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Little Drops Make the Mighty Ocean: The Influence of Collectivism in Addressing Collective Action Problems

A dissertation submitted in partial satisfaction of the

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in Psychological and Brain Sciences

by

Su Yi Leong

Committee in charge:

Professor David K. Sherman, Chair

Professor Heejung S. Kim

Professor Hongbo Yu

Professor Karen Nylund-Gibson

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The dissertation of Su Yi Leong is approved.

Heejung Kim

Hongbo Yu

Karen Nylund-Gibson

David Sherman, Committee Chair

March 2024

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I started my research journey trying to understand the role of family sacrifice in college student experience driven by a desire to repay and honor the sacrifices that my family has made for me. But along the way, I realize that the amount of sacrifices that family members make for each other is insurmountable and oftentimes unconditional. The only way to honor them is to pay it forward while expressing gratitude to everyone who has supported me in my journey.

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Vita of Su Yi Leong

March 2024

Education

June 2024 Ph.D. in Social Psychology, Quantitative Methods in the Social Sciences Emphasis
University of California, Santa Barbara, CA
Advisor: David K. Sherman, PhD

March 2022 M.A. in Social Psychology
University of California, Santa Barbara, CA.
Advisor: David K. Sherman, PhD
Thesis: *Individual costs and community benefits: Collectivism and individuals' compliance with non-pharmaceutical interventions to combat COVID-19*

June 2018 B.A. (Honors) Psychology and Early Childhood and Family Studies
magna cum laude
University of Washington, Seattle, WA
Honors Thesis: *Cultural model of family: How first- and continuing-generation college students view family in relation to college*

Awards and Grants

2024 UC Santa Barbara Department of Psychological and Brain Sciences McClintock Award ($1,000)
2023 UC Santa Barbara Academic Senate Graduate Student Travel Grant, University of California, Santa Barbara ($450)
2023 UC Santa Barbara Academic Senate Graduate Student Travel Grant, University of California, Santa Barbara ($1,500)
2020 Multidisciplinary Research on the Coronavirus and its Impacts (MRCI) Grant, University of California, Santa Barbara ($2,500)
2019 Graduate Student Association (GSA) Graduate Student Travel Grant University of California, Santa Barbara ($200)
2017 – 2018 Mary Gates Research Scholar, University of Washington, Seattle ($250)

Published Manuscripts

Leong, S., Hegarty, M., Sherman, D.K. (2024). Pluralistic ignorance and occupational choice: The impact of communicating norms on graduate students' career aspirations. *Journal of Applied Social Psychology,* 1-20. https://doi.org/10.1111/jasp.13028

Leong, S., Eom, K., Ishii, K., Aichberger, M.C., Fetz, K., Müller, T.S., Kim, H.S., Sherman, D.K. (2022). *Individual cost and community benefits: Collectivism and individuals' compliance public health interventions*. *PLOS ONE 17*(11): e0275388. https://doi.org/10.1371/journal.pone.0275388

Sherman, D.K., Ortosky, L., **Leong, S**., Kello, C., & Hegarty, M. (2021). The changing

landscape of doctoral education in science, technology, engineering, & mathematics: STEM graduate students, PhD advisors, and preferences for varied career options. *Frontiers in Psychology.* https://doi.org/10.3389/fpsyg.2021.711615

Manuscripts in Preparation

Aichberger, M.C., Fetz, K., **Leong, S.**, Kim, H.S., Sherman, D.K., & Müller, T.S. (2024). Discrimination experiences as barriers to technology-based infectious disease control – Digital contact tracing for SARS-Cov-2. Manuscript in preparation.

Invited Talks and Oral Presentations

Leong, S. (2024, February). *Little drops make the mighty ocean: The role of collectivism in addressing collective action problems.* Oral presentation at the Society for Personality and Social Psychology Conference. San Diego, CA.

Leong, S. (2023, December). *Little drops make the mighty ocean: The role of collectivism in addressing collective action problems.* Social Psychology Area Meeting. University of California, Santa Barbara.

Leong, S. (2023, March). *Pluralistic ignorance and occupational choice: the impact of communicating norms on graduate students' career aspirations.* AGEP Fresno State Career Development Workshop. Fresno, CA.

Leong, S., & Kim, H. S. (2022, February). *Collectivism, social change, and collective problems.* Symposium chair at the 2022 Society for Personality and Social Psychology Conference. Online.

Leong, S., Eom, K., Ishii, K., Aichberger, M.C., Fetz, K., Müller, T., Kim, H.S., Sherman, D.K. (2022, February). *How collectivism shapes compliance to community-benefiting yet personally-costly behaviors.* Oral presentation at the 2022 Society for Personality and Social Psychology Conference. Online.

Leong, S., Eom, K., Ishii, K., Aichberger, M.C., Fetz, K., Müller, T., Kim, H.S., Sherman, D.K. (2021, July). *Individual cost and community benefits: Collectivism and individuals' compliance with non-pharmaceutical interventions to combat COVID-19*. Oral presentation presented at the 2021 Asian Association of Social Psychology. Online.

Leong, S. (2021, May). *The role of collectivism in individuals' compliance with COVID-19 non-pharmaceutical interventions.* Minicon at University of California, Santa Barbara. Online.

Leong, S. (2021, February). *The role of collectivism in individuals' compliance with COVID-19 non-pharmaceutical interventions.* Guest lecture at cultural psychology class with Prof. Heejung Kim. Online.

Poster Presentations

Leong, S., Kim, H.S., Sherman, D.K. (2023, March). *Little drops make the mighty ocean: The influence of collectivism on collective action problems.* Poster presentation at the 2023 International Convention of Psychological Science. Brussels, Belgium.

Leong, S., Hegarty, M., & Sherman, D.K. (2022, February). *"I support your (non)academic career pursuits": The impact of communicating norms about advisor's support for varied career options on STEM PhD students' career development.* Poster session presented at the 2022 Society for Social and Personality Psychology Intervention Science Preconference. Online.

Yang, J., **Leong, S.,** Brady, L.M. (2021, July). *Cultural models of sacrifice: The role of*

family responsibilities. Poster session presented at the 2021 Asian Association of Social Psychology. Online.

Ortosky, L., **Leong, S.,** Sherman, D.K. (2021, March). *STEM PhD students' career preference and sense of belonging: Demographic similarities and differences.* Poster session presented at the 2021 AGEP Conference, Online.

Leong, S., Kim, H.S., Sherman, D.K. *Digital contact tracing to address COVID-19: The role of collectivism.* Poster session presented at the 2021 Society for Personality and Social Psychology Conference, Online.

Yang, J., **Leong, S.,** Brady, L.M. (2021, February). *Cultural models of sacrifice: The role of family responsibilities.* Poster session presented at the 2021 Society for Personality and Social Psychology Conference, Online.

Leong, S, Yang, J., & Brady, L.M. (2020, February). *Social class cultural models of sacrifice.* Poster session presented at the 2020 Society for Personality and Social Psychology Conference, New Orleans, LA.

Yamamoto, K., Levari, A., Beavert, K., Avolio, B.J., Sun, Y., & **Leong, S.** (2019, April). *Validating a measure of strategic thinking.* Poster session presented at the 2019 Society for Industrial and Organizational Psychology Conference, Fort Washington, MD.

Leong, S., Brady, L.M., & Shoda, Y. (2019, February). *Cultural models of family: How race and generation status affect the perceived role of family in college*. Poster session presented at the 2019 Social and Personality Psychology Conference, Portland, OR.

Leong, S., Brady, L.M., & Shoda, Y. (2018, May). *Cultural models of family: How first- and continuing-generation college students view family in relation to college.* Poster session presented at the 2018 Psychology Honors Research Symposium, Seattle, WA.

Leong, S., Brady, L.M., & Shoda, Y. (2018, May). *Cultural models of family: How first- and continuing-generation college students view family in relation to college.* Poster session presented at the 2018 Undergraduate Research Symposium, Seattle, WA.

Teaching

2024	Lab in Social Psychology, Graduate Teaching Assistant
2023	Lab in Social Psychology, Graduate Teaching Assistant
2023	Research Methods, Graduate Teaching Assistant
2020	Health Psychology, Graduate Teaching Assistant
2020	Statistics, Graduate Teaching Assistant

Research Assistantship

2022	European Research Council Grant, Graduate Student Research Assistantship, University of California, Santa Barbara
2020 – 2022	Alliances for Graduate Education and the Professoriate, Graduate Student Research Assistantship, University of California, Santa Barbara

Mentorship

2019 – Present 3-4 research assistants per academic year

- Luiza Rosa, 2021 UCSB Morgan Award for Academic Excellence
- Priscilla Diaz-Gonzalez, 2022 UCSB PBS Distinguished Senior Award
- Patricia Pang, Honors Student

2021 – 2022 Access Grads Mentor

Services

2020 – 2023 Psychology Subject Pool Prescreen Coordinator
2021 Prospective Student Recruitment Coordinator

Professional Experience

Summer 2023 User Experience Research Intern at TuneIn, Inc.
Summer 2022 User Experience Research Intern at Meta, Inc.

Skills

Languages

English (Native), Mandarin (Native), Cantonese (Professional), Malay (Intermediate)

SPSS, R & SQL

Qualtrics

ABSTRACT

Little Drops Make the Mighty Ocean: The Influence of Collectivism in Addressing Collective Action Problems

by

Su Yi Leong

This present research maintains that collectivism facilitates the process of addressing large-scale collective action problems, such as the COVID-19 pandemic and climate change crisis. Addressing large-scale collective action problems requires the intervention of an authority to mobilize a large proportion of individuals to engage in community-benefitting behaviors. In Chapter 1, I propose a theoretical framework that describes the ways in which collectivism align with the characteristics of addressing large-scale collective action problem. Specifically, I propose three psychological mechanisms – other-orientation, susceptibility to social norms, and trust in authority – will explain collectivists' tendencies to engage in community-benefitting behaviors. In Chapter 2, using the COVID-19 pandemic as a large-scale collective action problem, I test how the three aspects of collectivism predicts greater compliance with people's likelihood of opting-in to digital contact tracing and wearing a face covering in public (Study 1). Findings show that susceptibility to social norms consistently predict greater compliance with both health preventative measures, while other-orientation does not. Findings also show mixed effect of trust in government, where greater trust only predicts greater likelihood of opting-in to digital contact tracing, as the measure has direct relevance with the government. In Chapter 3, I probe the relationship between collectivism

and trust in government further in the context of climate crisis. Across Studies 2 and 3, I analyze two global datasets to show that collectivists have greater pro-environmental intention and support for climate change policies more, in part because they place greater trust in government. In Study 4, I test the causality of trust in government on policy support by asking participants to imagine themselves moving to a new country with a government that differs in their levels of competence and corruption, and test the moderating role of collectivism. Finding show the robust relationship between collectivism and policy support across conditions. Regardless of the levels of a government competence and corruption, high collectivists are still more likely to support climate policies compared to low collectivists. Lastly, I discuss the limitations, boundaries, and future directions of this research in Chapter 4. This research expands our theoretical understanding of collectivism by identifying specific psychological mechanisms that relates to particular behaviors, and highlights the need to leverage collectivism to promote community-benefitting behaviors across different large-scale collective action problems.

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The Influence of Collectivism in Addressing Collective Action Problems

Addressing climate change crisis and preventing future public health outbreaks are examples of the most pressing global collective action problems impacted by human activities in modern societies. The disastrous, irreversible consequences of global warming impact every corner of the globe, and has caused widespread damage in communities, infrastructures, and the economy (NCEI, 2023). Yet, despite decades of warnings from scientists and experts about the increased global temperature, there is no sign of slowing down (NASA, 2023). Similarly, the COVID-19 pandemic has highlighted the importance of large-scale coordination without which a single outbreak can spread, disrupting societal operations and drastically transforming our daily lives (CDC, 2020). Addressing large-scale collective action problems such as the public health and climate change crises are challenging, because they require group effort and coordination, and involve compromise in short-term self-interest for long-term collective benefits (Olson, 1965). Entities face a dilemma between acting for the benefit of their group, or prioritizing their own short-term goals, which could lead to reducing or even nullifying the group coordination efforts. This dilemma raises a crucial psychological question in which the process of how individual weigh different costs and benefits of different courses of action.

Among a myriad of factors that influence how individuals perceive costs and benefits of various behavioral options, the present research posits that one particularly important factor is culture. In particular, collectivism, a cultural orientation that is characterized by greater prioritization of group- over personal-goal, could be a key component that facilitates the process of addressing large-scale collective action problems. Collectivism has been

theoretically and empirically connected to larger societal-level threats (e.g., Fincher et al., 2008; Hornsey et al., 2016; Kim et al., 2016). For example, in the context of public health crisis, research on historical disease demonstrated the positive associations between collectivism and regions with greater pathogen threats (Fincher et al., 2008; Murray & Schaller, 2010). This link could be attributed to collectivistic tendencies, where collectivists' greater in- and out-group distinctions, as well as their tendency to conform, could be beneficial in inhibiting the spread of pathogenic diseases (Fincher et al., 2008). In the context of addressing the climate change crisis, another type of societal-wide action that involves compromising personal interest for collective benefits, collectivism has been found to be positively associated with greater beliefs in climate change, and tendency to engage in more pro-environmental behavior (Hornsey et al., 2016; Lou & Li, 2022). Although there is increasing evidence pointing to the crucial relevance of culture in addressing real-life societal threats (e.g., Lu et al., 2021; Eom et al., 2016), many studies relied on country-level indices to examine the association between culture and the targeted outcomes. To advance our understanding of cultural influence and extend beyond cross-cultural differences on an aggregate-level (Matsumoto & Yoo, 2006), we need better theoretical understanding of the processes in which collectivism influences individual actions.

