Do we believe people can change? The impact of growth mindset on beliefs in rehabilitation for the Earth and incarcerated individuals

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Abstract

This series of studies examines the concept of growth mindset in two separate but equally as important contexts: climate change and incarceration. Study 1 investigates the relationship between growth mindset and hopefulness about climate change, and Study 2 investigates the relationship between growth mindset and beliefs in rehabilitation for incarcerated people. Both studies were conducted via survey. The data was collected via Prolific, and the samples were mostly caucasian, but evenly split between male and female genders (N = 209 for Study 1, N = 208 for Study 2). The only significant finding was the mediating effect of perceived personal warmth on beliefs in rehabilitation for one of the three vignettes in the measure for beliefs in rehabilitation for incarcerated people. More research should be done examining the role of optimism, which was a control variable in all analyses, and showed to be a strong predictor in many of them.
Do we believe people can change? The impact of growth mindset on beliefs in rehabilitation for the Earth and incarcerated individuals

This research attempts to examine two of the most significant and prevalent issues that face the United States and the globe through a singular lens. The matter of climate change has the potential to affect the life of each and every person who lives on Earth. With this threat looming over our heads, the way that we cope and react become more important with each passing day, because the only thing that can possibly combat climate change is the action of billions of people. While reality is bleak, the giving up of individuals could be the thing that tips our fate in climate change’s favor rather than our own.

Very separate from the issue of climate change is the matter of mass incarceration in the United States. The rate at which people are imprisoned in this country is abominable, and the prison system itself does almost nothing to provide its inmates with the tools to reassimilate back into society. Without these skills, previously incarcerated individuals are extremely likely to re-offend due to unlivable conditions outside of prison, creating a cycle that a person can hardly escape once incarcerated for the first time.

The nature of these problems is such that they may seem impossible to solve, especially from the standpoint of one person, which is the standpoint we all occupy. Additionally, the nature of these problems seem very different and unrelated. However, these two massive issues can be diluted down to one single question: do we believe people can change? If we examine these two issues from this angle, we can begin to understand ways that we can make actionable changes that have the potential to make a difference.
Climate Change: Hope and Hopelessness

One of the most pressing issues of our time is the persistent threat of climate change. Politicians and family members alike argue about the seriousness of the state of the Earth, how close we are to damaging our planet in irreversible ways, or who is the most to blame for what is happening. Scientists continue to urge that if we, from the largest corporations and industries in the United States down to each individual civilian, do not change our environmental behaviors, it could be just a few years before the Earth becomes uninhabitable, or apocalyptic natural disasters occur (“The Effects of Climate Change,” 2019). With something so seemingly large and beyond our reach looming over us, one might wonder how the possibility of this impending catastrophe affects the mindsets, emotions, and lifestyles of people all over the globe.

In terms of direct effects of climate change on people’s lives, there have already been shifts in weather patterns and abnormally extreme natural disasters (Ocko, 2018). The effects that these large scale and violent weather events have on communities across the globe are often devastating and can cause incredible distress for those trying to recover from a disaster of that magnitude (Blashki, Burke, Fritze, & Wiseman, 2008). The effects of climate change also delve into the social and economic realms of life. For example, the presence of climate change could increase negative social stigma surrounding the purchase and use of products that are affordable but not sustainably made (e.g. fast food, cheap clothing), decrease the capacity of vendors to consistently offer affordably priced produce, or create instability in professions that depend on climate or natural conditions such as farming or fishing. Factors such as these play important roles in the daily lives of many, and when climate change makes them more difficult, that is
stress put on the lives of many people, the majority of which are within disadvantaged populations and communities (Blashki et al., 2008).

Outside of these more direct effects, just thinking about climate change, the vast effects it can have and already does have on our lives, and the challenges that we will have to face in the long term to attempt to reverse what damage has been done in any way can prove very emotionally stressful and can provoke much anxiety in individuals (Blashki et al., 2008). Even the amount of coverage one views in the media can be overwhelming and, depending on the valence and information provided, can be aggravating for some to see. For some it might be overwhelming to be surrounded by such negative news so constantly, for others it might be taxing to listen to people argue about an issue that needs to be solved so immediately. The ways that individuals cope with this stress and anxiety surrounding climate change can vary greatly. Sometimes it seems that the more definite and specific information is learned about climate change, the more bleak things begin to look, so one of the most common ways of coping is by psychologically distancing oneself from the issue of climate change. Many people have difficulty associating concretely with depictions of climate change, and oftentimes only have a high arousal response to depictions of extreme natural disasters, a situation that would result in immediate harm, and not depictions of drought or landscape desolation, which could have equally as widespread and devastating effects, but are not as violent (Leviston, Price, & Bishop, 2014). Other coping strategies such as de-emphasizing the seriousness of climate change or choosing to trust in different societal actors fall into a category more consistent with denial (Ojala, 2012). Some people would rather believe that the threat of climate change is less
imminent than scientists claim that it is and therefore choose to trust sources outside of science and research.

Age also plays a role in coping mechanism selection as children and adolescents have a tendency to err more on the side of psychologically distancing themselves from the issue, and young adults tend to utilize problem-focused ways of coping that involve taking action. Even though children and adolescents distance themselves from the problem, they do more consistently trust sources that provide scientific information about climate change, and also trust in the technological developments that could be used to help fix some of the factors contributing to climate change (Ojala, 2012). While Ojala does not offer any causal explanations for these coping differences between age groups, a possible explanation could be that as a person grows older, their understanding of climate change and its consequences becomes more concrete, decreasing psychological distancing and increasing the capacity to see specific problems that actions can be taken to resolve. But as the harsh reality is more clearly realized, young adults might begin to cope by completely denying climate change (i.e., de-emphasizing seriousness, distrust of sources of information) rather than simply psychologically distancing themselves.

One of the last and most important coping strategies is hope (Ojala, 2012), which is defined by Synder (2002, p. 1) as “perceived capability to derive pathways to desired goals, and motivate oneself via agency thinking to use those pathways.” Hope, while similar to optimism, differs in that it is a goal-oriented way of thinking in which a person can conceptualize pathways to their goals (Synder, 2001), rather than a generalized expectancy that the future will be positive (Sheier & Carver, 1985). Additionally, hope is an emotion felt about more personally relevant but possibly less likely outcomes, whereas optimism is a mindset that is generally applied to all
things, no matter how relevant to the person. Overall, hope is the emotion linked to the outcomes that are more important to a person (Bruininks & Malle, 2005). Maintaining hope in the face of something as overwhelming as the threat of climate change is surely difficult, but focusing on tangible ways to combat this problem seems to be one method that helps. Feldman and Hart (2018) found that people that viewed news images and news texts that focus on climate-oriented actions felt an increased sense of hope and decreased sense of fear when thinking about climate change issues. News images and texts on the topic of climate change that did not focus on tangible actions did not have this same effect. This finding supports Hope Theory, which operates under the premise that human action is goal-oriented, and that being able to visualize or conceptualize a pathway to a goal allows one to continue to feel hopeful about that goal (Synder, 2002). While young adults view climate change as an important issue, they also remain pessimistic about it (Ojala, 2012). Their valuing of climate change does lend itself to their willingness to sacrifice in order to protect the environment (Liu & Sibley, 2012), but hope rather than pessimism acts as more of a motivating force (Ojala, 2012). Environmental hope is positively correlated with support for pro-environmental policies (Feldman & Hart, 2018) and with pro-environmental behaviors (Ojala, 2012). In order to combat climate change, behavioral and policy changes must be made, and thinking that climate change is an important issue is not enough to motivate people to make those changes. Hope is one of the key factors that could mobilize a nation, or even just one person, to effect change that could be extremely powerful in resolving an issue that affects the entire globe. Promoting and developing hope involves many different factors, but conceptualization of tangible and concrete goals is a course of action
consistent with the very definition of what hope is. Seeing the change as real and possible is the first and most powerful step in bringing that change to fruition.

**Rehabilitation of Incarcerated Individuals**

A very different but equally as complex issue to tackle is the level of incarceration in the United States. American prisons house 2.3 million incarcerated individuals every day. Our rate of incarceration is the highest in the world, and five times that of the next highest country’s rate (Sawyer & Wagner, 2019). In addition to these overall statistics, in 2008 over 87,000 juveniles were in custody of juvenile facilities, not even including the juveniles sent to alternative residential placements (Melton, 2010). There are numerous factors that play into this monstrosity of a legal system, but one of them is that the American ideal of punishment is social exclusion (Melton, 2010). By socially isolating people who commit crimes, people who must already to some extent be on the fringe or have a condition or situation that compelled them to break the law, we push them further away from the norms that we want everyone to adhere to.

