition from the CCPS are independent of each other, it seems that self-transcendence and self-enhancement measures from the BIV should not be mixed either. When separating the BIV measures, CCPS-cooperation was correlated with self-transcendence (Pearson correlation = .304, $p < .005$), and CCPS-competition was correlated with self-enhancement (Pearson correlation = .379, $p < .005$).

Moderations and Scrooge Effect

Illustration 4 presents the moderating model hypothesized and tested with multiple regression through PROCESS SPSS macro version 3.5.2 by Hayes (2017). The interactions between negative primes and personal social values were not significant when considering any of the four outcome variables. Even the Scrooge effect that had been observed by previous research (Joireman & Duell, 2005; Zaleskiewicz et al., 2015) was absent: when comparing participants with higher self-transcendence (pro-social) values against those with higher self-enhancement (pro-self) values in the DP and MS conditions, there is no divergent interaction from MS to DP, as the Scrooge effect proposes. As previously noted, the negative priming manipulations produced no main effects, meaning that the negative scenarios had no effect on behaviors and attitudes of cooperation and competition, and the lack of interaction effects makes it evident that it

was not the case that the main effects were hidden by interactions. Tables 6 through 13 present the results of the regression analysis.

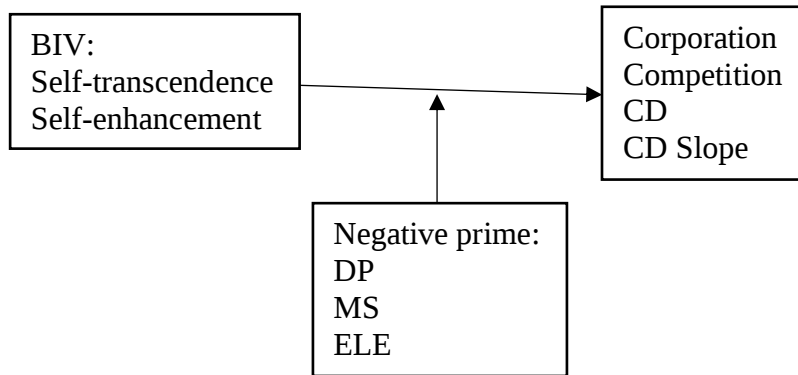


Illustration 4. Moderation Pathway Hypothesized

Table 6. Regression of CCPS-Cooperation on Self-Transcendence and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Transcendence	0.04	0.73	0.95	-1.39	1.48	
Negative Prime	-5.62	5.46	0.31	-16.41	5.18	F(1, 132)= 1.35,
Interaction	0.38	0.33	0.25	-0.27	1.04	$p > .10$, $r^2 = .01$

Note. b refers to the standardized regression coefficient, SE is the standard error, *p* is the *p*-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 7. Regression of CCPS-Competition on Self-Transcendence and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Transcendence	-0.75	0.77	0.33	-2.28	0.77	
Negative Prime	-2.54	5.79	0.66	-14.00	8.91	F(1, 132)= .18,
Interaction	0.15	0.35	0.67	-0.54	0.84	$p > .10$, $r^2 = 0$

Note. b refers to the standardized regression coefficient, SE is the standard error, *p* is the *p*-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 8. Regression of CD on Self-Transcendence and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Transcendence	-2.03	2.64	0.44	-7.26	3.19	
Negative Prime	-2.45	19.86	0.90	-41.74	36.85	F(1, 132)= .29, p > .10, r ² = 0
Interaction	0.65	1.20	0.59	-1.73	3.03	

Note. b refers to the standardized regression coefficient, SE is the standard error, p is the p-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 9. Regression of CD Slope on Self-Transcendence and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Transcendence	-0.04	0.04	0.07	-0.09	0.01	
Negative Prime	-0.38	0.20	0.30	-0.73	0.03	F(1, 132)= .39, p > .10, r ² = .03
Interaction	0.02	0.02	0.40	0.00	0.08	

Note. b refers to the standardized regression coefficient, SE is the standard error, p is the p-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 10. Regression of CCPS-Cooperation on Self-Enhancement and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Enhancement	0.94	0.76	0.22	-0.56	2.45	
Negative Prime	-0.12	4.58	0.98	-9.18	8.94	F(1, 132)= .09, p > .1, r ² = 0
Interaction	0.11	0.36	0.76	-0.60	0.82	

Note. b refers to the standardized regression coefficient, SE is the standard error, p is the p-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 11. Regression of CCPS-Competition on Self-Enhancement and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Enhancement	0.82	0.78	0.30	-0.73	2.36	
Negative Prime	-2.60	4.70	0.58	-11.89	6.69	F(1, 132)= .31, p > .10, r ² = 0
Interaction	0.20	0.37	0.58	-0.53	0.94	