To address this gap, the dissertation starts by reviewing different characteristics of collectivism and collective action problems, and posits that collectivists' emphasis on other-orientation, sensitivity to social norms, and trust in institutions, would facilitate the process of addressing collective action problems by overcoming barriers, such as the tension between self- and group-benefit, the need to achieve high rates of compliance, and the need to gain public trust. To test the theoretical proposition, Chapter 2 investigates the relationship

between there three aspects of collectivism on individuals' compliance with health preventative measures during the COVID-19 public health crisis (Study 1). To test the generalizability of collectivism influence on different types of large-scale collective action problems, Chapter 3 examines whether and how collectivism shapes individuals' their attitudes towards pro-environmental issues and various climate change policies on the individual- (Study 2) and national-level (Study 3). Given the vital role of institutions in spearheading and maintaining efforts to address collective action problems, Chapter 3 will also explore the relationship between collectivism and trust in institutions on support for pro-environmental issues (Study 3) and test whether there is a causal role for trust by manipulating characteristics such as competence and integrity of the government, to see if they change views on climate policy (Study 4). Lastly, I will conclude by discussing some theoretical boundaries of collectivism and future directions.

Characteristics of Collective Action Problems

Collective action problems, or *social dilemmas,* are situations that require individuals to decide between maximizing short-term personal interest or cooperating with others for long-term collective benefits (Olson, 1965). Collective action problems come in many forms and are commonly studied in social sciences by asking participants in small groups to make choices (e.g., prisoner's dilemma, public resource allocation tasks, etc.) between preserving their personal interest, or cooperating with others and contribute to a common pool to reap greater collective rewards later (see Van Lange et al., 2013, for review). However, addressing collective action problems is challenging, as individuals often face the temptation to prioritize short-term individual gains over long-term collective benefits. In situations where there are limited common resources, if everyone acts to maximize their own self-interest,

they will be worse off compared to if they contribute to the group and maximize the collective interest, a phenomenon also known as the "tragedy of the commons" (Olson, 1965). In addition to the nature of the collective action problem that determines how much efforts and resources are required, human psychological tendencies play a profound role in shaping the extent to which individuals contribute to a collective effort to resolve a common issue (Jagers et al., 2020). The following section uses climate change crisis and the COVID-19 pandemic as examples, and highlights three aspects of collective action problems - the tension between self- and group-interest, levels of public cooperation and compliance, and role of authorities - among others, that influence the extent to which these problems can be effectively resolved.

Tension between Self- and Group-Interest

A major challenge of resolving collective action problems is the "free-rider problem", where individuals or collectives rely on others to cooperate and try to contribute as little as possible to preserve self-interest (Bornstein, 1992, Gavrilets, 2015; Olson, 1965). Take the climate change crisis as an example. To reduce carbon emissions and support pro-environmental initiatives in developing nations, developed countries pledge to contribute an amount proportionate to the size of their economy and historical greenhouse gas emissions to a common fund with an annual climate finance goal of $100 billion. However, consistent reports revealed that most developed nations are not meeting their proportional contributions to the goal, having fulfilled only half of their pledged amounts (WRI, 2021). Similarly, before vaccinations were widely available during the COVID-19 pandemic, companies defied government recommendations to resume operations without proper health preventative measures, resulting in a surge in positive infection rates (the Washington Post,

2021). These strong tendencies to preserve self-interest often lead to less optimal outcomes, commonly termed as "the tragedy of the commons" (Hardin, 1968).

Indeed, a systematic review of 17 studies on 7,107 individual patterns revealed that *unconditional* cooperation with others and prioritizing collective benefits was rare, and preservation of self-interest was common (Thoni & Volk 2018). Across a wide range of situations, it was found that in group settings where individuals can either cooperate with their group members to contribute to a public pool and yield the greatest collective benefits or privately keep their individual contributions, approximately 60% of the participants *conditionally cooperate* by making decisions or behave in ways based on how their group members act. 20% would defect from the group and keep the contribution to themselves (i.e., free-riding), while only 4% unconditionally cooperate (Thoni & Volk, 2018). The findings revealed human tendencies to make decisions that are contingent upon others', followed by preserving their own self-interest, instead of acting in ways that benefit others altruistically. When trying to achieve a common goal or yield the greatest collective interest, unconditional cooperation would be rare, especially if the collective benefits are not immediate or obvious.

Levels of Public Cooperation and Compliance

The second key characteristic of resolving collective action problems is the need for a substantial amount of cooperation and compliance, especially if the problem has societal-wide implications and involves many people and entities (Jagers et al., 2020). Large-scale collective action problems cannot be overcome or managed unless a large percentage of a population cooperates and takes actions that align with the collective goals (Jagers et al., 2020). For example, researchers estimated that greenhouse gas emissions from U.S. households can be reduced by up to 20% if majority households make changes in several

domains, ranging from switching to energy-efficient equipment to daily interactions such as carpooling or trip-chaining (Dietz et al., 2009). Similarly, depending on the country and demographic characteristics, health experts estimated about 50% to 90% of the population needs to be vaccinated to achieve heard immunity in COVID-19 (Fontanet & Cauchemez, 2020; Tetteh et al., 2021). To reach the optimal levels and effectively resolve large-scale CAPs, mobilizing the public, encouraging cooperation, and achieving high degrees of compliance is crucial.

However, research has suggested the levels of cooperation is shaped by the nature of the trade-offs and group sizes (Barcelo & Capraro, 2015; Broom et al., 2019; Isaac et al., 1994; Zelmer, 2003). A meta-analysis, along with experimental findings, reveals that, if individuals' benefit for fully cooperating with others (i.e., collective benefit) increases proportionally with the size of the group, individuals are more likely to cooperate if more members are involved (Barcelo & Capraro, 2015). On the other hand, if individuals' cost to cooperate and benefit for full cooperation remain the same, individuals are less likely to cooperate as the group size increases (Barcelo & Capraro, 2015). In addition to the payoff structure of the collective action problem, other group characteristics, such as being an early (vs. late) group member (Capraro & Barcelo, 2015), the ability to communicate among members (Kerr & Kaufman-Gilliland, 1994), existence of sanctioning systems for defectors (Yamagishi, 1992), or interpersonal factors such as trust (Sato, 1988), higher prosocial orientation (Brewer & Kramer, 1986) and stronger social norms (Ostrom, 1990) can increase the likelihood of cooperation and compliance.

The Role of Authorities

As more individuals and entities are required to resolve a collective action problem,

reliance on a leader or authority to regulate the effort and promote cooperation increases (Jagers et al., 2020; Tyler & Degoey, 1995; Yamagishi, 1988). The role of authority is crucial in the extent to which a collective action problem will be effectively addressed, as the authorities would likely determine the amount of resources devoted to resolve the issue, propose solutions to achieve optimal outcomes, and implement systems that would promote cooperation and possibly sanction defectors among the people involved (Jagers et al., 2020; Messick et al., 1983; Yamagishi, 1988, 1992). At the same time, individuals are more likely to cooperate when they perceive the authorities to be fair, democratic, and representative of their communities (Ostrom, 1990; Tyler & Degoey, 1995; Van Vugt et al., 2004). Indeed, there is abundant evidence that demonstrated that critical role of authorities in establishing support for pro-environmental policies (e.g., Fairbrother et al., 2019; Harring et al., 2013), more effective implementation of policy regulations and responses (Chen et al., 2021), and greater alignment between individual behaviors and authories' recommendations (e.g., Travaligno & Moon, 2021). To effectively address complex collective action problems, it is equally important for authorities to emerge and sustain the effort, and to establish trust among their constituents.

To summarize, this discussion focuses on three key characteristics of collective action problems. First, on the individual-level, the decision to engage in collective action often involves a compromise in self-interest for the sake of a collective benefit, yet individuals would likely base their actions or behaviors on others, or defect from the group to preserve their own self-interest. Second, in addition to the nature of the collective action problems, interpersonal factors and increased group sizes would add to the complexity of resolving collective action problems that require a substantial amount of cooperation and compliance.

Third, the role of authorities is crucial in facilitating the efforts and directions of resolving collective action problems, while public perception of the authorities would shape the extent to which these efforts are supported and maintained.

Although there is a myriad of studies that examine human tendencies in social dilemmas, these studies are constructed in ways that participants could experience the direct impacts and consequences of their decisions, and teams are small enough that participants' backgrounds and cultural predispositions may not have a huge impact. However, outside a lab environment, addressing large-scale collective action problems require a huge amount of people, coordination, and group mobilization, introduces diversity in cultural backgrounds, predispositions, and warrants external influence such as governmental regulations (Jagers et al., 2020). Given these characteristics, the present research posits that collectivism, a cultural orientation most commonly operationalized as the prioritization of group- over personal-interest, could encourage cooperation and facilitate the process of addressing large-scale CAPs.

Collectivism and Collective Action Problems

Cultural values and orientation shape the ways individuals view themselves in relation to others, and influence individuals' reaction, attitudes, and behaviors in social situations (Triandis, 1989; Markus & Kitayama, 1991). Collectivism, in particular, emphasizes interdependence, mutual obligation and shared responsibilities among group members (Schwartz, 1990; Triandis, 1989). Individuals who endorse more collectivistic values tend to cultivate a more interdependent view of self, where they define themselves as fundamentally connected to others, and value the maintenance of harmony with groups. Thus, collectivists tend to prioritize group goals over personal goals, and engage in behaviors

that serve to maintain interdependence and harmonious relationships with group members (Markus & Kitayama, 1991). The following section outlines three aspects of collectivism that serve and maintain the goal of interdependence, and posits that these aspects of collectivism can facilitate the process of addressing collective action problems.

Other-Orientation

One of the most widely discussed aspects of collectivism is collectivists' greater proclivity towards their in-group members (Hui & Triandis, 1986; Triandis, 1989). Collectivists view the self as adaptable and flexible in different social contexts (Morling & Fiske, 1999), often define themselves by their social roles (Cousins, 1989), and allocentric tendencies (Bochner, 1994). Given the greater self-other overlap, collectivists are more concerned about the impacts and consequences of their actions on their in-group members, feel greater interdependence and involved in the lives of their in-group members, and are more likely to engage in behaviors that preserve group harmony (Hui & Triandis, 1986; Markus & Kitayama, 1991; Triandis, 1989;). In situations that involve compromising self-interest for a collective goal, more collectivistic individuals were more likely to sacrifice their self-interest and allocated more rewards to benefit their in-group members (Leung & Bond, 1985). Even when resources are scarce, collectivists are more likely to allocate resources to people who made greater contribution to a collective entity and evaluate them more positively than less collectivistic individuals (Mullen & Sitka, 2009). Thus, when tension between self- and collective-interest arise in the process of addressing collective action problems, collectivists are more likely to engage in behaviors or make choices that prioritize group goals, even if they have to sacrifice or compromise their self-interest.

Susceptibility to Social Norms

Another defining aspect of collectivism is collectivists' greater susceptibility to social norms (Triandis, 1996; Oyserman et al., 2002). One line of research suggest that collectivists exhibit affiliative tendencies and conforming behaviors possibly because they wish to avoid social sanctions and disruption of group harmony (Yamaguchi et al., 1995). The tight social ties within a collectivistic society or network facilitate more social monitoring and sanctioning of in-group members, while protecting themselves from potential threat imposed by out-group members (Gelfand et al., 2011). As a result, collectivistic groups enforce stricter social norms, and are more likely to punish individuals who exhibit non-conforming attitudes and behaviors (Gelfand et al., 2011). Indeed, cross-cultural studies have shown that collectivists are more likely to conform to a majority than individualists (Bond & Smith, 1996), and are more driven by social norms to engage in certain actions (Eom et al., 2016). Collectivists also show greater preference for conformity by making choices that reflect fitting in with the majority (Kim & Markus, 1999), and evaluate individuals who deviate from the norm more negatively, in part because they perceive standing out and uniqueness as selfish (Kinias et al., 2014).

Alternatively, another line of research, the intersubjective norms model, suggests that social interactions among individuals are shaped by the awareness of how most others behave and react in a social environment, and react in ways that perpetuate and reinforce the dominant cultural ideas (Chiu et al., 2010; Zou et al., 2009). In other words, regardless of one's *personal* cultural orientation, individuals will act according to the prevailing orientation among people in their respective cultural context. In more collectivistic cultural contexts, where values about conformity are more prevalent and highly regarded, individuals conform more because they are aware that most others in their social environment will likely

endorse the same conformity values and act accordingly. For example, individuals' likelihood of complying with requests for help is more strongly predicted by their perception of whether most of their peers were collectivistic, instead of their personal levels of collectivism (Zou et al., 2009). Thus, this perspective maintains that social context is a more powerful factor that shapes people's behaviors than a person's cultural orientation. In more collectivistic cultural contexts, social interactions are tighter because adherence to social norms is simply a default and implicit mental heuristic that guides individuals' choices and behaviors.

Together, both perspectives suggest that collectivistic individuals are more susceptible to the influences of social norms, regardless of whether the influence is shaped by personal or contextual factors. An alternative way to interpret and integrate both perspectives is to view contextual and personal factors as mutually influencing one another. Thus, collectivistic social interactions are characterized by tighter social norms and greater susceptibility to conform, regardless of whether it is driven by personal or contextual factors, which facilitates the process of addressing CAPs that require high degree of group coordination and mobilization.