Not only is the matter of incarceration itself an issue in the United States, but the rate of recidivism in the United States is also very high. Every year American prisons release over 65% of their offenders (Greene-Joyner, 2019), but almost half of released offenders reoffend and are arrested again within the eight years following their release (Zoukis, 2017). The statistics are even worse for young offenders: 67.7% of released offenders under the age of 21 reoffend and are arrested again (Zoukis, 2017). These statistics indicate that our prison system is one that disproportionately convicts individuals, and also keeps them in the system by not helping them properly assimilate into society. This can be especially damaging to a young person’s life. Given
the recidivism rate for those under the age of 21, it is likely that a young person who is imprisoned early in their life never escapes the grasp of the prison system.

The rate of recidivism is so high because of the social stigma that surrounds previously incarcerated individuals. There is a lack of programs to facilitate the re-entering of ex-offenders into society (Greene-Joyner, 2019), and without that kind of engagement between someone who is an outsider and the core of society, it is not likely that that person finds their way into the norm. It is extremely difficult for previously incarcerated individuals to find affordable housing or a consistent job with good wages (Clow, Ricciardelli, & Cain, 2012). The prejudice that they face in trying to acquire these basic needs directly prevents them from being able to function as a normal person in society. Without money for food or clothing and with no place to live, many ex-offenders are set right back on course to offend again. These prejudices stem from negative attitudes formed for a variety of reasons. Many people in the larger society assume that ex-offenders are not trustworthy because of the crime they have committed. As a result, those people try to avoid ex-offenders whenever they can, which also creates a sense of unfamiliarity about previously incarcerated individuals (Hirschfield & Piquero, 2010). As an ex-offender it is difficult to garner social support in your community, and that same struggle is present when trying to gain social support from even family members (Pettus-Davis, Dunnigan, Veeh, Howard, Scheyett, & Roberts-Lewis, 2017). Pettus-Davis an colleagues (2017) found that the older a family member was, the less likely they were to support an ex-offender family member. Additionally, they found that even when social support was present, the ex-offender felt the quality of that support worsen over time.
The United States imprisons millions of individuals every day under the pretense of punishment, but what about rehabilitation? Releasing a person into the world completely unprepared to function the way society will ask of him/her is not truly a release. Without any program, service, or support from those around them, ex-offenders are bound to reoffend and fall right back into the system that they waited so long to be free of. One of the most crucial ways that this vicious cycle can be halted is by changing the stigma surrounding previously incarcerated individuals. Recognizing and normalizing their presence, along with building a sentiment of trust between previously incarcerated individuals and the community can be a powerful combination in terms of merging ex-offenders into the community (Hirschfield & Piquero, 2010).

Rade and colleagues (2017) found the anti-stigma interventions that promoted growth mindset were useful in the process of community reintroduction. Similarly to Hirschfield and Piquero (2010), the researchers also found that familiarization (prior contact with an ex-offender) was a predictor of support for reentry. Overall, the findings of this study showed that growth mindset was a strong predictor of positive attitudes toward ex-offenders, and therefore a predictor of support for reentry (Rade, Desmarais, & Burnette, 2017).

**Growth Mindset**

This concept of growth mindset has the potential to be an important factor in both the context of beliefs in rehabilitation of incarcerated individuals and the previously discussed context of hope about climate change. Growth mindset, a construct developed by Carol Dweck, can be defined as “belief that people and their traits are malleable and can develop over time” (Rattan & Dweck, 2018, p. 677), but can also be rephrased in a variety of different ways to fit
context. For example, in the context of teaching children to work with a growth mindset, they are often taught that making mistakes is part of learning, that it’s natural and acceptable (Peterson, 2019). Alternately, when explaining to parents how to treat their children so that they develop a growth mindset, parents are told to praise their children for the effort they put forth rather than the performance or result itself (Anderson & Nielson, 2016). There are many different ways to implement and talk about growth mindset because it is so useful and applicable in so many aspects of life.

Growth mindset exists on a spectrum, and at the other end of the spectrum is fixed mindset. While growth mindset promotes that people and traits can change and develop, fixed mindset promotes that people will always be exactly who they are, and that working hard cannot change the ability or talent of a person. Fixed mindset pushes for performative goals that validate the self, while growth mindset pushes for learning goals that focus simply on improving the self (Dweck & Yeager, 2018). Fixed and growth mindset heavily affect the way a person views failure, challenges, and their own effort. Fixed mindset dictates that failures and challenges are qualities that cannot be changed, while growth mindset dictates that those things are a natural part of the process it takes to improve and master skills (Dweck & Yeager, 2018).

The implementation of growth mindset largely began in the school classroom. Even at an elementary age, if you explicitly teach a child growth mindset, their abilities tend to improve (Peterson, 2019). Viewing their qualities and abilities as things to be developed rather than fixed entities to be worked with is helpful for children during difficult school transitions and in completing difficult classes (Yeager & Dweck, 2012). Growth mindset interventions to groups of high schoolers who are close to dropping or failing out of school are also very effective. In a
study by Paunesku and colleagues (2015), high schoolers close to dropping or failing out increased their grade point averages and their overall performance in core classes after receiving a growth mindset intervention.

Growth mindset can even help children overcome deleterious factors in their lives in order to achieve academically. Froedge (2018) found that students with disabilities were better able to overcome psychological barriers in academic achievement when they had a growth mindset. The students with growth mindset had larger growth percentages in their reading and math abilities. Claro and colleagues (2016) conducted a study in which growth mindset, socioeconomic status, and the child’s reading ability were investigated. While family income is a strong predictor of a child’s reading ability, growth mindset is equally as good a predictor, regardless of socioeconomic status (Claro, Paunesku, & Dweck, 2016). Even though students from lower income families were less likely to exhibit growth mindset, the children from lower income families who did performed equally as well if not better than their wealthy counterparts: children in the lowest 10th percentile of family income who had a growth mindset showed academic performance as high as that of fixed mindset children from the 80th income percentile (Claro et al., 2016). This study really shows how meaningful growth mindset can be. A child who has significantly less resources than other children in his/her class can adopt growth mindset and realize their potential.

Implementation of growth versus fixed mindsets can begin at a very early age, especially in terms of the way parents interact with their children. A parent can form the way a child begins to see him or herself via the mindset that they choose to apply when reacting to things the child does. Parents who have a fixed mindset when it comes to their children engage with them in
ways that are “unconstructive,” and as a result, the child subsequently has lower level reading
tools than children raised in growth mindset households (Anderson & Neilson, 2016). This study
also then implemented a growth mindset intervention with the children, all of whom increased
their reading and writing achievements afterwards (Anderson & Neilson, 2016).

Perfectionism is also an academic construct that can be harmful to students. In a study by
Chan (2012), Chinese students were clustered into groups based on their level of perfectionism.
It was found that the group of unhealthy perfectionists had significantly higher scores of fixed
mindset, indicating that lack of growth mindset can cause one to have negative life outcomes
and/or poor well-being due to high expectations for oneself, and inability to accept one’s failures
as parts of a journey instead of finite statements about one’s ability (Chan, 2012).

Beyond academic achievement, growth mindset has also been found to reduce the
incidence of aggression or stress, especially caused by peer victimization or being excluded
(Yeager & Dweck, 2012), and the onset of depression (Dweck & Yeager, 2018). In this context,
growth mindset helps children to better recover from social shortcomings or negative social
events. While school is mainly about learning, negative social events at school can be some of
the most damaging moments of a child’s or any person’s life. Growth mindset can reframe those
moments as not failures, but things to work through or work around. Growth mindset has also
been shown to decrease the amount of disciplinary citations received by Black and Latino boys,
who are more likely than other groups of children to receive such citations (Goyer, Cohen, Cook,
Master, Apfel, Lee, . . . Walton, 2019). Growth mindset interventions that focused around
feelings of belong and value affirmation made these boys less likely to act out or retaliate, and
therefore reduced their aggression in school. It has also been found that having a fixed mindset
increased the amount of aggression out forth by bullies in schools, and having a growth mindset decreased the amount of hatred and aggression in response to being a victim of bullying (Dweck, 2012). Even in adulthood, it has been shown that growth mindset buffers the psychological distress than can be caused by stressful life events (Schroder, Yalch, Dawood, Callahan, Brent Donnellan, & Moser, 2017).