Note. b refers to the standardized regression coefficient, SE is the standard error, p is the p-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 12. Regression of CD on Self-Enhancement and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Enhancement	4.51	2.79	0.11	-1.00	10.02	
Negative Prime	29.28	16.80	0.08	-3.95	62.51	F(1, 132)= 1.68, p > .1, r ² = .01
Interaction	-1.71	1.32	0.20	-4.33	0.90	

Note. b refers to the standardized regression coefficient, SE is the standard error, p is the p-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

Table 13. Regression of CD Slope on Self-Enhancement and Negative Primes

	B	SE	<i>p</i>	LCI	UCI	
Self-Enhancement	-0.02	0.03	0.51	-0.07	0.03	
Negative Prime	-0.15	0.15	0.33	-0.45	0.15	F(1, 132)= .4, p > .1, r ² = .01
Interaction	0.01	0.01	0.38	-0.01	0.03	

Note. b refers to the standardized regression coefficient, SE is the standard error, p is the p-value, LCI is the lower-level confidence interval, and UCI is the upper-level confidence interval. Significance testing was conducted at 95% confidence.

As previously noted, this research first tried to compare personal values by combining self-transcendence and self-enhancement measures into the single measure of composite personal social values. After correlation analysis, presented previously, it was found that these two measures should be treated as independent from one another, which led to significant correlations with CCPS-cooperation and CCPS-competition. In the analysis of interactions, even when treating BIV measures separately, the CD measures still showed no correlations with any of the other measures in the study, and the effects of the negative priming conditions on the outcome variables (competition, cooperation, cumulative CD, and CD slope) were still null.

C. Perceptions of Environmental Pollution and Demographic Correlations

At the end of the questionnaire, along with the demographic questions, participants were asked about their attitudes towards climate change / environmental pollution. Table 14 presents the frequencies of participants' responses to the question, "What is your opinion on the possible dangers of climate change / environmental pollution?", which measured the variable "Possible Dangers." Simply eyeballing the results is sufficient to see that the great majority of college students perceive very serious possible dangers (more than half of the sample chose the worst outcome among the five possible responses as the option that best fit their perception). Table 15 presents the frequencies of participants' responses to the question "What is your opinion on our understanding of climate change / environmental pollution?", which measured the variable "Understanding." Again, it seems evident that College students are well aware of the situation, since almost half of the sample chose the option that indicated the most

concrete understanding of the problem, from the five options offered, and 90% chose that it was a scientific fact, or at least scientific evidence.

Table 14. Perceptions of “Possible Dangers”

Response	n	%
Would cause minimal unperceptive changes.	1	0.74
Would cause a few changes.	2	1.47
Would cause moderate changes.	18	13.24
Would cause severe changes	45	33.09
Would cause catastrophic damages	70	51.47

Table 15. Perceptions of “Understanding”

Response	n	%
No scientific evidence	0	0
Very little is known	4	2.94
Little scientific evidence	9	6.62
There is evidence	56	41.18
Proven scientific facts	67	49.26

Before comparing participants’ perceptions about the climate between genders, political party affiliations, and ages, the correlation between the two results (Understanding and Possible Dangers) were tested; results indicated a significant correlation with a Pearson correlation of .497, $p < .001$. In terms of gender, there was no difference in Understanding $F(1, 133) = 2.50, P > .05$, yet females considered Possible Dangers more severe than males $F(1, 133) = 7.14, P < .01$. Political party affiliation was associated with significant differences on both the Possible Dangers and Understanding variables; participants who identified more strongly as democrats predicted greater harm from climate change and rated the understanding of climate change as more certain, compared with those who identified more strongly as republican: $F(4, 131) = 7.56, P <$

.01 for Possible Dangers, and $F(4, 131) = 4.07, P < .01$ for Understanding. Lastly, analysis of correlations found no differences between age groups' responses to Possible Dangers (Pearson's $r = -.09, P > .1$) and Understanding (Pearson's $r = .056, P > .1$), although this result should be regarded with care since the age groups were very uneven, with a skewness of 2.80, and a kurtosis of 8.45, and a small range (18 to 45 years of age).

IV. DISCUSSION

The current study examined factors that may affect attitudes and behaviors of cooperation and competition, which are important to understand climate change mitigation efforts. These factors were personal social values, negative prime manipulations about distressing situations, and interactions between these two. In the absence of statistically significant results regarding negative prime manipulations, the hypotheses regarding this factor were not supported: Behaviors and attitudes of cooperation and competition did not differ between participants in different negative prime manipulations; and there were no interactions between personal social values and the effects of the different negative primes.