Trust in Authority

The third aspect of collectivism is the greater trust in authority. The close association between collectivism and trust in authority could be explained by the need to maintain social cohesion and protect one's community, especially when facing a collective threat (Fincher et al., 2008). Historically, regions that had more instability and faced greater collective threat (e.g., pathogen) were more collectivistic (Fincher et al., 2008), and had more centralized authorities with greater decisive power (Chen et al., 2021; Schwartz, 2012). Establishing a

more centralized authority allowed greater efficiency to come up with rapid decisions and coordinate a large group of people to engage in certain behaviors to maintain social order and protect one's community (Chen et al., 2021). Thus, with the influence of the social context, collectivists tend to be socialized with values that promote obedience and placed greater trust in authority (Chao & Chao, 1994; Travaglino & Moon, 2021). For example, children who were brought up with collectivistic values were more motivated to work on tasks associated with an authority figure (e.g., mother), even when they were under pressure and risk failure (Fu & Markus, 2014; Iyengar & Lepper, 1999). Even when an authority is not physically present, collectivists experienced greater guilt and negative affect when they perceived that they violated an authority figure's expectations. For example, in deciding the outfits to choose in a social event, compared to European American participants, Indian participants who were reminded of their father, an authority figure, chose outfits that were consistent with their perception of what their father would expect them to wear (Savani et al., 2012). Collectivists' greater trust in authorities enable the authorities to more effectively strategize and implement approaches that require public coordination, and navigate complex issues to advance the collective interests.

In summary, the three aspects of collectivism - other-orientation, adherence to social norms, and trust in authorities - are approaches that collectivists engage in to uphold the goals of social harmony and prioritization of group- over personal-interest. At the same time, these aspects of collectivism also closely align with the characteristics of addressing large-scale collective action problems. Thus, in the next studies, I will use the COVID-19 pandemic and climate change crisis as testbeds to empirically test whether and how these three aspects of collectivism influence the process of addressing large-scale CAPs.

CHAPTER 2: INDIVIDUAL COSTS AND COMMUNITY BENEFITS: COLLECTIVISM AND INDIVIDUALS' COMPLIANCE WITH PUBLIC HEALTH INTERVENTIONS[1]

In March 2020, after more than 118,000 cases in 114 countries and 4,291 deaths, the World Health Organization officially declared COVID-19 as a pandemic (CDC, 2022). The COVID-19 pandemic was undoubtedly one of the most significant and challenging public health crises that directly impacted each of us. All members of society had to abruptly change their daily routine, stay at home, and follow public health guidelines to mitigate the spread of the virus. Health authorities and the government had to quickly come up with a wide variety of health measures to avoid overloading the healthcare systems while prioritizing resources to the development of vaccines and scientific understanding of the virus. However, despite the governments' and public health authorities' best effort to take control of the situation, there was a large discrepancy in individuals' compliance with public health interventions across societies, and varying degree of success in curbing the spread of the virus globally.

To curb the spread of COVID-19, individuals and key institutions had to give up varying degrees of personal interest to cooperate and combat the spread of COVID-19. For example, individuals were instructed to stay at home (CDC, 2022), and only sectors or occupations that were deemed "essential" were allowed to operate, resulting in loss of personal freedom, economic gains, and public resources (NCSL, 2021). Proposed public health interventions would not be optimally effective unless societies achieved a high

[1] This research is published at PLOS ONE.

Leong, S., Eom, K., Ishii, K., Aichberger, M.C., Fetz, K., Muller, T. S., Kim, H. S., & Sherman, D. K. (2021). Individual cost and community benefits: Collectivism and individuals' compliance with public health interventions. *PLOS ONE* 17(11): e0275388. https://doi.org/10.1371/journal.pone.0275388

proportion of public compliance that closely follow the recommended guidelines. Before vaccines were available, studies suggested that 80% of universal mask wearing could reduce COVID-19 positive and mortality rates (Eikenberry et al., 2020). After the development and implementation of vaccines, societies would need to achieve more than 90% vaccination rates globally to achieve herd immunity (Plans-Rubio, 2022). Furthermore, the dissemination of inconsistent messaging and abundance of misinformation and conspiracy theories related to the pandemic have significantly influenced public trust in government and scientific experts (Banai et al., 2022; Rieger & Wang, 2022).

At the same time, the varying degree of success in curbing the spread of the virus, and the differences in individual's compliance with public health interventions across societies, are reflective of the key role that collectivism plays in compliance with public health interventions. Consistent with the pathogen prevalence hypothesis (Fincher et al., 2008), countries that were more collectivistic had lower COVID-19 positive cases and death rates (Kumar, 2021; Maaravi et al., 2021). Studies on cultural orientation and compliance with health measures demonstrated that more collectivistic regions were associated with greater adherence to non-pharmaceutical interventions, such as wearing a face covering (Lu et al., 2021). When evaluating COVID-19 vaccination intentions, a large-scale survey with more than 400,000 respondents revealed that people from more collectivistic regions had greater vaccination acceptance, compared to those from more individualistic regions (Leonhardt & Pezzuti, 2022). Using country-level cultural indices, findings of these studies suggested that collectivism played a crucial role in encouraging public coordination and compliance.

Although illuminating, the existing literature has focused on the association between cultural variables such as collectivism and compliance on the societal-level. There was a lack

of understanding for how and why such positive association exists on the individual-level. While it was expected that individual-level collectivism functions similarly as has been shown at the societal level, the present study tests the three aspects of collectivism - other-orientation, greater susceptibility to social norms, and greater trust in government - as distinct psychological mechanisms that explain the positive association between collectivism and greater compliance with public health interventions, expanding our knowledge about the role of collectivism in addressing large-scale CAPs.

Study 1

Because data collection was concluded before the development and implementation of vaccines, Study 1 focused on two key public health related behaviors, digital contact tracing (DCT) and wearing a face covering (FC). DCT effectively added traditional contact tracing efforts by identifying potential exposure to a virus based on the location and duration of interactions between two (or more) people through cellular technology; wearing face coverings created a barrier to prevent respiratory droplets from reaching others (CDC, 2020).

Both behaviors resembled the dilemmas faced when resolving such large-scale CAPs. First, opting-in to DCT and wearing FCs imposed some individual costs to achieve a collective goal. Individuals may view DCT as a violation of their privacy, a new form of government surveillance, or a potential source of discrimination and stigmatization (Megnin-Viggars et al., 2020; Whitelaw et al., 2020). Wearing FCs can be uncomfortable and inconvenient, and can be associated in some contexts with the stigma of being sick and weak (Bakhit et al., 2020; Eikenberry, 2020; Sotgiu, 2020), and was viewed as a violation of personal liberty (Stewart, 2020). Second, both measures required a sufficient proportion of the population to comply to be optimally effective. For example, at least 60% of the

population has to opt-in for DCT to be effective (Ferretti et al., 2020). Similarly, immediate or near universal face covering usage (>80%) could have decreased death and positive rates substantially from COVID-19 (Eikenberry et al., 2020). Third, DCT, if implemented, would likely be monitored and operated through the government or health authorities. Gathering public trust in these key institutions was crucial to encourage high opt-in rates given the vast amount of personal and sensitive information collected through this approach (He et al., 2022; Riemer et al., 2020; Wang et al., 2022). Moreover, wearing face coverings was also associated with people's level of trust in government, where individuals who trusted the government more were more likely to wear face coverings and engage in COVID-19 preventative measures, compared to those with lower trust (Min et al., 2020; Lim et al., 2021; Liu et al., 2022).

Taken together, there were two primary objectives in this study. The first goal was to examine the influence of collectivism in people's decision to comply with health preventative measures with potential individual costs. I hypothesized that more collectivistic people would be more likely comply with these measures compared to less collectivistic people. The second goal was to test potential psychological mechanisms that explain greater compliance with health preventative measures. I tested three aspects of collectivism - other orientation, susceptibility to social norms, and trust in authorities - to explain the relationship between collectivism and compliance.

Method

Participants

Determination of sample size was informed by Sherman et al., (2022), where there was a correlation of r = .13 between collectivism and compliance with environmental

behaviors. Power analyses conducted in G*Power (Faul et al., 2007) revealed that a correlation of this magnitude could be obtained with .80 power and an $\alpha = .05$ with $N = 462$.

A total of 530 participants were recruited through Amazon Mechanical Turk. Data was collected between July 1 and July 17, 2020. 37.4% of the participants identified as female, 57.5% as male, 0.6% as non-binary/other, and 4.5% unspecified. The mean age of participants was 37.21 (*SD* = 11.28). 68.1% of the participants identified themselves as White, 13.4% as Black, 6.4% as Hispanic/Latino, 5.5% as Asian, 0.4% as American Indian, 0.2% as Native Hawaiian or Pacific Islander, and 1.6% as multi-racial/others. The remaining participants did not identify their racial/ethnic identities. Refer to Table 1 for full demographic information.

Table 1

Study 1 – Participants' Demographic Characteristics

Characteristics		M(SD)	n	%
Age		37.21(11.28)		
Years of Education		14.58(4.30)		
Income (Median)		$40,000 - $49,999		
Political Ideology		3.86(1.88)		
Gender				
	Male		305	57.5
	Female		198	37.4
	Other		3	.6
	Missing		24	4.5
Ethnicity				
	American Indian/Alaska Native		2	.4
	Asian/Asian American		29	5.5
	Black/African American		71	13.4
	Hispanic/Latino American		34	6.4
	Native Hawaiian/Pacific Islander		1	.2
	White/European American		361	68.1
	Other/Unspecified		8	1.5
	Missing		24	4.5
Majority Racial Group Status				
	White		361	68.1

Non-White	145	27.4
Missing	24	4.5

Procedures

The survey was conducted online in July 2020, when COVID-19 positive rates were increasing exponentially in the United States. The survey was conducted in English language. At the start of the survey, participants provided their written consent to take part in the study through selecting the "Yes, I agree to participate" option after reading a consent form that contained study information. After indicating their willingness to take part in the study, participants responded to measures of cultural orientation (e.g., individualism-collectivism, tightness-looseness). Then, they read a short passage about what digital contact tracing is, and how it works, and answered some questions about their attitudes and intention to opt in to DCT. In the second part of the study, participants reported their attitudes towards face covering, and indicated whether they wear a face covering when it is required, and when it is not required. Participants responded to the mediator variables after responding to the outcome variables (i.e., decision to opt-in to DCT and wear a face covering). Lastly, participants reported their demographic information. All participants were debriefed in writing at the end of the survey. The survey took approximately 12 minutes to complete, and participants were compensated $1.50. This study was reviewed and approved by UCSB Office of Research Application for the use of Human Subjects.

Materials and Measures

DCT Information

Participants were provided the following information about DCT:

"What is contact tracing? Contact tracing for COVID-19 is the process of

identifying, assessing, and managing people who have been exposed to the disease to prevent onward transmission. Digital contact tracing tools aid traditional contact tracing efforts by using data from people's mobile phones. How does digital contact tracing work? To use digital contact tracing tools, people download an app on their mobile phones. When someone tests positive for COVID-19 and shares this information via the app, the app automatically and anonymously notifies other people who had contact with the person. These individuals with potential exposure are advised to be tested and/or quarantined."

Predictor Variable

Individualism-Collectivism. Participants completed a 14-item validated individualistic and collectivistic value orientation measure (Oyserman et al., 2002; Kim et al., 2016). Individualism items included "it is important for me to develop my own personal style", while collectivism items included "it is important for me to think of myself as a member of my religious, national, or ethnic group." All items were assessed on a 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Individualism and collectivism items were averaged and each form a composite score, with higher values indicating higher endorsement of each cultural value orientation (Individualism: $M = 4.94$, $SD = 1.19$, $a = .86$; Collectivism: $M = 5.65$, $SD = .81$, $a = .76$). See Table 2 for descriptive statistics, correlation coefficients, and alpha levels for all key measures

Table 2

Study 1 - Descriptive Statistics and Zero-Order Correlations between Key Variables

		M	SD	*a*	1	2	3	4	5	6	7	8	9
1	Collectivism	4.94	1.19	.86	-								
2	Individualism	5.65	.81	.76	.39**	-							
3	Comm. Concern (DCT)	61.53	28.44	-	.35**	.09	-						
4	Norm (DCT)	58.99	24.84	-	.45**	.20**	.46**	-					
5	Comm. Concern (FC)	61.96	30.32	-	.29**	.01	.66**	.37**	-				
6	Norm (FC)	59.68	26.23	-	.45**	.13**	.42**	.61**	.38**	-			
7	Trust in Gov.	3.05	1.08	.85	.56**	.09*	.33**	.52**	.32**	.45**	-		
8	DCT Decision	-	-	-	.25**	.03	.27**	.43**	.18**	.28**	.32**	-	
9	Face Covering	-	-	-	.10*	.02	.12**	.14**	.12**	.22**	.08	.23**	-

*p <.05; **p <.01; ***p<.001

†COL = collectivism; IND = individualism; Comm. Concern = concern for community; Norm = perceived social norm; Trust in Gov. = trust in government; DCT = digital contact tracing; FC = face covering

Outcome Variable

DCT Decision. Participants responded to the question "if your health authority administers digital contact tracing, would you opt in (sign up for the app) or opt out (not sign up for the app)?" to indicate their intention to opt in to DCT (0 = *I would opt out*; 1 = *I would opt in*).

Face Coverings (FC). Participants responded to two dichotomous questions that assess two different situations where people may wear masks, where it was required and when it was not required. Specifically, they responded (0 = *No*, 1 = *Yes*) to the queries: "do you use face covering where it is required?", and "do you generally use face covering even when it is not required (in social places where you interact with other people)?".