Outside of the realm of children and school, growth mindset can even act as a protectant against some of the pervasive and harmful forces that exist in our lives. Rattan and Dweck (2018) conducted a study in which they found that women and minorities who confronted a coworker that had made a prejudiced comment in the workplace had more positive subsequent expectations for that coworker moving forward. Having those positive expectations was then associated with a higher sense of belonging in the workplace, greater workplace satisfaction, and greater relationships with the coworkers that had expressed the bias (Rattan & Dweck, 2018). While a negative event was experienced, these women and minorities were able to not only stand up for themselves, but also feel even more welcome than before in the workplace because of their ability to trust that coworker to change. Growth mindset interventions focusing on disbelief in stereotypes have also been shown to increase the self-efficacy of women who are STEM majors in college and may face discrimination based on their gender (Fabert, 2015).

Another interesting context for growth mindset to take hold is in the context of resettling refugees. Those with growth mindset in the United States and the United Kingdom supported the idea of refugees resettling in their country (Madan, Basu, Rattan, & Savani, 2019). Another factor that was noted in the study was that those with growth mindset also were more likely to believe that refugees have the capacity to assimilate into the host society (Madan et al., 2019).
One of the largest barriers for many immigrants and refugees in being accepted in the United States is the cultural clash between their heritage and the host culture. Often it is this cultural clash that citizens of the host country attack when they disapprove of immigrants and refugees trying to settle in the United States or the United Kingdom. The fact that having a growth mindset can counteract that initial cultural clash and promote the idea that people who are different can melt into the whole is an important aspect that could be utilized in pro-immigrant interventions.

In the study done by Rade and colleagues (2017) that was mentioned previously, growth mindset is shown to be positively correlated with positive attitudes toward ex-offenders and subsequently greater support for ex-offenders’ reentry into society. The role the growth mindset plays in this study is that of allowing participants to see ex-offenders as people capable of changing and being reformed by the prison system. Growth mindset can be beneficial when applied to yourself, and can help people learn to work steadily at something until they achieve it or not react so negatively to failure. But when applied to other people, for example, in a context such as this study or the Madan and colleagues (2019) study, it can really change someone else’s life that you see that potential in them.

Growth Mindset: Implications for Climate Change and Rehabilitation

Growth mindset is the construct that pulls together the two vastly different contexts that have previously been discussed. While the topics of climate change and rehabilitation of incarcerated individuals seemingly exist in different realms, they both grapple with the same question: do we believe people can change? This question is present in almost every walk of life. Do we think people can improve? Do we think they can become better versions of themselves?
Do we think they actually have the capacity to change who they are? In the context of climate change, in order to feel hopeful in any way, to some extent a person must trust and believe that millions of people will change their environmental behaviors, or that millionaires will reduce the negative impacts of their massive industrial companies. It is easy to think that you personally are capable of making that change, but do we trust other people to do the same? If a person has a growth mindset, then they are more likely to see the traits of others as having potential to change or be developed, and therefore are more likely to believe that each of the millions of people that are needed to solve this massive problem have the capacity to change their environmental behaviors. By believing that these individual changes are possible, a person is better suited to see the solution to climate change as a goal that is able to be achieved via actionable steps. This frame of mind will allow them to feel hopeful about climate change, despite the intensity and ominousness of the threat.

Parallelly, in the context of rehabilitation for incarcerated people, in order to believe that someone who is incarcerated can be successfully reintegrated back into society, you must believe that they have the ability to change from the person who committed the crime in the first place, to a person who will be a productive member of the community. Once again, it is easy to imagine yourself as someone who might be reformed or learn their lesson from incarceration, but it is difficult to trust that another person has completed that change. A person with a growth mindset will be more likely to view incarcerated people, not as fixed entities or overall bad people, but rather as humans who can learn, grow, and develop new traits and life practices. By believing in their ability to make these personal changes, a person with a growth mindset is more likely to
believe that incarcerated individuals have the capacity to be rehabilitated while in prison, and to be productive members of society once they are released.

When you consider these two contexts in this way (i.e. based on the ability of others to change), growth mindset naturally comes into play. Having a growth mindset puts a person in a much better position to view these behavioral changes of other people as entirely possible. By operating under the assumption that all people and their traits are malleable and can develop further with time, finding hope in both of these contexts is much more likely.

The current research will address the relationship between growth mindset and these two contexts in the form of two separate studies. Study 1 will investigate the relationship between growth mindset and hope (or hopelessness) about climate change. Study 2 will investigate the relationship between growth mindset and beliefs in rehabilitation for incarcerated people.

**Replication**

These two studies, while concerning two topics that are currently pressing matters in the United States, are also significant in the realm of ethical research practices. Recently there has been in a crisis in scientific research, felt very intensely in the field of psychology, in which the findings from many studies, including findings that have been considered canon for decades, are not able to be replicated (Yong, 2018). Upon further examination of some of the questionable research practices that have become acceptable over the years, many psychologists have started a movement for more open and inclusive research practices to prevent erroneous or false findings from being published or trusted. Part of this movement includes replicating studies to make sure that their findings hold true. Replication can take many forms, a direct replication meaning that the exact procedure of a study is performed again and the exact analyses on the data are
performed again. A conceptual replication involves testing the same concept or hypothesis that was tested in the original study, but possibly changing variables or methodology in order to see if the findings hold true in contexts other than the specific one utilized in the original study. It is important that these replications are done for older studies, to confirm that the foundation of psychological research is sound, but it is equally as important to conduct these replications for new studies (Nosek & Errington, 2017). By replicating new studies, we prevent the possible invalidation of years of work that could be built upon the findings of that study. In the case of the current research, these two studies will act as conceptual replications of each other. Both of these studies measure the effect of growth mindset on an individual’s beliefs that another person can change, but in two very different contexts. By conceptually replicating itself, this project not only follows open science practices, but also removes the task of replicating either of these studies from the workload of another researcher. This is an equally important component because one of the barriers to increasing the number of replications that are conducted is that there is no reward or discovery in conducting a replication. It is difficult to convince researchers to take the time and resources that they could be using to further their own career and instead utilize them to simply confirm the work of other researchers. By internally replicating, this project is another step closer to the ideals of open and inclusive psychology, and increases the validity of its findings.

STUDY 1

Study 1 investigated whether growth mindset is associated with hope and/or hopelessness about climate change. Hope is a function of goal-oriented thinking (Synder, 2002), and focusing on tangible goals has been found to increase environmental hope (Feldman & Hart, 2018). When
thinking about tangible goals in terms of combating climate change, the most common ideas that come to mind are all of the small ways that each individual can change their environmental behaviors and reduce the negative impact they have on the planet. Having hope that we can stop climate change before conditions become dangerous is contingent upon believing that people have the capacity to change their environmental behaviors, and growth mindset is an excellent predictor of belief that people can change.

**Environmental Knowledge**

In addition to measuring growth mindset and hope about climate change, Study 1 will also measure the effect of knowledge about environmental issues on hope about climate change. This seeks to recognize the effect that ignorance of these issues or in depth knowledge of them could possibly have on the results. In children, increased environmental education has been shown to increase the likelihood that they participate in environmentally responsible behaviors (Erdoğan, 2011). In adults, increased environmental knowledge can improve the amount of “green” choices individuals make when purchasing products (Lin & Niu, 2018). While environmental knowledge can improve environmental attitudes and behaviors, it is not clear how it could affect environmental hope. Those who are more educated on environmental issues are likely seeking that information out, and therefore must be interested in or care about the issue of climate change. If a person cares deeply about the issue of climate change, then they may be more inclined to feel hopeful in the face of the challenge it presents. However, the more information is learned about climate change, the more pessimistic a person could begin to feel. Much of propagated information about climate change is very bleak, and adopting that information into one’s outlook could cause hopelessness rather than hope.
**Age**

It is expected that age of participant will have an effect on the results. In the context of Study 1, it is clear that there are disparities in coping mechanisms in thinking about climate change between age groups (Ojala, 2012). Building off of that, the current researchers believe that younger people might see climate change as something that will definitively affect their future, whereas older people might see climate change as something that will not come to full realization until after they are dead. Because of the perceived time frame of climate change, it might not seem as if it will ever be a personal reality for older people, in which case their levels of hope/hopelessness might be coming from a place of psychological distance. Younger people might be more motivated to be hopeful about climate change because they know they will have to experience the effects of it at some point, but they could be pushed to hopelessness by the harsh reality of it.

**Political Ideology**

Climate change has become a constant discussion topic and platform for many politicians. Within our nation, there are a great deal of politicians and billions of constituents, all with vastly differing points of view on whether climate change exists or not, how important they think mitigating climate change is, and what actions they believe will be the most effective in mitigating it. Because of the current heightened politicization of this matter, the researchers will also consider political ideology when conducting Study 1 and the analyses for Study 1.