Comparing composite personal social values, which treat the constructs self-enhancement and self-transcendence as opposite ends of a scale, to measures of cooperation and competition, individuals with values that lean more towards self-enhancement and away from self-transcendence have attitudes and behaviors that lead them to compete more and to seek personal growth more, as one may expect (Stern, 1998), but these composite values do not correlate with CCPS-cooperation measures. This is because there is a stronger correlation between the pro-self constructs of competition and self-enhancement than between the pro-social constructs of cooperation and self-transcendence. Results demonstrated support for the idea that the constructs cooperation and competition are not opposites, but different measures without relation to each other, as demonstrated by the absence of correlation between the two, which validates findings from previous research. Likewise, the constructs self-enhancement and

self-transcendence are independent of each other, as they were also uncorrelated with each other.

Given the lack of effect caused by the negative prime manipulations, the patterns revealed by the demographic questions are the most informative findings of this research, besides the personal social values.

A. Negative Prime Manipulation

Despite the adequate statistical power, coming from the small effect size predicted and the large enough sample size, negative prime manipulations seemed to produce no effects on participants' attitudes and behaviors of cooperation or competition, or decisions in a CD game. This may be because people, especially younger populations, are not affected by thoughts of death or future apocalypses because these events seem too far away and unreal to cause an effect. According to Terror Management Theory, the ultimate fear of a self-conscious mortal organism is the fear of death, which human individuals avoid in multiple manners, such as believing in the afterlife, believing in a meaning of life, or achieving symbolic immortality by leaving a legacy for future generations (Becker, 1973; Vail et al., 2012; Cox et al., 2019). This argument is weak, though, because previous researchers have demonstrated the Scrooge effect with similar methods and participants (Vess & Arndt, 2008; Vail et al., 2012; Cox et al., 2019; Joireman & Duell, 2005; Zaleskiewicz et al., 2015).

Alternatively, it may be that the manipulation did have an effect, but not towards conscious attitudes and behaviors about cooperation and competition, as measured by the CCPS. In this experiment, not even the Scrooge effect was found and the only major difference between this research and the previous seems to be the dependent variables

measured: Zaleskiewicz and partners (2015) used a dictator game and a rating of satisfaction, Joireman and Duell (2005) used the BIV, Vess and Arndt (2008) used article evaluations, and Cox and partners (2019) mentioned a few other dependent variables that have been employed, but did not make any reference to the CCPS or the commons dilemma ever being used in the field of terror management theory. Results may be demonstrating that conscious thoughts of behaviors and attitudes towards cooperation and competition are not affected by thoughts of death.

B. Values and Social Behaviors

A novel achievement of the current research is finding correlations between the BIV and the CCPS measures. Previous research had found correlations between measures from the Social Value Orientation and the BIV, as well as with the CCPS. Furthermore, the CCPS had been found to be correlated with the scale developed by Schwartz and Bilsky (1990), which had been used to develop the BIV. Yet, direct correlations between the BIV and the CCPS measures had not established prior to the current results. This study found correlation between CCPS-cooperation and self-transcendence and between competition and self-enhancement. The current study successfully validated the claim that cooperation and competition are distinct measures that are uncorrelated, as previously stated by Lu and colleagues (2013), and that, likewise, personal social values of self-transcendence and self-enhancement, as measured by the BIV, are also not necessarily correlated, and should not be aggregated, as first attempted in this study.

C. Demographics

As observed in previous research, females are more concerned about the environment than males (Ballew et al., 2019; Brough et al., 2016; Gifford & Comeau,

2011), which may be due to both genders conforming to gender stereotypes: caring traits are more likely to be attributed to female characteristics, therefore females may be more likely to pretend to care about others, including the environment, while males may be more likely to pretend not to care about others, nor the environment, to feel more masculine (Brough et al., 2016). This difference between genders was not present regarding attitudes toward the credibility of environmental science, though, because acknowledging the facts and being well-informed is not necessarily caring about the matter, therefore males could admit to understanding about the problem without having identity conflicts.

Meanwhile, as observed in previous findings, environmental concern increases as an individual leans more strongly towards the democratic party (Ballew et al., 2019; Leiserowitz et al., 2018; 2020). Research and data have shown that individuals tend to hold beliefs similar to those expressed by leaders of their political parties (Kahan & Braman, 2006; Gifford, 2011). Since the democratic party seems to have expressed more concern about climate change and environmental issues, their respective followers generally hold the same concern, while, on average, leaders in the republican party express less concern, or even deny the problem, leading many of their followers to do the same. However, the denial of climate change may also be due to differing worldviews between conservatives and liberals. Duchi and others (2020) found that people with liberal ideologies tend to have growth mindsets instead of fixed mindset. Meanwhile, fixed mindsets are more common in conservatives. People with a growth mindset perceive the world as changing and reformable; when thinking of climate

change, they may perceive it as something that can be changed instead of seeing it as a scary imminent event that humans are not causing or cannot change.