Mediator Variables

Concern for Community Health. Although participants may engage in health preventative measures to protect themselves and their community, I want to measure whether people engage in these behaviors to prioritize the interest of others' (i.e., other-orientation) or themselves (i.e., self-orientation). To contextualize the measure within this study, I created single item measures for each behavior to test participant's primary motivation in their decision making process for each behavior. "in considering digital contact tracing, which factor is more important to you?" Participants rated on a sliding scale from 0 (*protecting myself from COVID-19*) to 100 (*protecting my community from COVID-19*), with higher values indicating higher other-orientation where participants prioritize the community's health over oneself, $M = 61.53$, $SD = 28.44$. The same question was posed for wearing face coverings. Participants responded to the question "in considering wearing a face covering, which factor is more important to you?" Participants rated on a sliding scale from 0

(*protecting myself from COVID-19*) to 100 (*protecting my community from COVID-19*), *M* = 61.96, *SD* = 30.32.

Perceived Social Norms. We assessed participants' susceptibility to social norms by asking their perceived proportion of people in their communities who engage in the different public health behaviors using a measure developed by Eom and colleagues (2016). Participants indicated on a 0 to 100% sliding scale the proportion of people in their community who they think would opt in to DCT, and the proportion of people in their community who they think would wear face coverings when is required, and when it is not required; with higher values indicating a larger perceived proportion of people in their community who comply with these health measures, DCT: *M* = 58.99, *SD* = 24.84; FC (Required): *M* = 73.91, *SD* = 19.40; FC (Not Required): *M* = 59.68, *SD* = 26.23.

Trust in Government. As mentioned previously, because these behaviors were likely proposed and implemented by the government, capturing the varying perceptions and trust that Americans have of the government as it was making decisions during the COVID-19 pandemic was important in shaping their behaviors. Participants completed four items that were adapted from the trust in government survey by Pew Research Center (Pew, 2015). Example items include "I generally think the government is run for the benefit of this country". All items were assessed on 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Items were averaged and formed a composite score, with higher values indicating greater trust in government, *M* = 2.82, *SD* = 1.09, *a* = .75.

Covariates

Demographics. We controlled for participants' gender, age, income, and political ideology. Given the political sentiment associated with COVID-19 related attitudes and

behaviors (Agarwal et al., 2021), we controlled for participants' political ideology to assess the robustness of collectivism in predicting compliance. Participants responded to the question "when it comes to politics, do you consider yourself to be liberal, moderate, or conservative?" as a measure of their political ideology. The question was assessed on a 7-point scale ranging from 1 (*very liberal*) to 7 (*very conservative*).

Results

Compliance with Health Preventative Measures

Overall, 65.1% of participants indicated that available, they would opt in to digital contact tracing, whereas 34.9% would opt out. In terms of their current face-covering behavior, almost all participants (96.0%) reported that they use face covering when it is required. 77.2% participants reported that they still use a face covering, even if it was not required in places where social interactions took place. Subsequent analyses only focused on the decision to wear face covering when it is not required. Refer to Table 2 for zero-order correlations between key variables.

I conducted a binary logistics regression and controlled for individualism, gender, age, majority group status,[2] political orientation, annual income, and years of education. Collectivism significantly predicted DCT opt in rates, $\beta = .63$, $SE = .13$, $p < .001$, and participants' likelihood of wearing face covering when not required, $\beta = .35$, $SE = .14$, $p = .02$. More collectivistic participants were more likely to opt in to DCT and to wear a face covering when it was not required (Table 3).

[2] As Whites/European Americans have been shown to be less collectivistic in their value orientation than other groups (Oyserman et al., 2022), we also conducted analyses that controlled for race/ethnicity (coded as White/European Americans vs. racial/ethnic minority Americans). This variable was not a significant predictor of the key DVs and the direction and magnitude of findings remain unchanged when it is included.

Table 3

Study 1 - Collectivism Predicts Compliance with Health Measures

	Variable	*β*	*SE* of *β*	*Wald*	*p*	Exp (*β*)	95% CI	
							LL	UL
Digital Contact Tracing	Constant	1.30	.54	5.87	.02	3.68		
	Collectivism	.63	.13	25.17	<.001	1.88	1.47	2.40
	Individualism	-.22	.12	3.71	.05	.80	.64	1.00
	Tightness-Looseness	.06	.12	.28	.60	1.06	.84	1.34
	Gender (Male)	-.10	.21	.22	.64	.91	.61	1.36
	Gender (Female)	-.95	1.27	.55	.46	.39	.03	4.71
	Age	-.004	.01	.19	.67	.99	.98	1.01
	Political Ideology	-.14	.06	5.63	.02	.87	.78	.98
	Income	.09	.04	5.71	.02	1.10	1.02	1.18
	Years of Education	-.03	.02	1.55	.21	.97	.93	1.02
Face Covering	Constant	2.33	.61	14.13	<.001	10.25		
	Collectivism	.35	.14	6.53	.01	1.42	1.09	1.86
	Individualism	-.15	.13	1.14	.23	.86	.67	1.10
	Tightness-Looseness	.14	.13	1.15	.28	1.15	.89	1.49
	Gender (Male)	-.15	.23	.40	.53	.86	.55	1.36
	Gender (Female)	-1.99	1.26	2.48	.12	.14	.01	1.63
	Age	-.002	.01	.03	.86	.99	.98	1.02
	Political Ideology	-.33	.07	22.41	<.001	.73	.63	.83
	Income	.16	.05	11.76	<.001	1.17	1.07	1.28
	Years of Education	-.03	.02	1.43	.23	.97	.93	1.02

* $p < .05$; ** $p<.01$; ***$p <.001$

† R^2 DCT = .12, R^2 FC = .13

I conducted mediation analyses controlling for the same covariates for each of the two health measures to test whether concern for community health in relation to each health behavior, trust in government and perceived social norms explain the relationship between collectivism and compliance. Refer to Tables 4a and 4b for full regression coefficients.

DCT Opt-In

In relation to the intention to opt in to DCT (Figure 1), collectivism predicted greater concern for community health, $\beta = .32$, $SE = .05$, $p < .001$, greater trust in government. $\beta = .51$, $SE = .05$, $p < .001$, and greater perceived social norms, $\beta = .34$, $SE = .05$, $p < .001$. Those who were more collectivistic had greater concern for their community's health, felt greater trust in their government, and saw a greater proportion of other people as likely to opt in to DCT. In turn, greater trust in government, $\beta = .33$, $SE = .13$, $p = .01$, and greater perceived social norms, $\beta = .82$, $SE = .14$, $p < .001$, but not greater concern for community health, $\beta = .15$, $SE = .12$, $p = .22$, predicted greater likelihood of opting-in to DCT. Consequently, trust in government and perceived social norms each mediated the effect of collectivism on opting-in, as indicated by significant indirect effects (trust in government.: $\beta = .17$, BootSE = .07, BootCI[.04, .33]; perceived social norms: $\beta = .28$, BootSE = .08, BootCI[.16, .47]). By contrast, greater concern for community health was not a significant mediator ($\beta = .05$, SE = .04, BootCI[-.03, .14]). After controlling for all mediators, the association between collectivism and DCT opt in was non-significant, $\beta = .23$, $SE = .15$, $p = .12$.

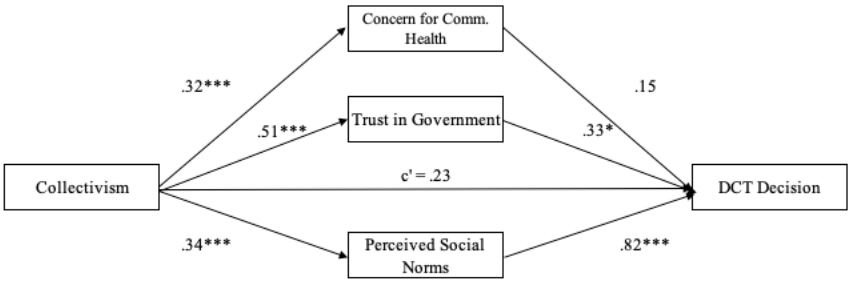

Figure 1. The relationship between collectivism and decision to opt-in to DCT as mediated by concern for community health, perceived social norms, and trust in government. Numbers are standardized regression coefficients.

Table 4A
Study 1 - Regression Coefficients for Mediation Models (DCT)

					95% CI of β	
	β	*SE of β*	*z*	*p*	*LL*	*UL*
Direct Effects						
COL → DCT	.23	.15	1.57	.12	-.06	.51
Separate Effect Paths						
COL → concern for comm.	.32	.05	6.22	<.001	.22	.42
COL → trust in gov	.51	.05	11.13	<.001	.42	.60
COL → perceived social norms	.34	.05	7.16	<.001	.25	.44
Concern for comm. → DCT	.15	.12	1.24	.22	-.09	.37
Gov. → DCT	.33	.13	2.43	.01	.06	.59
Norm → DCT	.82	.14	5.99	<.001	.55	1.09
Bootstrapped Indirect Effects	*β*	*BootSE*	*Boot LLCI*	*BootULCI*		
Total Indirect Effect of COL	.50	.10	.33	.74		
Concern for Comm	.05	.04	-.03	.14		
Trust in Gov	.17	.07	.04	.33		
Perceived Social Norms	.28	.08	.16	.47		

* $p < .05$; ** $p<.01$; ***$p <.001$

Face Covering

The mediational pattern for wearing face coverings in public was somewhat different than for opting in to DCT (Figure 2). Collectivism was positively associated with all three mediators, as it was predicted greater concern for community health, $\beta = .31$, $SE = .05$, $p < .001$, greater trust in government, $\beta = .51$, $SE = .05$, $p < .001$, and greater perceived social norms, $\beta = .36$, $SE = .05$, $p < .001$. However, only greater perceived social norms predicted greater likelihood of wearing face coverings in public, $\beta = .60$, $SE = .13$, $p < .001$. Neither concern for community health, $\beta = .06$, $SE = .12$, $p = .52$, nor trust in government, $\beta = -.07$, $SE = .14$, $p = .60$, explained the relationship between collectivism and wearing face covering. Consequently, only perceived social norms mediated the effect of collectivism on wearing a

face covering (β = .22, BootSE = .06, BootCI[.12, .36]). Neither concern for community health (β = .02, BootSE = .04, BootCI[-.06, .10]), nor trust in government (β = -.04, BootSE = .07, BootCI[-.17, .10]) were significant mediators. After controlling for all mediators, the association between collectivism and intention to opt in to DCT was non-significant, β = .18, *SE* = .16, *p* = .31.

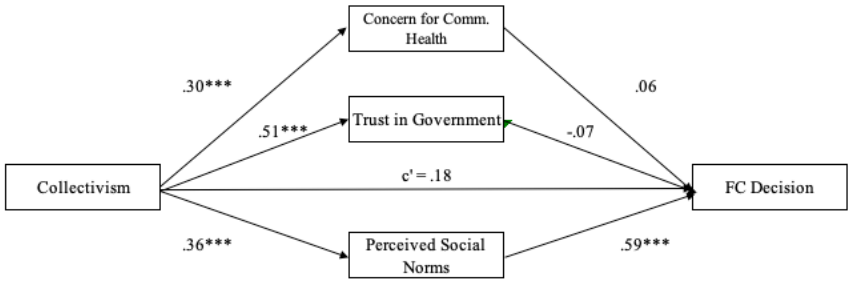

Figure 2. The relationship between collectivism and decision to opt-in to DCT as mediated by concern for community health, perceived social norms, and trust in government. Numbers are standardized regression coefficients.

Table 4B
Study 1 - Regression Coefficients for Mediation Models (FC)

Digital Contact Tracing	β	*SE of* β	*z*	*p*	95% CI of β	
					LL	*UL*
Direct Effects						
COL → FC	.18	.16	1.13	.26	-.13	.48
Separate Effect Paths						
COL → concern for comm.	.31	.05	5.71	<.001	.20	.40
COL → trust in gov	.51	.05	11.12	<.001	.42	.60
COL → perceived social norm	.36	.05	7.41	<.001	.27	.46
Concern for comm. → FC	.06	.12	.52	.60	-.18	.31
Gov. → FC	-.07	.14	-.52	.60	-.34	.20
Norm → FC	.60	.13	4.53	<.001	.34	.86

Bootstrapped Indirect Effects	β	*BootSE*	*Boot LLCI*	*BootULCI*
Total Indirect Effect of COL	.20	.09	.03	.39
Concern for Comm	.02	.04	-.06	.10
Trust in Gov	-.04	.07	-.17	.10

Perceived Social Norms	.22	.06	.12	.36

* $p < .05$; ** $p < .01$; *** $p < .001$

Chapter 2 Discussion

Using the COVID-19 pandemic as an example of a large-scale CAP, findings from this study somewhat supported the theorized relationship between collectivism and engaging in actions that impose tension between personal and collective benefits. First, the association between collectivism and compliance with both public health measures - above and beyond other cultural values, political ideology, and demographic factors - highlights the role of culture in making decisions that impose some personal cost for a collective goods.

Second, the present study examined how the three proposed aspects of collectivism shaped compliance. Across both public health measures, perceived social norms appeared to be a strong mediator for compliance. Specifically, those high on collectivism perceived that a greater proportion of people in their local community complied with public health measures than those low on collectivism, and in turn, they were more likely to comply themselves. These findings provided support that collectivists were more sensitive to social norms and may adjust their attitudes and behaviors to align with the actions of others within their social context.