**Study 1 Hypotheses**

For Study 1, the main hypothesis (H1) is that growth mindset will be positively associated with hopefulness about climate change. Since the core of combating climate change
GROWTH MINDSET AND REHABILITATION

involves changing environmental behaviors on both an individual level and larger scale, having a growth mindset in reference to others would make it more likely that a person believes people will actually commit to those changes. The second hypothesis (H2) is that level of environmental knowledge will be negatively associated with hopefulness about climate change. The third hypothesis for Study 1 (H3) is that age will be positively associated with hopefulness about climate change. In addition to the hypotheses for this study, the researchers have posed a research question: (RQ1) how will political ideology interact with the relationship between growth mindset and hopefulness about climate change? Because the matter of climate change has become such a highly politicized topic, the researchers are interested to see if political ideology has any effect on the results.

Optimism

The current researchers recognize that despite the distinction between hope and optimism, it is definitely possible that they could both play a role in Study 1. In the context of Study 1, climate change could be seen as something that is personally relevant because it will deeply affect the life of each person on Earth, but it could also be seen as a broader issue that occurs on a larger scale because of its global effects. Depending on which way an individual views the issue of climate change, they may utilize a hope-based way of thinking or an optimism-based way of thinking.

While both hope and optimism are important and beneficial modes of thinking to utilize, Study 1 measures hope because it is linked to higher importance desires. While optimism is not part of the hypotheses for this study, it is expected that all hypotheses will be supported when controlling for optimism in analyses.
Socioeconomic Status

The current researchers recognize that socioeconomic status can also play a significant role in the context Study 1. Those of higher socioeconomic status have the ability to choose to buy sustainable products, and feel like they are making a difference, causing them to feel more hopeful. Those of lower socioeconomic status might not have that opportunity, and also will feel the effects of climate change more directly (Blashki et al., 2008). This would make socioeconomic status positively associated with hopefulness about climate change.

The current researchers believe that despite these associations, when socioeconomic status is controlled, all of the hypotheses will continue to be supported.

Study 1 Method

Participants

Participants for this study were 116 males, 92 females, and 1 gender nonbinary person (N = 209), ranging in age from 18 to 62 years old. About 75% of our sample was aged 31 or younger. The sample was 78% caucasian, with 15 or less participants in all other race/ethnicity categories. 87.6% of our sample completed high school or further education, and 84.7% of them have a yearly household income of between $40,001 - $60,000 or less. Participants were recruited via Prolific, an online forum for collecting psychological data. The current researchers chose to utilize Prolific because it provides a sample that is more diverse in age, ethnicity, and socioeconomic status than a sample of college students. Additionally, Prolific compensates its participants in a fair and ethical way. For Study 1, participants were compensated $1.00 for the approximated 6 minutes it took them to fill out the survey.
**Procedure**

The participant answered a survey that included demographic questions, the Implicit Theories of Human Attributes measure, the Life Orientation Test - Revised, the Social and Economic Conservatism Scale, the Constructive Hope Scale, and the Environmental Knowledge Scale.

**Measures**

**Demographic questions.** Demographic questions such as gender and race/ethnicity will be asked, as well as socioeconomic status (yearly household income and highest completed level of education) and age, which are the two demographic factors that are most involved in the analyses.

**Growth Mindset.** The Implicit Theories of Human Attributes measure (Levy, Stroessner, & Dweck, 1998) is a three item measure. It is a Likert scale measure, where the participant must rate how much they agree with each of the three statements ranging from 1 = “Strongly agree” to 6 = “Strongly disagree.” The three items are as follows:

1. People can do things differently, but the important parts of who they are can’t really be changed.
2. The kind of person someone is, is something basic about them, and it can’t be changed very much.
3. Everyone is a certain kind of person, and there is not much that they can do to really change that.

For this measure in Study 1, \( \alpha = 0.850 \).

**Optimism.** The Life Orientation Test - Revised (Sheier & Carver, 1994) is a 10 item measure. Some of the items are measures of pessimism and are reverse scored. It is a Likert scale...
measure, the participant must respond how much they agree with the statement in a range from “0 = strongly disagree,” and “4 = strongly agree.” Below is an example item of a regularly scored item:

“In uncertain times, I usually expect the best.”

Below is an example of a reverse scored item:

“I hardly ever expect things to go my way.”

For this measure in Study 1, α = 0.766.

**Political Ideology.** The Social and Economic Conservatism Scale (Everett, 2013) is a 12 item scale that asks participants to indicate how positively or negatively they feel toward each item. It is a Likert scale ranging from “1 - very negative” to “5 = very positive.” Below are three example items from the Social and Economic Conservatism Scale:

1. Abortion (R)
2. Limited government
3. Gun ownership

For this measure in Study 1, α = 0.758.

**Hope and Hopelessness About Climate Change.** The Constructive Hope Scale (Ojala, 2012) is a 7 item scale. It is a Likert scale in which the participant must respond how much they agree with each statement from a range of “1 = strongly disagree” to “5 = strongly agree.” Below are two example items from the Constructive Hope Scale:

1. Because we as individuals can change our behavior, together we can influence climate change in a positive direction.
2. I believe that research and technical solutions will contribute to the improvement of the climate change problem.
For this measure in Study 1, \( \alpha = 0.668 \).

**Environmental Knowledge.** The Environmental Knowledge Scale (Tartaro, 2017) is a 10 item scale that asks participants to indicate whether each item (which is a behavior) mitigates or worsens climate change. Below are two example items from the Environmental Knowledge Scale:

1. Recycling (Mitigates)
2. Leaving lights on (Worsens)

### Study 1 Results

<table>
<thead>
<tr>
<th></th>
<th>( \beta )</th>
<th>( df )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth mindset</td>
<td>-0.01</td>
<td>193</td>
<td>0.85</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.34</td>
<td>193</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Education</td>
<td>-0.001</td>
<td>193</td>
<td>0.98</td>
</tr>
<tr>
<td>Income</td>
<td>-0.003</td>
<td>193</td>
<td>0.96</td>
</tr>
</tbody>
</table>

To test Hypothesis 1, which predicted that growth mindset would be positively associated with hopefulness about climate change, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, \( R^2 = 0.114 \). The results of the linear regression showed
no significant association between growth mindset and hope about climate change, so Hypothesis 1 is not supported (see Table 1).

Table 2. Linear Regression Results for Hypothesis 2; DV = Hopefulness about Climate Change

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Knowledge</td>
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<td>189</td>
<td>0.05</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.35</td>
<td>189</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Education</td>
<td>-0.04</td>
<td>189</td>
<td>0.59</td>
</tr>
<tr>
<td>Income</td>
<td>-0.02</td>
<td>189</td>
<td>0.83</td>
</tr>
</tbody>
</table>

To test Hypothesis 2, which predicted that environmental knowledge would be negatively associated with hopefulness about climate change, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, $R^2 = 0.131$. The results of the linear regression showed no significant association between environmental knowledge and hope about climate change, so Hypothesis 2 is not supported. However, the analysis for this hypothesis testing actually yielded results in the opposite direction than expected that were very close to being significant ($p = 0.050$) (see Table 2).
Table 3. Linear Regression Results for Hypothesis 3; DV = Hopefulness about Climate Change

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.02</td>
<td>185</td>
<td>0.83</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.32</td>
<td>185</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Education</td>
<td>-0.003</td>
<td>185</td>
<td>0.97</td>
</tr>
<tr>
<td>Income</td>
<td>-4.56e-4</td>
<td>185</td>
<td>0.10</td>
</tr>
</tbody>
</table>

To test Hypothesis 3, which predicted that age would be positively associated with hopefulness about climate change, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, $R^2 = 0.107$. The results of the linear regression showed no significant association between age and hope about climate change, so Hypothesis 3 is not supported (see Table 3).
To investigate Research Question 1, which asked how political ideology would interact with the relationship between growth mindset and hopefulness about climate change, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, $R^2 = 0.111$. The linear regression showed no significant association between political ideology and hopefulness about climate change, or between the interaction term of political ideology*growth mindset and hopefulness about climate change. To answer Research Question 1, political ideology does not have an effect on the relationship between growth mindset and hopefulness about climate change (see Table 4).
Study 1 Discussion

The findings for Study 1 show that there are no significant associations between growth mindset and hopefulness about climate change, environmental knowledge and hopefulness about climate change, or age and hopefulness about climate change. Hypotheses 1, 2, and 3 were unsupported by these data. Additionally, there were no significant relationships found between political ideology and hopefulness about climate change or the interaction of growth mindset and political ideology and hopefulness about climate change. The investigation for Research Question 1 revealed that there is no interaction between political ideology and growth mindset in predicting hopefulness about climate change.