D. Limitations

This research tried to find differences in behaviors and attitudes of cooperation and competition, between people with different values when primed to think about different negative scenarios, to predict the future behavior of humanity as the climate situation worsens, but the sample used may be inadequate to generalize to the world population, especially the population that is contributing the most to environmental pollution (i.e., politicians, affluent people, and managers of big corporations). After all, young college students tend to be more educated and aware of political and societal issues than the general public (Henry, 2008; Hanel, 2016), including in issues regarding the climate crisis (Hamilton, 2019; Karol, 2018). It is still useful to study this population to learn how to motivate them to act and demand change on the system. Another limitation of the sample is that it may not be generalizable to societies in other countries that may have different perceptions of death or the environment. Within the US the sample was advantageous since Texas tends to be a more Republican leaning state and still, the statistics showed the majority of the sample leaning in favor of environmental pollution concern, as presented in Tables 14 and 15. These trends may be even more accentuated in more democrat-leaning states.

Since the task was online, there was no way to control what participants were doing while answering the questionnaire. Participants could have been multitasking and therefore were not focusing enough on the task to be affected by the manipulation. It could be that they were paying enough attention to give answers about themselves and

their values but not enough to be affected by the manipulation. This would explain why their responses were precise enough to find the expected patterns with regards to demographics and personal values but had too much variability with regards to the negative primes.

A limitation of the experiment design, which was later pointed out, was that the answer choices for the political party affiliation question may not have been exhaustive; participants were forced to choose between democrat and republican parties, leaving out participants who may have chosen libertarian, green party, anarchist, or other. Although this limitation does not concern the main research question.

E. Future Research

If all predicted findings had been significant, a weakness of this study would have been the small effect size assumed, and further research would still be needed to ensure that the effects found were not due to giving too much leeway (leading to a type I error). Yet this is not the case; even though a small effect was assumed, negative primes did not correlate with CCPS-cooperation, CCPS-competition, or the CD.

This experiment could be attempted again using a dependent measure that has been tested before (e.g., the BIV, a dictator game, evaluation of an essay, measures of self-worth, or needs of worldview validation). In the current study, the BIV was used to measure participants' beginning levels of personal social values, but not their outcome levels, as done by Joireman and Duell (2005). Measures of self-worth or need of worldview validation could also be good measures of the different negative emotions invoked by the various negative primes. Assuming that the procedures were effective, a

question that remains unanswered is why the CCPS and the CD results were not affected, like other measures.

Something else that could be modified and explored in future research is the population from which the sample is obtained. Different demographics, like generation, education, and geographic location of habitat, could have different worldviews and perceptions on the environmental situation. Many areas of exploration may arise from comparing demographics: Did our sample strongly support the scientific evidence and potential problems of environmental pollution because of their age, party affiliation, or education? This is hard to determine because the three seem to be related; a report of more than 25,000 participants from across the United States found that support for the democratic party is positively correlated with years of post-graduate education and negatively correlated with age (Pew Research Center, 2020). Exploring the different effects that this experiment may have on people with different combinations of these characteristics may give researchers a clearer view into what future behaviors may look like in different populations, and how to tailor a message that will motivate different populations towards climate-change mitigation.

As mentioned in the limitations, the author of this research acknowledges that the individual has a relatively small effect on climate change, and the primary population of interest is politicians, affluent people, and managers of big corporations. Even within this population, there are those that are much more responsible than others (Guardian News and Media, 2019). Unfortunately, it is much harder to obtain a research sample from this population. Yet, studying the individual behavior is not fruitless because these corporations and structures will not change without pressure from the common people.

F. Conclusion

The goal of this research was to explore the effects of personal social values and presented negative scenarios on behaviors of cooperation and competition, in order to understand why humanity has not adequately addressed climate change as a community and what can be expected in the future, as the situation worsens and becomes more evident. The results may suggest that these matters were not covered by this study due to the lack of effects produced by the negative priming. Alternatively, though, the results may suggest that personal values have a much stronger influence on attitudes and behaviors about cooperation and competition than situational characteristics. Results did demonstrate that self-transcendence and self enhancement values have correlations with cooperation and competition, respectively. Results also suggest that college students are very aware of the scientific veracity and threats of human-caused climate pollution, although this is moderated by political party affiliations and gender stereotypes. This poses a challenge because values and worldviews are formed since childhood and are difficult to change. If the current results are true, the research is arguing that environmental communications research should shift its focus from investigating how to present the scenario into focusing on how to make certain values (e.g., self-transcendence) more salient to motivate individuals to care more about the environment and advocate for climate change mitigation.

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