Concern for community health (i.e., other-orientation), on the other hand, did not explain the relationship between collectivism and compliance. Perhaps one reason why community concern was not associated with compliance was due to the way this item was measured. Opting in to contact tracing and wearing face coverings provide protection for both personal health as well as community health. While the purpose of putting personal and community health at two ends of a continuum was to enable a test of which was a stronger factor that shaped people's decisions, this way of measuring this mediator overlooked the

possibility that people comply with public health interventions to protect both their personal and community health. One way to refine this measure is to separate personal and community health into two distinct items. Nevertheless, the results suggest that more collectivistic individuals do not comply with these interventions solely or primarily because they are *more* concerned about their communities.

A third aspect of collectivism - trust in government - revealed some inconsistent mediating patterns. Although there was a positive association between collectivism and trust in government, greater trust in government only explained the relationship between collectivism and opting-in to DCT, but not wearing a face covering. The variability across behaviors suggested that the extent to which people's trust in government translates to actual compliance is also condition on the behavior under consideration. Given that DCT is a tool that needed to be implemented, in part, by the government, establishing trust in government is particularly essential to encourage greater compliance (Shanka & Menebo, 2022). By contrast, for wearing a face covering, a behavior that is more visible among peers and communities, trust in government may not be a salient factor in individuals' decisions, in particular, when individuals received mixed recommendation from the government during the onset of the pandemic (Noar & Austin, 2022).

Finally, in the face of a common threat such as disease pathogens, prior research has revealed the psychological benefits of collectivism such as providing greater protection efficacy (Kim et al., 2016). Findings from the present study suggest that collectivists may feel more efficacious against threat by placing greater trust in authorities (Manson, 2020)., and perceiving greater social norms of compliance among their in-group members. A greater orientation towards others may also explain why individuals become more collectivistic in

the face of a common threat (e.g., pathogen; Fincher et al., 2008).

CHAPTER 3: AN EXPLORATION OF THE INFLUENCE OF COLLECTIVISM ON CLIMATE MITIGATION POLICIES

"The effects of individual lifestyle choices are ultimately trivial compared with what politics can achieve" - David Wallace-Wells, the Uninhabitable Earth (2019)

Chapter 1 provided some initial support for the theorized relationship between collectivism and addressing CAPs by focusing on people's compliance with public health measures during the COVID-19 pandemic. While the COVID-19 pandemic is one of the most disruptive large-scale CAPs in recent years, the climate change crisis has been, and still remains, one of the most pressing CAPs impacted by human activities. While both crises shared some similarities and characteristics of CAPs, such as the large-scale, long-term consequences if left unaddressed and the need to make tradeoffs between short-term individual interest and long-term collective wellbeing among all members and institutions in society (Manzanedo & Manning, 2020), there are several key notable differences. First, individual action to combat COVID-19 is direct and visible, where people wear a mask or maintain social distance to stop the spread of the virus. In comparison, the payoffs for individual actions to combat climate change crises are much less obvious and span across domains. For example, composting food, reducing personal traveling or supporting climate policies are behaviors that could address climate change, but the impact of these behaviors is indirect and diffused (Manzanedo & Manning, 2020). Second, there may be a temporal distance in people's views towards the consequences of climate change crises but not the pandemic. People perceived the COVID-19 pandemic as a health issue with direct consequences on oneself if they do not engage in preventative behaviors; but viewed the climate change crisis as a distant, future problem where they may not experience

consequences from environmental issues (Geiger et al., 2021; see also Capstick et al., 2015, for review). It is possible that because of the different views towards both CAPs, people feel less personally responsible, view their actions as less efficacious to address climate change and are thus less likely to support climate mitigation policies, compared to the COVID-19 pandemic (Poortinga et al., 2022). Indeed, as the opening quotes alluded, without large structural changes and strong environmental policies, slowing down global warming and addressing climate change crisis is extremely challenging.

Although country authorities have implemented different types of climate mitigation initiatives, government interventions and strong carbon-regulation policies, such as implementing a carbon tax, are still one of the most effective ways to reduce carbon emissions (Fekete et al., 2021; Hagmann et al., 2019). Yet, despite its efficacy, only 27 countries worldwide have adopted carbon tax policies as of 2023 (World Bank, 2023). Public opinions towards such policies were unfavorable, often because climate policies impose additional costs on households and businesses (Fairbrother, 2022; Drews & Van den Bergh, 2015). For example, in an examination of Canadian citizens' support (N = 1,306) for nine hypothetical climate policies, Rhodes and colleagues (2017) found that individual-action based policies, such as providing subsidies or tax rebates when purchasing "green" appliances, yield the highest levels of support, while market-based regulatory policies, such as implementing a carbon tax for all individuals and businesses, received the lowest levels of support. The findings were consistent with a review of public opinion about climate policies, where people favor policies that shift and re-allocate resources (e.g., shift government subsidies away from fossil fuels to renewable energy), and were less supportive of policies that impose cost on their households or personal income (Fairbrother, 2022).

Trust in Government and Support for Climate Change Policies

A key determinant that shapes the (lack of) support for climate change policies is closely associated with the levels of trust in government. Research has consistently demonstrated the importance of trust in government on garnering policy support, especially when the policies involve personal cost (Fairbrother et al., 2019; Kulin & Seva, 2021; Harring & Jagers, 2013). For example, in Sweden where carbon tax has already been implemented, respondents who placed greater trust in their politicians to use tax revenues in righteous and effective manners were more supportive of carbon tax compared to those who trust their politicians less (Hammer & Jagers, 2006). In Korea, citizen's levels of trust in government were positively associated with their willingness-to-pay for public projects, such as improving air quality in subway stations (Oh & Hong, 2012). On a broader scale, a recent sentiment analysis of 96,834 Tweets across 20 English-speaking countries revealed that "government" was the most frequently occurring word in Tweets that mentioned "carbon tax", and that although people's sentiments towards carbon taxes were generally negative, the sentiments were more negative when people's perceived cost of carbon taxes on individuals and businesses was higher, and when trust in government was lower (Zhang et al., 2021). The findings highlight that when considering the implementation of climate change policies, perceived costs and levels of trust in government are crucial in shaping people's attitudes towards such policies (Hammer & Jagers, 2006; Zhang et al., 2021). When individuals perceive the government as trustworthy, they will more likely support climate change policies, even when these policies may impose individual costs.

Despite the vital role that trust in government plays in garnering support for public efforts and climate policies, there is a lack of consensus in how trust is assessed across

different public datasets and empirical findings (Grimmelikhuijsen & Knies, 2015; Hamm et al., 2019; McEvily & Tortoriello, 2011). For instance, the International Social Survey Program (ISSP) operationalized trust as how much trust individuals would have in government departments to give them correct information about the causes of pollution (ISSP, 2020), while the Pew Research Center measured trust as the extent to which Americans "trust the government in Washington to do what is right" (Pew Research Center, 2015). While both ISSP and the Pew Research Center assessed a government's perceived trustworthiness, the ISSP focused on evaluating trustworthiness through the government's competence, expertise and performance. In contrast, the Pew Research Center's evaluation centered around a government's conduct and integrity.

Perceived government trustworthiness evaluated by its competence and integrity has independent effects on predicting public support. For example, Kitt and colleagues (2021) evaluated 1,552 Canadian citizens' levels of support for five low-carbon transportation policies and trust in their national government, among other measures. Trust in national government was evaluated in two ways. First, participants indicated their general level of trust in the national government on a single-item measure ranging from "no trust at all" to "high trust". Then, competence-based trust was measured using two items (e.g., the national government is competent enough to deal with these issues), followed by a four-item measure of integrity-based trust (e.g., the government intends to act fairly). The policies included a carbon tax, subsidies for purchasing electric vehicles, and three regulation-based policies. The findings revealed that, while general trust in national government is low, participants who perceived the government as competent were more likely to support all five policies, whereas participants who perceived the government with higher levels of integrity were more

likely to support carbon tax and mandates for zero-emission vehicle sales (Kitt et al., 2021). To investigate which component of trust played a more influential role in shaping individuals' support, Liu and colleagues (2020) experimentally manipulated participants' levels of competence- and integrity-based trust by informing them about an energy company's track record of successfully implementing projects (i.e., high vs. low levels of competence) and levels of transparency with the company practices (i.e., high vs. low levels of integrity). Then, participants evaluated their support for a wind energy project that would take place in their area of residence. Across two studies with participants from China (N = 252) and the Netherlands (N = 188), Liu and colleagues (2020) found that perceived integrity of an organization, instead of perceived competence, played a more profound role in levels of support for both groups. Perceived competence was found to predict higher levels of project support only when perceived integrity was low, and this effect was observed specifically among Chinese participants. In other words, when an organization exhibited low levels of integrity, perceived competence did not matter among Dutch participants, but could still play a role in shaping attitudes among Chinese participants.

The discussion above highlights the critical role of trust in government in encouraging support for climate change policies (e.g., Harring & Jagers, 2013), and more importantly, the need to consider how different aspects of government shape trust and public support. Correlational and experimental findings revealed that although it is still important for the government to exhibit high degree of competence (Kitt et al., 2021; Terwel et al., 2009), it is even more important for the government to be transparent about their conducts and motives to garner support for climate change policies, especially when these policies are associated with potential cost to individuals and households (Kitt et al., 2021; Liu et al.,

2020).

Cultural Influence on Climate Change Policy Support

Given the global impact of climate change, researchers have emphasized the importance of considering the influence of socio-cultural characteristics on climate change outcomes (Eom et al., 2019; Tam & Milfont, 2020). In particular, there is growing evidence that suggests culture, on the national- and individual-level, has distinct impact on individuals' views towards climate change policies. On the national-level, secondary analyses of the World Values Survey (WVS) revealed that less individualistic countries (i.e., higher collectivism) exhibited greater support for prioritizing environmental protection, even at the expense of slower economic growth and some loss of jobs (Wave 6, N = 78,542 across 52 countries/regions; Lou & Li, 2022). Similarly, more individualistic countries (i.e., less collectivistic) were associated with lower willingness to make financial sacrifices for the environment (Wave 5, N = 57,268 across 47 countries/regions, Eom et al., 2016). Similar patterns were observed across analyses of different datasets using different national-level cultural indices, including Hofstede's individualism (Allo & Loureiro, 2014; Chan, 2020; Eom, 2016; Hofstede, 1980; Lou & Li, 2022), and institutional and in-group collectivism dimensions of the Global Leadership and Organizational Behavior Effectiveness measure (i.e., GLOBE; House, 2004; Parboteeah, 2012). Overall, evidence on the national-level suggested that higher levels of collectivism is positively associated with support for pro-environmental policies or beliefs that involve sacrificing individual interest for a collective benefit.

Although national-level evidence offers a broad understanding of cultural influence on climate change policy support, it is important to note that these findings do not imply that

individualism was associated with opposition for climate change policies. Instead, research studies that examine culture on the individual-level revealed distinct sociocultural determinants that would influence support for climate change policies among people with different culture orientations. For example, people who endorsed more individualistic values were more likely to sacrifice self-interest for the environment driven by their beliefs in climate change (Chan & Tam, 2021; Eom et al., 2016; Tam & Chan, 2017), and when they perceived a greater sense of agency over the impact of their actions on the environment (Sherman et al., 2022). Comparatively, people who endorsed more collectivistic values were more likely to sacrifice self-interest for the environment driven by their perceived norms towards environmental issues (Eom et al., 2016; Sherman et al., 2022), when they felt a greater sense of efficacy to overcome climate change crisis as a community (Xiang et al., 2019), and if they perceived that protecting the environment is an important group value (Huang et al., 2022). Research findings on the individual-level suggested that individualism was likely a stronger determinant of situations where individualists can take control their pro-environmental behaviors and outcomes driven by their personal beliefs; while collectivism is a stronger determinant of situations where collectivists participate in group effort driven by their perceived group's views and attitudes towards a targeted issue.

Given that the following research studies focus on climate change policy support as the targeted outcome, where some policies would involve compromising self-interest, it is expected that high collectivism, characterized by the prioritization of group over personal interest, will likely predict greater support, compared to low collectivism.

Collectivism and Trust in Government

In the context of climate change crisis, studies have demonstrated the *independent*

influence of collectivism and trust in institutions on climate mitigation policy support. Collectivism is associated with greater support for sustainability initiatives that impose personal and economic cost (e.g., carbon tax; Parboteeah et al., 2012), while trust in institution is an important determinant of encouraging policy support (Fairbrother et al., 2019), and willingness to sacrifice self-interest for the environment (Harring et al., 2013). Yet, few studies have examined how cultural orientation would shape the relationship between trust in government and support for climate mitigation policies. As discussed in Chapter 1 and demonstrated in Study 1, the role of authority is more central in more collectivistic societies (Schwartz, 2012), and collectivists are likely more susceptible to the influence of an authority (Chao & Chao, 1994; Iyengar & Lepper, 1999; Savani et al., 2012). Empirical evidence from the COVID-19 pandemic provided supporting evidence that collectivists were more likely to comply to government implemented health measures, in part because they placed greater trust in government (Leong et al., 2022; Travaligno & Moon, 2021). Both theoretical and empirical findings pointed to trust in government as a key psychological mechanism that explained collectivists' greater tendencies to engage in group-benefitting behaviors, even at the cost of their personal interest.

Based on the preceding discussions and evidence from Study 1, the primary goal of this research was to hone in on the relationship between collectivism and trust in government in the context of addressing climate change crisis. To achieve this goal, Study 2 was a secondary analysis of the World Values Survey to test the theorized relationship using an existing global sample, followed by a secondary analysis of a dataset published by Kukowski and colleagues (2023) with specific environmental policies as the targeted outcome variables (Study 3). Lastly, Study 4 built upon the correlational findings and experimentally

manipulated government levels of competence and corruption to test whether there is a causal effect of trust in government, on support for climate change policies and whether that is moderated by collectivism.