STUDY 2

Study 2 investigated whether growth mindset is associated with beliefs in rehabilitation for incarcerated people. The idea that a person has been rehabilitated rests upon the notion that they have changed into a better version of themselves than they were before, or that they’ve returned to the normal version of themselves from a worse version. Because people who have a growth mindset believe that people and their traits are malleable, they are more likely to be able to see previously incarcerated people as reformed and rehabilitated rather than untrustworthy or stigmatized.

Perceived Personal Warmth

Study 2 also measured whether perceived personal warmth of the incarcerated person is a possible mediator of the relationship between growth mindset and beliefs in rehabilitation for incarcerated individuals. In a study by Berry and colleagues (2005), it was found that when participants valued warmth-related traits, they were more likely to forgive criminals for their
injustices. Also, personal warmth is often associated with likability (Awale, Chan, & Ho, 2019), and if the incarcerated person is more likable, personal warmth could enhance the effects of growth mindset, or even override the presence of a fixed mindset.

**Age**

In the context of Study 2, age can affect how likely it is a person has come into contact or become familiar with a previously incarcerated person. In the United States, most children attend school until they are eighteen years old. Previously incarcerated people are for the most part not allowed to work in settings that involve children, so the younger the participant is, the less environments they have been in which they might have encountered a previously incarcerated person. Additionally, Pettus-Davis and colleagues (2017) found that age was inversely correlated with social support for an incarcerated family member.

**Political Ideology**

The matter of incarceration, similar to climate change, has increasingly become an issue discussed in the media and politicians. There is considerable disagreement within the United States, not only between politicians and constituents of different political parties, but also within those political parties themselves, about the effects of mass incarceration on the communities that it disproportionately affects (Black/African American communities, Latinx communities), what crimes should constitute significant jail time, the role of racial discrimination in the justice system, and the inability of previously incarcerated people to assimilate back into society. Because of the current heightened politicization of this matter, the researchers also considered political ideology when conducting Study 2 and the analyses for Study 2.
Study 2 Hypotheses

The main hypothesis for Study 2 (H4) is that growth mindset will be positively associated with beliefs in rehabilitation for incarcerated individuals. Believing that an incarcerated person has the capacity to change and be released from prison as a better member of society is contingent on believing that people can change at all. Having a growth mindset is a strong indicator that a person thinks that other people can change. The secondary hypothesis for Study 2 (H5) is that the association between growth mindset and belief in rehabilitation for incarcerated individuals will be mediated by perceived warmth (of the incarcerated individual). In the context of Study 2, perceived interpersonal warmth of an incarcerated person could act as a mediating factor for someone seeing potential in that person to change for the better, and could also add to their likability, making the person hope that they can be rehabilitated. The third hypothesis for Study 2 (H6) is that age will be negatively associated with beliefs in rehabilitation for incarcerated individuals. In addition to the hypotheses for this study, the researchers have posed a research question: (RQ2) how will political ideology interact with the relationship between growth mindset and beliefs in rehabilitation for incarcerated people? Because the matter of mass incarceration has become such a highly politicized topic, the researchers are interested to see if political ideology has any effect on the results.

Optimism

The current researchers recognize that despite the distinction between hope and optimism, it is definitely possible that they could both play a role in Study 2. In this context, rehabilitation of incarcerated people could be considered at a person to person level (i.e., more personally relevant), or it could be considered at a systemic level (i.e. broader and more generalized). In the
same way as in Study 1, depending on which way a person views this issue, they might utilize hope-based versus optimism-based thinking.

While both hope and optimism are important and beneficial modes of thinking to utilize, Study 2 measures belief in rehabilitation because it is more closely applicable to the context. While optimism is not part of the hypotheses for this study, it is expected that all hypotheses will be supported when controlling for optimism in analyses.

**Socioeconomic Status**

Socioeconomic status dictates the places a person exists and chooses to go, and the people they encounter. It is possible that being of lower socioeconomic status might place a person in a neighborhood where it is more likely that the person encounters a previously incarcerated person. That familiarity could contribute to their belief in rehabilitation for incarcerated people. Conversely, a person of higher socioeconomic status might live in a neighborhood where previously incarcerated people cannot afford to live, therefore limiting the number of previously incarcerated people they might encounter. This lack of familiarity could contribute to hostility or aversion toward previously incarcerated people, and detract from beliefs for their rehabilitation. Because of this disparity in contact with previously incarcerated people, socioeconomic status would be negatively associated with hopefulness about climate change.

The current researchers believe that despite these associations, when socioeconomic status is controlled, all of the hypotheses will continue to be supported.
Study 2 Method

Participants

Participants for this study were 124 males, 84 females, and 1 gender nonbinary person (N = 208), ranging in age from 18 to 71 years old. About 92% of our sample was aged 40 or younger. The sample was 83% caucasian, with 14 or less participants in all other race/ethnicity categories. 89% of our sample completed high school or further education, and 83% of them have a yearly household income of between $40,001 - $60,000 or less. Participants were recruited via Prolific, an online forum for collecting psychological data, and were compensated $1.50 for the approximated 13 minutes it took them to fill out the survey.

Procedure

The participant answered a survey that included demographic questions, the Implicit Theories of Human Attributes measure, the Life Orientation Test - Revised, the Social and Economic Conservatism Scale, and a vignette exercise in which they read three short background stories, each about a different incarcerated person, and then answer follow-up questions that act as the measures of belief in rehabilitation for incarcerated individuals and perceived personal warmth.

Measures

Demographics. Demographic questions such as gender and race/ethnicity will be asked, as well as socioeconomic status (yearly household income and highest completed level of education) and age, which are the two demographic factors that are most involved in the analyses.
Growth Mindset. Study 2 will utilize the Implicit Theories of Human Attributes measure (Levy, Stroessner, & Dweck, 1998), which is the same measure of growth mindset used in Study 1 ($\alpha = 0.814$).

Optimism. Study 2 will utilize the Life Orientation Test - Revised (Sheier & Carver, 1994), which is the same measure of optimism used in Study 1 ($\alpha = 0.762$).

Political Ideology. Study 2 will utilize the Social and Economic Conservatism Scale (Everett, 2013), which is the same measure of political ideology used in Study 1 ($\alpha = 0.540$).

Measure of Belief in Rehabilitation for Incarcerated Individuals. This measure of belief in rehabilitation for incarcerated individuals was developed for this study by the researchers. After reading each of the three vignettes, the participant will respond how likely they think the subject of the vignette will do the following actions. This measure is a Likert scale, ranging from “1 = very unlikely” to “5 = very likely.” Below is an example vignette, and two example items:

Jeff is a 35 year old man who was arrested for possession of marijuana with intent to sell. He was caught after being identified on numerous college campuses selling to students. He has been in prison for 2 years so far and has 1 more left in his sentence. While in prison, Jeff has participated in activities such as basketball, drawing, and working in the cafeteria. Jeff has two brothers that he writes letters to once a month. Jeff has had one incidence of misbehavior during his time in prison, in which he got into a fight with other inmates while defending another inmate.

1. How likely do you think it is that Jeff finds employment upon release?

2. How likely do you think it is that Jeff is arrested again? (R)
For this measure as a whole, $\alpha = 0.770$. For each individual vignette, the $\alpha$’s are as follows:

Vignette 1 (subject name Jeff) = 0.748; Vignette 2 (subject name David) = 0.767; Vignette 3 (subject name Fred) = 0.795.

**Measure of Perceived Personal Warmth.** This measure of perceived personal warmth was developed for this study by the researchers. After reading each of the three vignettes and answering the questions from the Belief in Rehabilitation for Incarcerated Individuals measure, the participant will also respond how much they think each attribute describes the subject of the vignette, ranging from “1 = not at all” to “5 = very much.” Example items that would follow the example vignette above are below:

1. How hostile do you think Jeff is? (R)
2. How warm do you think Jeff is?

For this measure as a whole, $\alpha = 0.744$. For each individual vignette, the $\alpha$’s are as follows:

Vignette 1 (subject name Jeff) = 0.776; Vignette 2 (subject name David) = 0.767; Vignette 3 (subject name Fred) = 0.745.

**Study 2 Results**

The dependent variable for Study 2 is Belief in Rehabilitation for Incarcerated Individuals. However, there are multiple ways to score this dependent variable. Because the measure for this variable consists of an exercise that involves answering questions about three different vignettes, each about a different incarcerated person, there is a score for Beliefs in Rehabilitation for Incarcerated Individuals that is calculated from all responses to all questions about all three vignettes, and then there are scores calculated from the questions for each vignette on its own. The same is true for the Perceived Personal Warmth measure.
Table 5. Linear Regression Results for Hypothesis 4; DV = Beliefs in Rehabilitation for Incarcerated Individuals (TOTAL)

<table>
<thead>
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<th>Variable</th>
<th>β</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth mindset</td>
<td>0.05</td>
<td>196</td>
<td>0.47</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.21</td>
<td>196</td>
<td>0.004</td>
</tr>
<tr>
<td>Education</td>
<td>-0.13</td>
<td>196</td>
<td>0.07</td>
</tr>
<tr>
<td>Income</td>
<td>-0.01</td>
<td>196</td>
<td>0.84</td>
</tr>
</tbody>
</table>

To test Hypothesis 4, which predicted that growth mindset would be positively associated with beliefs in rehabilitation for incarcerated individuals, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, $R^2 = 0.0542$. The results of the linear regression showed no significant association between growth mindset and beliefs in rehabilitation for incarcerated individuals, so Hypothesis 4 is not supported (see Table 5).
Hypothesis 4, which predicted that growth mindset would be positively associated with beliefs in rehabilitation for incarcerated individuals, was not significant for the score of beliefs in rehabilitation for incarcerated individuals calculated from all questions for all three vignettes. The researchers performed a linear regression, using beliefs in rehabilitation for incarcerated individuals from Vignette 1 (subject name Jeff), controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, \( R^2 = 0.1088 \). There is a significant positive correlation between growth mindset and belief in rehabilitation for incarcerated individuals for Vignette 1 (subject name Jeff), so Hypothesis 4 was supported within Vignette 1 (see Table 6).
Table 7. Linear Regression Results for Hypothesis 4 (Vignette 2 - David); DV = Beliefs in Rehabilitation for Incarcerated Individuals (Vignette 2 - David)

<table>
<thead>
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<th></th>
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<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth mindset</td>
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<td>201</td>
<td>0.98</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.08</td>
<td>201</td>
<td>0.24</td>
</tr>
<tr>
<td>Education</td>
<td>-0.12</td>
<td>201</td>
<td>0.11</td>
</tr>
<tr>
<td>Income</td>
<td>0.08</td>
<td>201</td>
<td>0.27</td>
</tr>
</tbody>
</table>

Hypothesis 4, which predicted that growth mindset would be positively associated with beliefs in rehabilitation for incarcerated individuals, was not significant for the score of beliefs in rehabilitation for incarcerated individuals calculated from all questions for all three vignettes. The researchers performed a linear regression utilizing beliefs in rehabilitation for incarcerated individuals for Vignette 2 (subject name David), controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, \( R^2 = 0.02386 \). There is no significant correlation between growth mindset and beliefs in rehabilitation for incarcerated individuals for Vignette 2, so Hypothesis 4 is not supported within Vignette 2 (see Table 7).
Hypothesis 4, which predicted that growth mindset would be positively associated with beliefs in rehabilitation for incarcerated individuals, was not significant for the score of beliefs in rehabilitation for incarcerated individuals calculated from all questions for all three vignettes. The researchers performed a linear regression utilizing beliefs in rehabilitation for incarcerated individuals for Vignette 3 (subject name Fred), controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, $R^2 = 0.01399$. There is no significant correlation between growth mindset and beliefs in rehabilitation for incarcerated individuals for Vignette 3, so Hypothesis 4 is not supported within Vignette 3 (see Table 8).
The researchers were unable to fully test Hypothesis 5, which predicted that the association between growth mindset and beliefs in rehabilitation for incarcerated individuals would be mediated by perceived personal warmth, because there was no significant correlation between growth mindset and the beliefs in rehabilitation for incarcerated individuals (totaled for all vignettes). However, there was a positive association between growth mindset and beliefs in rehabilitation for incarcerated individuals for Vignette 1 (subject name Jeff), $\beta = 0.16^*$. The researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). There is a significant positive relationship between perceived personal warmth (Vignette 1 - Jeff) and beliefs in rehabilitation for incarcerated individuals (Vignette 1 - Jeff), and there is no longer a significant association between growth mindset and beliefs in rehabilitation for incarcerated individuals (Vignette 1 - Jeff) once perceived personal warmth (Vignette 1 - Jeff) is entered into
the regression, so Hypothesis 5 is supported within Vignette 1 (see Figure 1). However, the Sobel test for this model was not significant ($Z = 1.52, p > 0.13$), suggesting that the reduction of the effect of growth mindset on beliefs in rehabilitation for incarcerated individuals (Vignette 1 - Jeff) after including perceived personal warmth (Vignette 1 - Jeff) was not a significant reduction.

Vignettes 2 (subject named David) and 3 (subject name Fred) did not show a significant association between growth mindset and beliefs in rehabilitation for incarcerated individuals for their specific vignettes, so Hypothesis 5 testing could not be done within those two vignettes.

Table 9. Linear Regression Results for Hypothesis 6; DV = Beliefs in Rehabilitation for Incarcerated Individuals (TOTAL)

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.08</td>
<td>190</td>
<td>0.26</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.20</td>
<td>190</td>
<td>0.01</td>
</tr>
<tr>
<td>Education</td>
<td>-0.11</td>
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<td>0.14</td>
</tr>
<tr>
<td>Income</td>
<td>-0.01</td>
<td>190</td>
<td>0.85</td>
</tr>
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</table>

To test Hypothesis 6, which predicted that age would be negatively associated with beliefs in rehabilitation for incarcerated individuals, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and
highest level of completed education). For this model, $R^2 = 0.0593$. The results of the linear regression showed no significant correlation between age and beliefs in rehabilitation for incarcerated individuals, so Hypothesis 6 is not supported (see Table 9).

Table 10. Linear Regression Results for Research Question 2; DV = Beliefs in Rehabilitation for Incarcerated Individuals (TOTAL)

<table>
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<th>$\beta$</th>
<th>$df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Mindset</td>
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<td>0.31</td>
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<tr>
<td>Optimism</td>
<td>0.18</td>
<td>191</td>
<td>0.02</td>
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<tr>
<td>Education</td>
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<td>191</td>
<td>0.14</td>
</tr>
<tr>
<td>Income</td>
<td>-0.01</td>
<td>191</td>
<td>0.88</td>
</tr>
<tr>
<td>Political Ideology</td>
<td>0.08</td>
<td>191</td>
<td>0.30</td>
</tr>
<tr>
<td>Political Ideology*Growth Mindset</td>
<td>0.05</td>
<td>191</td>
<td>0.43</td>
</tr>
</tbody>
</table>

To investigate Research Question 2, which asked how political ideology would interact with the relationship between growth mindset and beliefs in rehabilitation for incarcerated individuals, the researchers performed a linear regression, controlling for optimism and socioeconomic status (represented by yearly household income and highest level of completed education). For this model, $R^2 = 0.0591$. The linear regression showed no significant correlation between political
ideology and beliefs in rehabilitation for incarcerated individuals, or between the interaction term of political ideology*growth mindset and beliefs in rehabilitation for incarcerated individuals. To answer Research Question 2, political ideology does not have an effect on the relationship between growth mindset and beliefs in rehabilitation for incarcerated individuals (see Table 10).

**Study 2 Discussion**

The findings for Study 2 show that there is no significant association between growth mindset and beliefs in rehabilitation for incarcerated individuals (total) or age and beliefs in rehabilitation for incarcerated individuals (total). Hypotheses 4 and 6 were not supported by the data and analyses. Since there was no association between growth mindset and beliefs in rehabilitation for incarcerated individuals (total), the researchers were unable to test Hypothesis 5 for beliefs in rehabilitation for incarcerated individuals calculated for all vignettes together. However, the researchers performed linear regressions between growth mindset and the beliefs in rehabilitation for incarcerated individuals scores for each individual vignette. These analyses showed that there was a significant positive association between growth mindset and beliefs in rehabilitation for incarcerated individuals within Vignette 1 (subject name Jeff). There were no significant associations between growth mindset and beliefs in rehabilitation for incarcerated individuals for Vignette 2 (subject name David) or Vignette 3 (subject name Fred). The researchers tested Hypothesis 5 within Vignette 1 (Jeff) and found that perceived personal warmth (Vignette 1 - Jeff) significantly mediated the association between growth mindset and beliefs in rehabilitation for incarcerated individuals (Vignette 1 - Jeff). Hypothesis 5 was supported within Vignette 1 (Jeff). Additionally, there were no significant correlations found between political ideology and beliefs in rehabilitation for incarcerated individuals (total) or the
interaction of growth mindset and political ideology and beliefs in rehabilitation for incarcerated individuals (total). The investigation for Research Question 2 revealed that there is no interaction between political ideology and the relationship between growth mindset and beliefs in rehabilitation for incarcerated individuals (total).