Study 2

Study 2 was a secondary analysis of the World Values Survey (Wave 5; Inglehart et al., 2014) to explore and test the generalizability of the theorized relationship between culture, government, and pro-environmental tendencies using an existing global sample. Wave 5 was chosen as it was the most recent dataset that included key variables of interest, such as individual-level (L1) culture orientation (i.e., idiocentrism-allocentrism), confidence in government, and environmental behavioral intentions. I also included national-level (L2) indices such as the Global Collectivism Index (GCI; Pelham et al., 2022) to account for the variability in culture dimensions across countries. I hypothesized that both individual- and national-level culture orientation would predict greater environmental behavioral intentions. I also hypothesized that this relationship would be explained by allocentrists' greater confidence in government.

Additionally, I performed two exploratory analyses where I tested whether country-level collectivism and trust in government would moderate the relationship between allocentrism, confidence in government, and environmental behavioral intentions. Using the GCI as the country-level variable (Pelham et al., 2022), the first exploratory analysis tested the intersubjective norm perspective (Eom & Kim, 2015; Zou et al., 2009), where collectivists engage in group behaviors more because they were aware that their surrounding others, who were also highly collectivistic, hold similar levels of environmental behavioral intentions as themselves Using the Edelman Trust Index (Edelman, 2024), the second

exploratory analysis tested the contextual influence of trust in government. Considering collectivists' greater reliance and trust on authorities, it was possible that residing in a social context with high public trust can emphasize the interdependence between individuals and the government on shaping people's behaviors. In other words, the relationship between allocentrism and confidence in government would be stronger in countries where public trust is high, and there would be cross-level influence of trust in government on allocentrists' environmental behavioral intentions.

Method

WVS Wave 5 data was collected between 2005 and 2009, with a total of 67,268 respondents across 48 nations.[3] All individual-level variables were z-scored and mean-centered within their respective countries prior to data analysis. After removing incomplete cases, the final sample included 30,716 participants across 37 nations. All analyses were conducted using R (R Core Team, 2021).

Measures

Individual-Level (L1) Variables

Idiocentrism-Allocentrism. Individual-level individualistic and collectivistic tendencies were measured using *idiocentrism* and *allocentrism* items included in the World Values Survey (Inglehart et al., 2014). Idiocentrism was measured by the following two items: "I seek to be myself rather than to follow others" and "I decide my goals in life by myself." Items were measured on a scale of 1 (*strongly disagree*) to 4 (*strongly agree).* Items were averaged and formed a composite, with higher values indicating greater

[3] Although there was a more recent wave of World Values Survey (Wave 7), it was not used as the primary analysis as the dataset did not contain key variables of interest, including measures of idiocentrism and allocentrism.

idiocentric/individualistic tendencies, $M = 3.35$, $SD = .53$, $r(30,716) = .38$, $p < .001$. Allocentrism was measured by the following two items: "one of my main goals in life has been to make my parents proud" and "I make a lot of effort to live up to what my friends expect". Items were measured on a scale of 1 (*strongly disagree)* to 4 (*strongly agree*). Items were averaged and formed a composite, with higher values indicating greater allocentric/collectivistic tendencies, $M = 2.82$, $SD = .66$, $r(30,716) = .29$, $p < .001$.

Confidence in Government. Confidence in government was a single item measure used as a proxy to evaluate people's trust in government. Participant reported how much confidence they have in their government on a scale from 1 (none at all) to 4 (a great deal), $M = 2.45$, $SD = .90$.

Environmental Behavioral Intention. Following the operationalization of Eom et al., (2016), environmental behavioral intention (EBI) was operationalized by participants' willingness to compromise part of their financial-interest to prevent environmental pollution, measured by the following two items: "I would give part of my income if I were certain that the money would be used to prevent environmental pollution", and "I would agree to an increase in taxes if the extra money would be used to prevent environmental pollution". Participants responded to the items on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree), $M = 2.73$, $SD = .75$, $r(30,716) = .62$, $p < .001$

National-Level (L2) Variable

Global Collectivism Index (GCI). GCI was a national-level cultural measure of collectivism developed based on six population indices, such as family living arrangement, total fertility rates, and interdependent attitudes (Pelham et al., 2022). GCI measured cultural index for 188 nations, which accounted for approximately 99% of the global population. GCI

ranked countries by levels of collectivism, with 1 being the most collectivistic (e.g., Somalia), and 188 being the least collectivistic country (e.g., Monaco).

Hofstede's Individualism (IND). Hofstede's (2010) individualism was included as another measure of national-level culture orientation. Hofstede's cultural dimensions have profoundly shaped the ways psychologists and other researchers examine individuals' values across different societies. Individualism-collectivism measured the extent to which people in a society were integrated as a group. More individualistic societies were characterized by looser social networks and the view of oneself as distinct from others; while more collectivistic societies were characterized by tighter social relations and perceived inherent connection between oneself and their close others (Hofstede, 1989; 2010). There were a total of 76 countries in Hofstede's individualism index, with higher ranking being more individualistic.

Both GCI (Pelham et al., 2022) and Hofstede's (1980) cultural dimensions were compared for two key reasons: First, GCI included a wider range of countries compared to Hofstede's cultural dimensions, allowing us to test the generalizability of the hypothesis in a large sample size. Second, GCI was a more objective measure as it was built upon ecological or population data that reflected values of collectivism, such as family size or living arrangement; while Hofstede's cultural dimensions were self-reported survey data that was more subjective and took place in smaller organizational settings. Both GCI and Hofstede's individualism were strongly negatively correlated (r = -.65, p <.001), and would be analyzed in separate models.

Covariates

All analyses controlled for individual-level demographic data, including gender, age,

income, education, and political orientation; as well as national-level indices, including Environmental Performance Index (EPI) and Gross Domestic Product per Capita (GDP).

Study 2 Results

First, to examine the zero-order correlations grouped by country between all key variables of the study, I computed within-country mean values for each variable, followed by a grand mean across all countries. All variables, except for idiocentrism, were positively correlated with one another (see Table 5 for full correlation matrix, and Table 6 for descriptive statistics within each country). Given that idiocentrism did not correlate with any other variable, as well as the study's primary focus on collectivism/allocentrism, I only reported the effect of allocentrism as the primary predictor variable.

Table 5

Study 2 - Zero-Order Correlations between Key Variables Aggregated by Countries (N = 37)

		1	2	3	4	5	6	7	8
1	Allocentrism	-							
2	Idiocentrism	.12	-						
3	Confidence in Government	.31+	.08	-					
4	Environmental Behavioral Intention	.40**	.16	.41**	-				
5	GCI	.81***	.13	.19	.41**	-			
6	Individualism	-.51***	-.06	-.13	-.40**	-.62***	-		
7	GDP Per Cap	-.74***	-.08	-.18	-.27	-.83***	.70***	-	
8	Environmental Performance Index	-.62***	.10	-.17	-.29+	-.69***	.52***	.71***	-

*p <.05; **p <.01; ***p<.001

Table 6

Study 2 - Descriptive Statistics between Key Variables by Country

	Country	N	GCI	Individualism	Allocentrism		Idiocentrism		Confidence in Gov.		Environmental Behavioral Intention	
					M	SD	M	SD	M	SD	M	SD
1	Australia	1173	-1.17	90	2.48	.53	3.15	.51	2.32	.78	2.65	.75
2	Brazil	1280	-0.06	38	2.91	.56	3.33	.49	2.34	.91	2.48	.75
3	Bulgaria	501	-0.6	30	2.56	.58	3.33	.51	2.19	.89	2.59	.82
4	Burkina Faso	792	1.08	15	3.45	.51	3.41	.55	2.41	.96	3.15	.69
5	Canada	1230	-1.1	80	2.59	.56	3.31	.51	2.29	.77	2.81	.69
6	Chile	601	-0.14	23	2.84	.66	3.52	.49	2.46	.88	2.65	.87

7	Ethiopia	1140	0.74	20	3.39	.56	3.48	.52	2.07	.88	3.02	.67
8	Finland	793	-1.3	63	2.3	.58	3.43	.46	2.7	.64	2.61	.72
9	Georgia	618	0.2	41	3.44	.58	3.5	.50	2.21	.86	2.72	.75
10	Ghana	637	0.3	15	3.09	.57	3.53	.55	3.01	.86	3.12	.65
11	Hungary	771	-0.96	80	2.56	.73	3.37	.56	1.78	.77	2.31	.79
12	India	658	0.25	48	3.25	.63	3.46	.58	2.84	.97	3.16	.69
13	Indonesia	1103	0.67	14	2.9	.44	3.35	.55	2.61	.78	2.81	.56
14	Italy	468	-0.73	76	2.7	.58	3.32	.49	2.09	.72	2.63	.72
15	Japan	413	-1.18	46	2.63	.52	3.21	.41	2.18	.75	2.66	.65
16	Jordan	272	-0.35	30	3.52	.55	3.51	.53	3.31	.95	2.62	.91
17	Mexico	1145	0.09	30	3	.56	3.32	.52	2.38	.90	2.97	.61
18	Moldova	747	-0.64	27	2.58	.53	3.37	.52	2.14	.86	2.72	.72
19	Morocco	382	0.96	46	3.38	.54	3.42	.53	2.58	.84	2.5	.85
20	Norway	917	-1.33	69	2.12	.77	3.72	.41	2.54	.67	2.78	.92
21	Peru	857	0.29	16	2.93	.52	3.27	.47	1.86	.76	2.87	.59
22	Poland	554	-0.5	60	2.89	.65	3.43	.50	1.97	.71	2.52	.79
23	Romania	665	-0.43	30	2.53	.75	3.53	.51	2.03	.79	2.44	.86

24	Slovenia	537	-0.78	27	2.6	.64	3.39	.49	2.13	.69	2.75	.68
25	South Africa	1860	-0.1	65	2.83	.60	3.41	.55	2.82	.93	2.51	.84
26	South Korea	1189	-0.74	18	2.93	.54	3.18	.55	2.41	.68	2.69	.57
27	Spain	832	-0.9	51	2.78	.58	3.26	.49	2.41	.79	2.39	.81
28	Sweden	863	-1.43	71	2.24	.56	3.34	.46	2.36	.68	2.8	.62
29	Switzerland	921	-1.15	68	2.49	.67	3.45	.49	2.76	.63	2.68	.73
30	Thailand	1461	-0.14	20	2.98	.51	3.29	.50	2.36	.71	2.9	.50
31	Trinidad and Tobago	563	-0.37	16	2.69	.48	3.32	.52	2.16	.86	2.74	.67
32	Turkey	708	0.04	37	3.28	.46	3.45	.45	2.73	1.02	2.94	.62
33	Ukraine	443	-0.74	25	2.64	.64	3.3	.58	2.03	.87	2.46	.79
34	United States	1103	-1.18	91	2.52	.53	3.18	.51	2.31	.75	2.48	.74
35	Uruguay	721	-0.55	36	2.76	.57	3.18	.58	2.72	.98	2.38	.68
36	Vietnam	1106	0.12	20	3.08	.55	3.2	.53	3.82	.42	3.29	.55
37	Zambia	692	1.01	35	2.97	.62	3.22	.67	2.5	.99	2.55	.73

To examine whether allocentrism was associated with greater environmental behavioral intention, I conducted a multi-level analysis using the *lme4* package from R to account for the hierarchical nature of the dataset, with respondents nested within their countries (Bates et al., 2021). To simultaneously test the independent effects of cultural orientation across levels on the environmental intention, the model included within-country-mean-centered allocentrism as the individual-level (i.e., L1) predictor nested within countries, GCI as the national-level (i.e., L2) predictor, and the cross-level interaction between both predictors. Additionally, individual-level demographic variables (e.g., gender, age, income, education, political orientation) as well as culture-level indices (e.g., EPI, GDP) were included as covariates.

Results showed that individual-level allocentrism predicted greater environmental behavioral intention, b = .18, SE = .01, t(30,716) = 22.08, p <.001 (Figure 3). Individuals who had greater allocentric tendencies had greater pro-environmental intention.

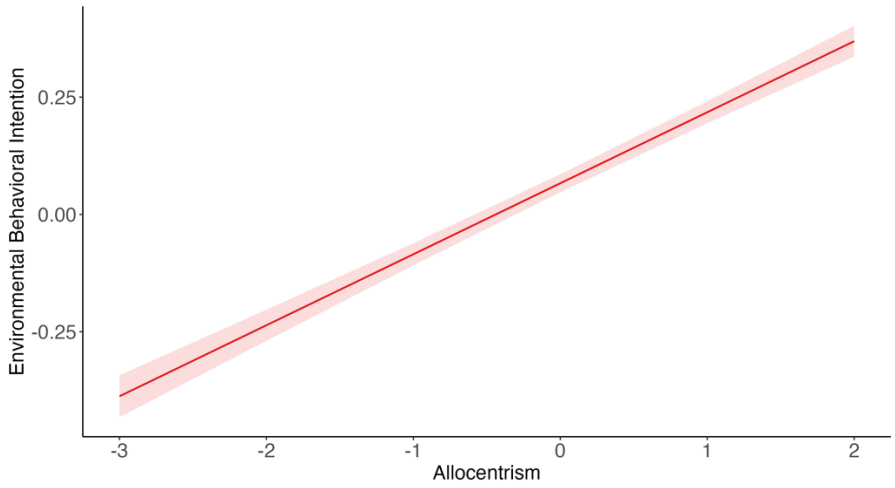

Figure 3. Individual-level allocentrism was positively associated with greater environmental-behavioral intention.