**General Discussion**

This project sought to connect growth mindset to two of the most pressing issues of our time: climate change and mass incarceration. In Study 1, we investigated three hypotheses: that growth mindset would be positively associated with hopefulness about climate change (H1), that environmental knowledge would be negatively associated with hopefulness about climate change (H2), and that age would be positively associated with hopefulness about climate change (H3). These three hypotheses were unsupported by the data and analyses performed for Study 1. Additionally, Study 1 posed a research question: how will political ideology interact with the relationship between growth mindset and hopefulness about climate change (RQ1)? The analyses performed to investigate this research question revealed no significant effects or relationships between political ideology and hopefulness about climate change or political ideology and the relationship between growth mindset and hopefulness about climate change.

In Study 2, the researchers also investigated three hypotheses: that growth mindset would be positively associated with beliefs in rehabilitation for incarcerated individuals (H4), that perceived personal warmth would mediate the association between growth mindset and beliefs in rehabilitation for incarcerated individuals (H5), and that age would be negatively associated with beliefs in rehabilitation for incarcerated individuals (H6). Hypotheses 4 and 6 were unsupported by the data and analyses performed. Because Hypothesis 4 was unsupported, Hypothesis 5 could
not fully be tested. But because beliefs for rehabilitation for incarcerated individuals consists of three vignettes, the researchers were able to test Hypothesis 4 for each of the vignettes individually. Hypothesis 4 was supported within Vignette 1, so the researchers tested for Hypothesis 5 within Vignette 1. These analyses revealed that Hypothesis 5 was also supported within Vignette 1. Additionally, Study 1 posed a research question: how will political ideology interact with the relationship between growth mindset and beliefs for rehabilitation for incarcerated individuals (RQ2)? The analyses performed to investigate this research question revealed no significant effects or relationships between political ideology and beliefs for rehabilitation for incarcerated individuals or political ideology and the relationship between growth mindset and beliefs for rehabilitation for incarcerated individuals.

In terms of Hypotheses 3 and 6, the rationale that the researchers chose for the age variable might be incorrect in both Study 1 and Study 2. In Study 1, Hypothesis 3 states that age will be positively associated with hopefulness about climate change. The rationale behind this is that the older you are, the less you feel you will have to actually experience the consequences of climate change, and as a result, you may assume that the issue will resolve itself because you know you will not be directly involved in that process. However, it is possible that the younger people cling to hope that the climate crisis will be resolved as a coping mechanism for the knowledge that their future could be greatly affected by the climate crisis, while older people feel comfortable believing that climate change is irreversible because they believe they will not live to see the worst of it.

In Study 2, Hypothesis 6 states that age will be negatively associated with beliefs in rehabilitation for incarcerated individuals, because younger people are less likely to be in
situations where a previously incarcerated person comes into their life (schools) and older people are more likely to be put in situations where society might encourage them to shy away from previously incarcerated people (hiring people for a job, dating, etc.). However, it is possible that young children may view people in prison as intangible and as wholly bad because of the stigma of society, and older people have a higher chance of having come into contact with someone who was previously incarcerated, and this contact subsequently showing them that previously incarcerated people are just like any other person.

In summary, while most of the analyses in this project did not support the hypotheses posed, there are still many takeaways from this work, and many avenues stemming from this work left to explore.

**Strengths**

While neither Study 1 nor Study 2 showed the associations between growth mindset and their respective dependent variables as predicted, almost all analyses showed that optimism (one of the control variables) was significantly positively associated with the dependent variables. While most hypotheses in this project went unsupported, the identification of optimism as a variable of interest in these two contexts is very integral to the continuance of this work.

Another strength of this work is the finding that perceived personal warmth significantly mediates the association between growth mindset and beliefs in rehabilitation for incarcerated individuals within Vignette 1 (subject name Jeff). While this is a small subset of the data collected, and not the overall support of Hypothesis 5, and the Sobel test for this analysis was insignificant, this finding shows that to some extent, the logic behind this hypothesis could be
correct, and that investigating ways to improve the measures used to collect this data is worth pursuing.

Despite wanting to pursue ways to improve the measures for Perceived Personal Warmth and Beliefs in Rehabilitation for Incarcerated Individuals developed for Study 2, the development of these measures alone is a strength of this project. These measures were developed because there was a complete lack of measures that fit the needs of this study in previously published literature. Both of the completely new measures achieved very high reliability values (see Study 2 Method), and are now available for anyone to use or build off of in the continuance of this or other work.

Another strength of these studies was that they were correlational rather than experimental. The correlational structure of these studies allowed us to collect far more data than an experimental study would have allowed. It also allowed us to collect data for variables that are naturally occurring, rather than introduce a stimulus and simply observe reaction. This allowed us to uncover relationships between the variables we collected.

Lastly, the use of open science practices was taken very seriously in the creation and execution of this project. The idea behind this two-study concept was to execute two studies that readily replicated one another. While neither of the studies achieved proving what they intended to prove, and hence the replication portion remains unachieved as well, there are a plethora of other open science practices upheld by this project. The samples for both studies in this project were large, non-student samples, which contributes to the ability for the findings of this work to be applied to a broader population of people in the world. Additionally, the samples were very
evenly split between genders. The samples were also extremely diverse in age. The other open science guidelines followed by the researchers are outlined below:

**Open Data.** The researchers will leave their raw data open to the public, so that anyone can use it to attempt to re-run the analyses and reproduce the results.

**Open Code.** The researchers intended to leave their code open to the public so that anyone could see exactly what analyses they ran and how, and attempt to re-run the analyses and reproduce the results. However, due to the COVID-19 pandemic, resulting in having to complete this project remotely instead of on Haverford College’s campus, the researchers chose to use the Jamovi program to analyze their data. Jamovi, unlike SPSS (which is what was intended to be used) does not show code, so this portion of open science practices was unable to be executed.

**Open Materials.** The researchers will leave their materials open to the public, so that if another researcher wanted to exactly replicate this study, he/she could use the exact materials used in the original study, eliminating possible influences on changed materials on the results.

**Preregistration.** The researchers will formally preregister their studies, declaring hypotheses and method before conducting the study so that nothing can later be altered to attempt to make the results seem more significant or more interesting.

**Reproducibility.** The researchers had intended on their analyses being reproduced by a peer (and reproducing that peer’s analyses for their project), but due to the COVID-19 pandemic, and the resulting change from utilizing SPSS to Jamovi for data analysis, this open science practice was unable to be executed.
Limitations

While the samples for these studies were diverse in almost all of the demographics measured, they were predominantly caucasian. Diversifying the racial composition of the samples in future work would allow the findings to be legitimately applicable to a broader population of people.

In terms of the measures and variables utilized in these studies, many have issues that could have contributed to the lack of supported hypotheses in this project. Firstly, the measure for environmental knowledge consisted of a list of behaviors that the participant was to indicate if they mitigated or worsened climate change. While this was the only measure in the literature that fit what was needed for Study 1, it is possible that the items were too easy. Almost every participant achieved close to a perfect score on this measure. The items were every day actions that at this point in time most people know are either bad or good for the environment. Also, because the participants were simply choosing between “mitigate” and “worsen” as their answers, regardless of how informed they were, they had a 50% chance of choosing the correct answer every time. The researchers are also interested in a broader definition of environmental knowledge. What this measure lacked was a measurement of knowledge of current statements from scientists about the urgency, bleakness, and gravity of the current climate crisis. This kind of knowledge is closer to what the researchers were trying to convey when formulating the logic used for Hypothesis 2 (that environmental knowledge will be negatively associated with hopefulness about climate change). The researchers also recognize that the rationale they chose may be incorrect. It is possible that those more invested in learning about climate change might
be the people holding onto hope that the climate crisis can be resolved instead of becoming bitter and pessimistic about the state of things.

The political ideology variable is involved in both Study 1 and Study 2, but there are flaws in this measure that could have contributed to the lack of significant findings in relation to this variable. Most of the items on the Social and Economic Conservatism Scale (Everett, 2013) are annotated as being economic-related items. This imbalance could have potentially skewed what scoring as highly “conservative” on this scale actually means, and the way this variable correlated with other variables. Especially in the context of Study 2, which deals with the issue of incarceration (which is far more a socially political issue than an economically political issue), the lack of social items in the SECS measure could have disrupted any relationship that the beliefs in rehabilitation for incarcerated individuals and political ideology variables might have had. Additionally, the reliability for the political ideology measure in Study 2 was much lower than desired (α = 0.540).

In addition to the issues with the measure itself stated above, the researchers recognize that it is not always the case that constituents of a particular political party are in agreement on all issues. While more liberal politicians tend to err on the side of policies or initiatives that attempt to mitigate climate change or reduce the rate of incarceration, that does not mean that all people who are registered democrats agree with those initiatives or have strong feelings about them. Especially in the context of Study 1, belief in climate change is heavily rooted in science, and trust in science is not necessarily designated to one political party or another.

Another measure that posed some interesting limitations is the beliefs in rehabilitation for incarcerated individuals measure, which consisted of reading three different vignettes and
subsequently answering questions about that person. The researchers, having created these vignettes completely, recognize that the choices they made had possible consequences, despite the fact that those choices were made for a reason. For example, the race of the incarcerated individuals in the vignettes was left out. This choice was made because the issue of incarceration is extremely racialized in the media and politics due to the disproportionate amount of people of color incarcerated. The researchers did not want to insert race into these vignettes, allowing it to skew the way the participants viewed the subjects of the vignettes. However, by removing race from the vignettes, the participants were left to imagine the race of the subjects of the vignettes on their own. When imagining a person, their appearance is a large part of what is imagined, and you cannot imagine someone without imagining their race since race is based upon appearance. By leaving the race of the subjects of the vignettes up to the imagination of the participants, the researchers have no knowledge of what race was imagined or what role that imagined race played in the perceptions of the participants on the subjects of the vignettes.

Another decision made about the vignettes was that each had to be unique. An effort was made to make all the details in the vignettes fairly neutral, so that the participants were assessing their beliefs in rehabilitation for that person and the personal warmth of that person without being manipulated, but the vignettes all needed to be different from one another to create a sense of diverse individuals. However, this has made it difficult to discern why Hypotheses 4 and 5 were supported within Vignette 1, but not the other two. When examining Vignette 1 in comparison with the other two, Jeff (the subject of Vignette 1) was the oldest subject, had the shortest sentence, and the least violent crime (selling marijuana to college students). He was also disciplined the least amount of times (once) in prison, but was punished for the most violent
disciplinary offense (getting in a fight) but for a seemingly good reason (standing up for a fellow inmate). Any of these factors could have contributed to the support of Hypotheses 4 and 5 within this vignette, but there are so many differences from the other vignettes that it is impossible to say which it is.

A third issue with the vignettes is that it is extremely difficult to create the feeling that the participant knows enough about the subjects of the vignettes to make evaluations about their likelihood to assimilate back into society or their personal warmth/personality. The vignettes were intentionally made neutral so that the participants would project their own sense of personal warmth onto the subjects of vignettes instead of the researchers creating their own definition about what personal warmth is or is not, and making a “warm” vignette versus a “not warm” vignette. This choice might have not only made the subjects of the vignettes seem fictitious, but also confused the participant by asking them to make judgments about the personality of the people in the vignettes while having given them no information about the subjects’ personalities.

Future Directions

While almost all of the hypotheses posed in this project went unsupported, what is clear from the analyses performed is that any continuance of this work should investigate optimism as a predictor for hopefulness about climate change and belief in rehabilitation for incarcerated individuals. Optimism, while a control variable for all analyses, was significantly correlated with the dependent variable in almost every analysis performed. The researchers chose to control for optimism because it is so similar to the constructs of growth mindset, hope, and belief, which are all core to the hypotheses posed in this project. Because of how similar these constructs all are, it
is very feasible that optimism is a much better predictor of the dependent variables in these studies than growth mindset will be.

Another future direction for this work is the further development and manipulation of the vignette exercise and subsequent questions measuring beliefs in rehabilitation for incarcerated individuals and perceived personal warmth. This exercise and these measures were created for the purposes of these studies because no other published measures were adequate. If work on this topic is to continue, then this measure needs to be improved and expanded upon. One possible change could be to manipulate the sense of “warmth” of the personalities of the subjects in the vignettes. Instead of removing any sense of personal warmth from the vignettes and allowing the participants to project onto them, the researchers could manipulate the personal warmth variable and then use the perceived personal warmth measure questions to check that the “warm” vignette was perceived as being more warm than the “not warm” vignette. To enhance the idea that the subjects of the vignettes are somewhat real or recreate the feeling of interacting with a person, audio clips of people speaking as the subjects of the vignette could be created and utilized.

Another way to expand the use of these vignettes would be to manipulate the details given in a meaningful way. Instead of creating vignettes that have a lot of differing details, future research could create vignettes where most details are similar, and one factor is manipulated. Some interesting areas to investigate could be seeing if the severity or level of violence of crime or age are factors in believing in the possibility for an incarcerated person’s rehabilitation. One could vary the sentence length for the same crime without explanation to see if longer sentence length makes the participant assume that the subject is a worse criminal. Lastly, it could be interesting to investigate whether committing a crime for a “good” reason makes someone seem
more or less likely to be rehabilitated, and to see how far that balance could go; how severe a crime is acceptable to commit if it is for a “good” reason?

Another avenue to investigate is if Study 2 reveals an end to growth mindset theory. The lack of support for the hypotheses in the study could be indicative of methodological flaws, but also could be evidence that we cannot apply growth mindset to all contexts and expect it to have a significant effect. Is it possible that the matter of incarceration and moral reform is beyond the scope of growth mindset theory? If this is the case, it could be interesting to see what other contexts sit outside of the realm of growth mindset. For example, I think it would be interesting to see if growth mindset is associated with a person’s position on the death penalty or abortion, two extremely polarizing issues of our time that deal with grave consequences and a variety of modes of reasoning.

This project, while not successful in terms of hypotheses, consists of research that is important for the world we live in today. While there is a lot of work surrounding the topic of psychology in the realm of climate change, any work that can be done to strengthen the movement against the climate crisis is necessary. The destruction of the earth is an extremely pressing matter, if not the most pressing matter, because if we destroy the one planet we have to live on, then all other issues we deal with cease to be important. For humans to live, the earth must live as well, and actions towards saving the planet must start now if the impact is to ever be felt. Research that illuminates how to revitalize and maintain hope and motivation in the face of an issue looming so large is extremely important in order to effect change.

Continuing work pertaining to Study 2 is also extremely important, firstly because there is not much research being done in this area. There is a good amount of work on how being in
prison affects a person psychologically, but almost nothing about their process of reassimilating back into society or the way people view previously incarcerated people. Social stigma is one of the biggest barriers in previously incarcerated people attaining housing and work once they are released from prison, and this inability to provide reliable income, food, and shelter for oneself often lends itself to the very common cycling in and out of prison. Finding ways to alter the way people perceive previously incarcerated people would change the society that previously incarcerated people reenter into after being imprisoned, and make that society far more hospitable to them. One person or a few people giving previously incarcerated people the opportunity for a job or a place to live could be the beginning of someone getting back on their feet, escaping the cycle of the justice system, and living a happy life.

Conclusions

Throughout these two studies, the overarching theme is rehabilitation and the possible factors that can make a person more or less equipped to facilitate rehabilitation in different contexts. While the goal of these particular studies was to identify growth mindset as the key predictor in hopefulness about climate change and beliefs in rehabilitation for incarcerated individuals, the analyses revealed that optimism proved to be a significant predictor in almost all regressions. Despite the original notion that growth mindset would be the main predictor, it is important that any variable showed significant impact on the dependent variables in both studies. The long term goal of this research is to find variables or factors that better equip a person to believe in rehabilitation of any kind, therefore making them more likely to act in efforts to make that rehabilitation happen. The identification of optimism as a key variable is certainly important, but so is further work to identify more factors that can contribute toward this broader concept of
rehabilitation. What factors besides optimism and growth mindset could potentially make a person more amenable to the idea that people can change, become better, and hence become a small but important piece of a larger puzzle that solves global issues? This theme of rehabilitation can be applied in numerous contexts. Being more geared toward rehabilitation could make someone more likely to continue thinking of ways to cure someone in the medical field, more likely to revive a business after an economic downturn, or more likely to see ways to reconcile with a loved one or a spouse with whom they have had a falling out or a breakup. So many things in this world can be broken or harmed. This research searches for ways to identify who is best equipped to facilitate healing and putting the pieces back together.
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GROWTH MINDSET AND REHABILITATION


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