National-level GCI did not predict environmental behavioral intention, b = .03, SE =

.03, $t(39) = 1.10$, $p = .28$. In other words, there was no difference in environmental behavioral intention regardless of country-level culture orientation. However, there was a significant cross-level interaction, $b = .10$, $SE = .01$, $t(30{,}706) = 9.83$, $p < .001$. The interaction seemed to be driven by more allocentric individuals residing in more collectivistic countries exhibiting the greatest environmental behavioral intention (Figure 4a)

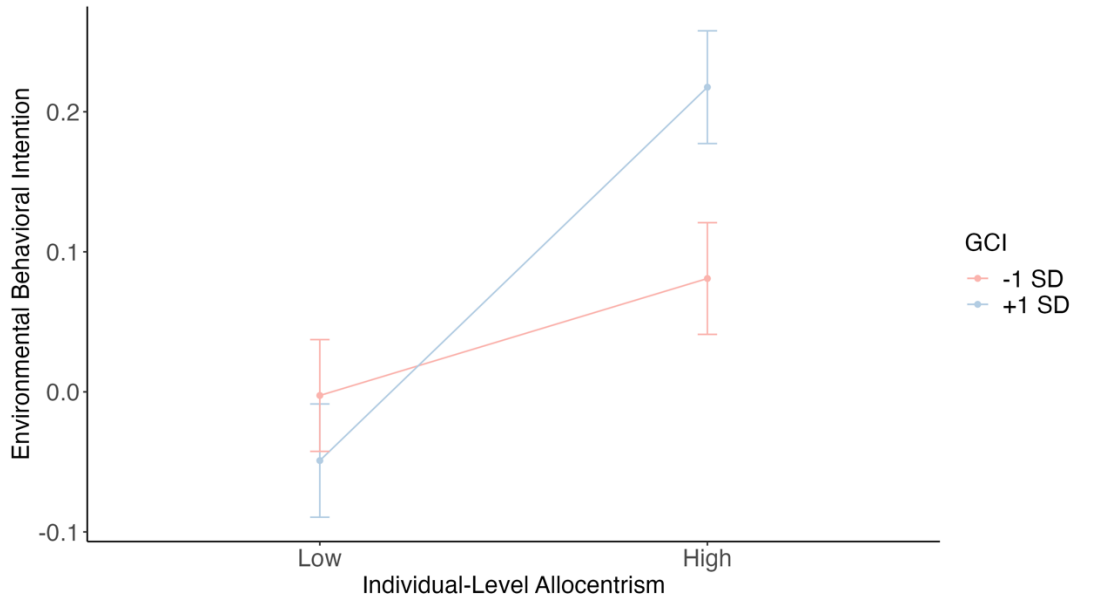

Figure 4a. Interaction effect between individual-level allocentrism and national-level GCI on environmental behavioral intention.

Similarly, Hofstede's Individualism did not predict environmental behavioral intention, $b < .001$, $SE < .001$, $t(34) = 16.50$, $p = .18$, but there was a significant cross-level interaction, $b = -.002$, $SE < .001$, $t(30{,}698) = -8.18$, $p < .001$. As with GCI, more allocentric individuals residing in less individualistic countries exhibited highest levels of environmental behavioral intention (Figure 4b).

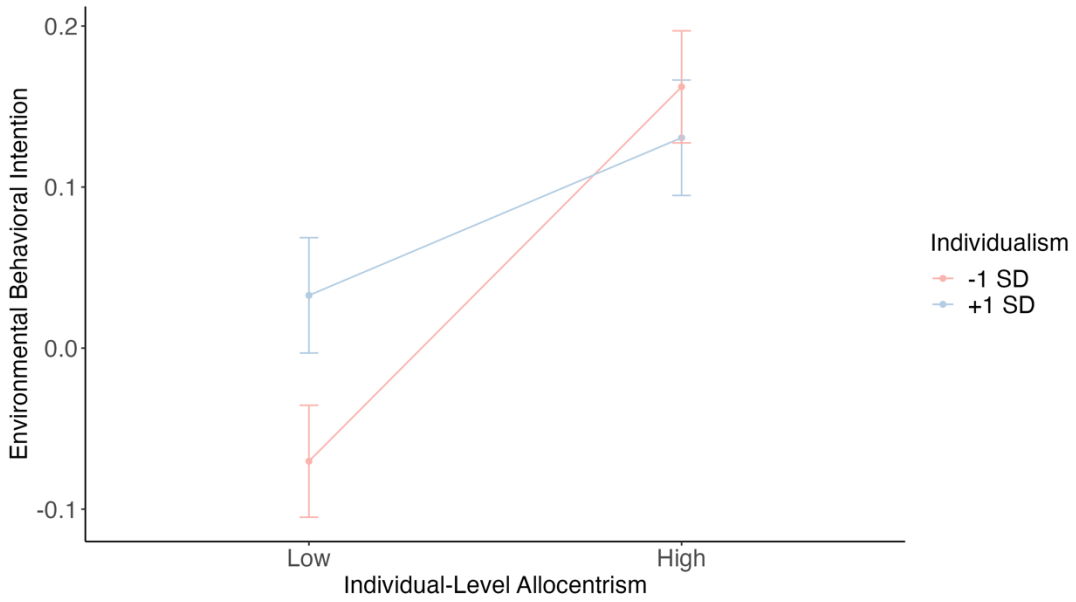

Figure 4b. Interaction effect between individual-level allocentrism and Hofstede's Individualism on environmental behavioral intention.

Next, to examine whether individual-level confidence in government explained the relationship between allocentrism and environmental behavioral intention, I conducted a 1-1-1 mediation model[4] controlling for individual- and country-level covariates using *lavaan* (Figure 5, Rosseel, 2012). Allocentrism was associated with greater environmental behavioral intention, $b = .13$, $SE = .007$, $p < .001$; and greater confidence in government, $b = .12$, $SE = .008$, $p < .001$. In turn, greater confidence in government predicted greater environmental behavioral intention, $b = .08$, $SE = .005$, $p < .001$. There was a small but significant indirect effect, suggested that more allocentric individuals had greater environmental behavioral intention in part because they had greater confidence in their

[4] A 1-1-1 mediation model was conducted for the following reasons: First, on the theoretical level, individuals' views of the government would more likely shape their willingness-to-pay, regardless of the social context they are situated in. Second, given that country-level GCI did not predict the outcome variables, I do not expect people's view of the government to significantly affect the outcome. Nevertheless, I tested a 2-1-1 mediation model with GCI as a predictor, and as expected, there was no indirect effect of confidence in government. Theoretically and statistically, a 1-1-1 mediation model accounting for Level-2 variables were the most appropriate analysis.

government, *ab* = .01, *SE* = .001, *p* <.001.

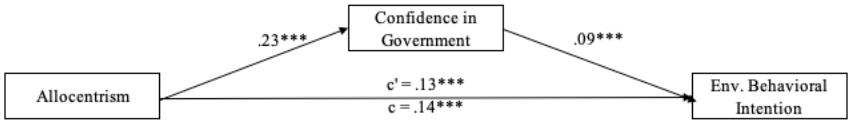

Figure 5. The relationship between allocentrism and environmental behavioral intention as mediated by confidence in government.

Exploratory Analysis: Is the relationship between allocentrism, confidence in government, and pro-environmental intention stronger in more collectivistic culture contexts?

To test whether contextual influence of collectivism (i.e., national-level collectivism) would strengthen the relationship between individual-level collectivism, their views of the government, and environmental behavioral intention, I conducted another multi-level analysis with allocentrism and confidence in government as the L1 variables, GCI as the L2 variable, and environmental behavioral intention as the dependent variable. Results showed that allocentrism predicted greater environmental behavioral intention, *b* = .17, *SE* = .008, *t*(30,715) = 20.64, *p* < .001; as did confidence in government, *b* = .08, *SE* = .005, *t*(30,711)= 15.10, *p* < .001. There was a significant two-way interaction between allocentrism and confidence in government, *b* = .03, *SE* = .009, *t*(30,709) = 2.88, *p* = .04. However, there was no significant cross-level interactions between confidence in government and GCI predicting environmental behavioral intentions, *b* = -.001, *SE* = .007, *t(*30,703*)* = -.18, *p* =.86. There was no contextual influence of collectivism on people's levels of confidence in government and environmental behavioral intentions. There was no significant three-way interaction, *b* = .009, *SE* = .01, *t*(30,700) = .79, *p* =.43. The strength of relationship between allocentrism and confidence in government predicting environmental behavioral intention did

not differ across different cultural contexts. In other words, people's environmental behavioral intentions were primarily driven by the positive association between individual-level allocentrism and confidence in government, but not country-level collectivism.

There were some discrepancies when using Hofstede's individualism as the country-level (L2) variable. Allocentrism predicted greater environmental behavioral intention, b = .23, SE = .01, t(30,709) = 15.90, p < .001; as did confidence in government, b = .06, SE = .01, t(30,699)= 5.78, p < .001. Unlike GCI, there was no significant two-way interaction between allocentrism and confidence in government, b = .02, SE = .02, t(30,702) = .92, p = .36. There was a significant cross-level interaction between allocentrism and individualism, b = -.002, SE <.001, t(30,698) = -8.27, p <.001. More allocentric individuals residing in less individualistic countries had greater environmental behavioral intentions. There was also a significant cross-level interaction between confidence in government and individualism, b <.001, SE <.001, t(30,692) = 2.42, p =.02. Individuals who had greater confidence in their government residing in more individualistic countries had greater environmental behavioral intentions. There was no significant three-way interaction, b <.001, SE < .001, t(30,694) = .42, p =.68. The strength of relationship between allocentrism and confidence in government predicting environmental behavioral intention did not differ across nations with varying degree of individualism.

Exploratory Analysis: Does Individual- and Country-Level Trust in Government Affect Collectivists' Environmental Behavioral Intention?

To explore whether allocentrists' greater environmental behavioral intentions are driven by other contextual influence, such as a country's general sentiment towards their government, I conducted another multi-level model analysis with allocentrism and

confidence in government as the L1 predictors nested within country, Edelman's Trust Index (2024) as the L2 predictor, and environmental behavioral intention as the outcome variable while controlling for individual- and country-level covariates. The Edelman's Trust Index (2024) was an aggregated value of people's trust in public institutions and government in 27 countries. After assigning trust values to countries available across the World Values Survey and Edelman datasets, the final sample consisted of 14,778 participants across 14 countries. Results suggested that allocentrism marginally predicted greater environmental behavioral intentions, b = .08, SE = .05, t(14,777) = 1.78, p = .07. Confidence in government was associated with greater environmental behavioral intention, b = .12, SE = .03, t(14,778) = 3.69, p <.001, and there was significant two-way interaction between allocentrism and confidence in government, b = -.13, SE = .06, t(14,777) = -2.36, p = .02. Pairwise comparison revealed that environmental behavioral intention was greatest among allocentrists who trusted the government more. There was no country-level influence on environmental behavioral intention, b = .01, SE = .01, t(12) = 1.26, p = .23. There was no cross-level interaction between allocentrism and country-level trust index, b = .01, SE = .01, t(14,777) = .63, p = .53; nor between confidence in government and country-level trust index, b = -.01, SE = .01, t(14,777) = -1.14, p = .25. There was a significant three way interaction, b = .01, SE = .01, t(14,777) = 3.30, p = .001., primarily driven by the interaction between both L1 variables – allocentrism and confidence in government. In other words, findings from this analysis suggested no country-level influence of trust on the relationship between allocentrism, confidence in government and environmental behavioral intentions. People who were more allocentric were not driven by their perceived others' views towards the government. Instead, their environmental behavioral intentions were dependent on their

personal levels of confidence in the government.

Study 2 Discussion

Using a global sample, Study 2 revealed that within the same country, more allocentric individuals had greater environmental behavioral intention. Although there was no country-level influence on the outcomes measured using GCI (Pelham et al., 2022) and Hofstede's cultural dimensions (Hofstede et al., 2010), the interactions suggested that the relationship between allocentrism and environmental behavioral intention were stronger among allocentrists who live in more collectivistic countries. This interaction could be explained by the intersubjective norm perspective, where more allocentric individuals relied on their surrounding others to inform their attitudes towards a targeted issue (Zou et al., 2009). It was possible that allocentrists in more collectivistic cultural contexts perceived that their surrounding others had greater pro-environmental intention, and subsequently aligned their attitudes to these perceived norms.

The mediation analysis also revealed that, within the same cultural context, more allocentric individuals had greater pro-environmental intention, in part because they had greater confidence in government. Although there was evidence that confidence in government has a profound impact in predicting environmental behavioral intentions among people with high levels of allocentrism (Exploratory Analysis 1), the consistent evidence that allocentric individuals have greater environmental behavioral intention, regardless of their levels of confidence in government, suggested allocentrism as a more robust psychological predictor. Furthermore, using GCI and Individualism as national-level cultural indices also revealed that cultural context did not profoundly influence the relationship between collectivism and confidence in government. Rather than a moderator, treating confidence in

government as a mediator revealed greater psychological nuance as it served as an explanation for why such strong association exist. In other words, the mediation analysis allowed inference of collectivists' greater trust in government as a key psychological mechanism that shape their likelihood of engaging in group-benefitting behaviors that required government interventions.

A key limitation of Study 2 was the reliance on using existing measures in the WVS as proxies to our targeted constructs. For example, the single-item confidence in government measure could not account for the multi-faceted components of trust in government, and the dependent variables were not related to climate policy support. Additionally, the correlational nature of Study 3 introduced many areas of ambiguity and room for interpretation across different variables. Although my findings ruled out several alternative explanations, such as the possibility that allocentrists relied on their perceived others' trust in government to inform their pro-environmental intentions (Exploratory Analyses 2), it was possible other researchers can interpret the data using their own theoretical lens.

Nevertheless, the large and diverse sample from WVS provided some initial insights about the positive associations between collectivism, trust in government, and pro-environmental tendencies. To address some of the limitations, in Study 3, I sought to replicate these findings with more refined measurements and wider range of policies.

Study 3

To have a more concrete understanding of how these environmental behavioral intentions translate to actual support for climate policies, Study 3 was a secondary analysis of a dataset published by Kukowski and colleagues (2023) where I investigated the relationship

between culture, trust in government and policy support. The dataset consisted of a diverse sample of participants (N = 7,349) across 9 geographical regions, and included measures of trust in government, as well as 9 climate policies with varied degrees of coerciveness. For example, there were three policies that involved providing incentives to adopt climate friendly behaviors (i.e., incentive-based), three that involved imposing mandates to force compliance (i.e., tax-based), and the remaining three that were more general regulation-based policies (i.e., regulation-based). Due to the lack of information about country of residence in this dataset, I operationalized culture using two approaches. The first approach was to divide participants from the 9 geographical regions into two categories – individualism (coded as 0) and collectivism (coded as 1). The second approach was to create a continuous variable where I find the top 3 most populous countries within the geographical region and created an average collectivism score based on the GCI and Hofstede Individualism.

There were several main hypotheses in this study. First, it was expected that participants from more collectivistic geographical regions would support climate change policies more in general, compared to participants from less collectivistic geographical regions. The differences in level of policy support between participants from more (vs. less) collectivistic geographical regions will be even greater when the policies were more coercive in nature, compared to the less coercive and regulation-based policies. Second, I hypothesized that participants from more collectivistic geographical regions would report higher levels of trust in government. Third, I expected a significant indirect effect of trust in government on the relationship between collectivism and policy support.

Method

Participants

The original survey was embedded in a game for 45 days (Kukowski et al., 2023). There were a total of 7,349 participants who consented the use of their data for research purposes. 49% participants identified as female, 42% male, and 9% others. 68% participants were between the ages 18-29, followed by 21% between ages 30-49, and 11% over 50. Participants identified their country of residence based on the following geographical regions, including USA (N = 3,573), Europe (N = 1, 283), Canada (N = 1,016), South Asia (N = 409), East Asia (N = 285), Rest of Asia (N = 299), Oceania (N = 241), Latin America (N = 131), and Africa (N = 110). On a scale from 1 (extremely left-leaning) to 7 (extremely right-leaning), participants' mean political ideology was 3.57 (SD = 1.71). Refer to Table 7 for full demographic information, and Kukowski and colleagues (2023) for specific recruitment procedures.

Table 7

Study 3 – Participants' Demographic Characteristics

Characteristics	USA (N = 3,573)	Canada (N = 1,016)	Europe (N = 1,283)	Latin America (N = 131)	Oceania (N = 241)	Africa (N = 110)	East Asia (N = 285)	South Asia (N = 409)	Rest of Asia (N = 299)
Gender	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Male	1,396 (39%)	586 (58%)	583 (45%)	55 (42%)	116 (34%)	27 (25%)	85 (30%)	117 (29%)	91 (30%)
Female	1,943 (54%)	332 (33%)	604 (47%)	41 (31%)	82 (48%)	28 (25%)	161 (56%)	257 (63%)	164 (55%)
Other	234 (6.5%)	98 (9.6%)	95 (7.4%)	35 (27%)	43 (18%)	55 (50%)	39 (14%)	35 (9%)	44 (15%)
Age									
18 - 29	2,570 (72%)	662 (65%)	831 (65%)	75 (57%)	108 (60%)	60 (55%)	196 (69%)	283 (69%)	200 (67%)
30 - 49	611 (17%)	213 (21%)	335 (26%)	37 (28%)	85 (26%)	26 (24%)	69 (24%)	99 (24%)	71 (24%)
Over 50	392 (11%)	141 (14%)	117 (9.1%)	19 (15%)	48 (24%)	24 (22%)	20 (7%)	27 (7%)	28 (9%)
Education									
High school or less	956 (27%)	257 (15%)	247 (19%)	22 (17%)	25 (10%)	10 (9%)	37 (13%)	72 (18%)	59 (20%)
Some college/university	1,474 (41%)	506 (50%)	312 (24%)	30 (23%)	65 (27%)	22 (20%)	94 (33%)	123 (30%)	103 (34%)
University degree	1,142 (32%)	353 (35%)	724 (56%)	79 (60%)	151 (63%)	78 (71%)	154 (54%)	214 (52%)	137 (46%)
Political Ideology (M, SD)	3.39 (1.77)	3.64 (1.47)	3.41 (1.57)	4.04 (1.87)	3.64 (1.57)	4.89 (2.24)	4.12 (1.56)	4.32 (1.63)	3.99 (1.60)
Income (M, SD)	3.78 (1.75)	3.96 (1.47)	4.11 (1.55)	4.61 (1.62)	4.63 (1.70)	5.23 (2.07)	3.78 (1.66)	3.71 (1.73)	3.77 (1.67)

Measures

Predictor Variable

Individualism-Collectivism (Binary). Participants' culture orientation was measured by categorizing participants into relatively individualistic (vs. collectivistic) cultures based on their reported geographical regions. Specifically, participants who reported residing in USA, Canada, Europe, and Oceania were considered individualistic (coded as 0), and participants who reported residing in Latin America, Africa, East Asia, South Asia, and Rest of Asia were considered collectivistic (coded as 1). While we recognized that there is considerable amount of variability in culture orientation within each region, there was no information on the specific countries in which respondents were living in. Therefore, majority of the respondents from this sample were considered individualistic (N = 6003; 82%), compared to those who were considered collectivistic (N = 1344;18%).

GCI (Continuous). An alternative measure of culture orientation was to find the top three most populous countries within a geographical region and calculate the average collectivism score based on the GCI. For example, the score for Europe (-.68) was the average GCI scores of Germany (-1.35), United Kingdom (-1.35) and France (-1.17); while the score for Latin America (.03) was the average GCI scores of Brazil (-.16), Mexico (.09), and Colombia (.15). Higher, positive scores indicated greater collectivism. Once again, while this approach was an attempt to triangulate the binary method, the problem of overlooking diversity of culture orientation within each region remained. See Table 8 for detailed categorization of individualism-collectivism, and how GCI was computed for each region.

Hofstede's Individualism (Continuous). Using the same approach and list of countries, I have also assigned an Individualism value to each geographical region, with

higher scores indicating greater individualism.

Table 8

Study 3 - Computing Culture Variable using Binary and Continuous Approaches

Geographical Region	Binary (1 = COL, 0 = IND)	Continuous (Average GCI)	Hofstede's Individualism
USA	0	-1.18	60
Canada	0	-1.10	72
Europe (United Kingdom, France, Germany)	0	-1.21	76
Oceania (Australia, New Zealand)	0	-.68	71
Latin America (Brazil, Mexico, Colombia)	1	.03	33
Africa (Nigeria, Ethiopia, Egypt)	1	.74	7
East Asia (China, Japan, South Korea)	1	-.68	54
South Asia (India, Pakistan, Bangladesh)	1	.73	11
Rest of Asia (Indonesia, Philippines, Vietnam)	1	.49	17

*Average GCI and Hofstede's Individualism were calculated based on the top 3 most populous countries in the region

Mediator Variable

Trust in Government. Trust in government was measured with a single-item measure, "how much do you trust your national government". Participants rated their levels of trust on a scale of 1 (not at all) to 7 (very much), $M = 3.59$, $SD = 2.10$, with higher values indicating greater trust.

Outcome Variable

Climate Change Policy Support. Participants rated their support for 10 climate change policies on a scale of 1 (strongly oppose) to 7 (strongly support). Among the 10 policies, 4 policies were tax-based where the policies involved force financial compliance if successfully implemented (e.g., "adopt a tax on carbon dioxide", $M = 4.22$, $SD = 1.55$, $a =$

.77). 3 policies were incentive-based where the policies provided incentives so that individuals could voluntarily engage with (e.g., "subsidize long-distance train and bus travel", $M = 5.06$, $SD = 1.51$, $a = .68$), and the remaining 3 policies were more general regulation-based policies (e.g., "adopt a mandatory carbon footprint label on consumer products", $M = 4.82$, $SD = 1.63$, $a = .76$). All items were averaged and formed a composite score for policy support ($M = 4.65$, $SD = 1.35$, $a = .84$).

Covariates

All analyses controlled for participants' age, gender, political ideology, education, and income.

Study 3 Results

First, I examined the zero-order correlation and descriptive statistics of all key variables. Binary measure of culture and GCI were highly correlated with each other, $r(7,347) = .91$, and positively correlated with trust in government ($r_{binary} = .10$, $r_{gci} = .10$, $r_{ind} = .10$), as well as policy support ($r_{binary} = .10$, $r_{gci} = .10$). Hofstede's Individualism was negatively correlated with binary measure of culture ($r = -.86$), GCI ($r = -.94$), and trust in government ($r = -.05$). Trust in government was also positively correlated with policy support ($r = .12$). Table 9 contains information about descriptive statistics and correlation coefficient with all key variables, as well as different policy types.

Table 9

Study 3 - Descriptive Statistics and Zero-Order Correlations between Key Variables

		M	SD	*a*	1	2	3	4	5	6	7	8
1	Culture (Binary)	-	-	-	-							
2	GCI	-.90	.59	-	.92***	-						
3	Individualism	57.48	17.76	-	-.86***	-.94***	-					
4	Trust in Gov.	3.59	2.10	-	.10***	.10***	-.05***	-				
5	Policy Support (Composite)	4.65	1.35	.84	.10***	.10***	-.05***	.21***	-			
6	Support (Incentive)	5.06	1.51	.68	.10***	.10***	-.06***	.17***	.85***	-		
7	Support (Tax)	4.22	1.55	.77	.08***	.08***	-.02***	.21***	.88***	.60***	-	
8	Support (Regulatory)	4.82	1.63	.76	.08***	.08***	-.05***	.17***	.87***	.67***	.62***	-

*p <.05; **p <.01; ***p<.001

Binary Measure of Culture Predicting Trust in Government and Policy Support

I first ran two independent sample t-tests to test whether there were cultural differences in levels of trust in government and policy support. As predicted, respondents from more collectivistic regions reported greater levels of trust in government (M = 4.05, SD = 2.21), and higher levels of policy support (M = 4.93, SD = 1.20) compared to respondents from more individualistic regions (trust: M = 3.49, SD = 2.06, t(1899) = -8.50, $\underline{p}$ <.001; policy support: M = 4.59, SD = 1.38, t(2214) = -9.05, p <.001).

Next, I ran a mediation model with culture as the predictor variable, trust in government as the mediator variable, and policy support as the outcome variable (Figure 6). To test the robustness of culture orientation on policy support, all analyses controlled for participants demographic variables. As predicted, respondents from more collectivistic geographical region predicted greater trust in government, β = .16, SE = .03, p < .001. In turn, trust in government predicted greater support for climate change policies, β = .16, SE = .01, p <.001. There was a significant indirect effect of trust in government on the relationship between culture and support for climate change policies, ab = .03, 95% CI [.02, .04]. In other words, findings from Study 3 replicated Study 2, where respondents from more collectivistic regions supported climate change policies more, in part because they placed greater trust in government.

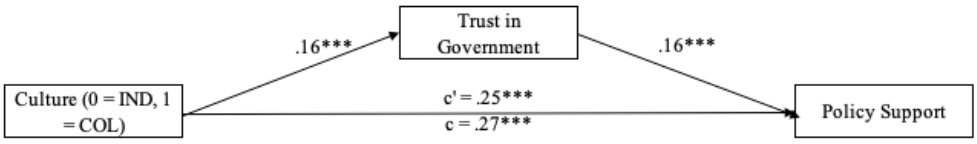

Figure 6. The relationship between binary measure of culture and policy support as mediated by confidence in government.

I ran three additional mediation models for each policy type to examine whether the patterns were consistent. Across the different types of climate change policies (i.e., incentive-, tax- or regulatory-based), trust in government consistently mediated the relationship between collectivism and policy support. Refer to Table 10A for full coefficient.

Table 10A

Study 3 - Regression Coefficients for Mediation Models (Binary Measure of Culture)

	β	*SE of β*	*t*	*p*
Total Effects (c)				
Culture (Binary) → Policy Support (Composite)	.27	.03	9.62	<.001
Culture (Binary) → Incentive	.21	.02	9.36	<.001
Culture (Binary) → Tax	.17	.02	7.81	<.001
Culture (Binary) → Regulatory	.18	.02	7.71	<.001
Separate Effect Paths				
Culture (Binary) → trust in gov.	.16	.03	5.79	<.001
Trust in gov → Policy Support (Composite)	.16	.01	13.24	<.001
Trust in gov → Incentive	.10	.01	10.00	<.001
Trust in gov → Tax	.13	.01	13.46	<.001
Trust in gov → Regulatory	.10	.01	9.61	<.001
Indirect Effect Paths (c')				
Culture (Binary) → Trust in gov. → Policy Support (Composite)	.25	.03	8.82	<.001
Culture (Binary) → Trust in gov. → Incentive	.20	.02	8.73	<.001
Culture (Binary) → Trust in gov. → Tax	.15	.02	6.98	<.001
Culture (Binary) → Trust in gov. → Regulatory	.17	.02	7.09	<.001

Indirect Effect Estimates	*β*	*BootSE*	*Boot LLCI*	*BootULCI*
Policy Support (Composite)	.03	.01	.02	.04
Incentive	.02	.01	.01	.02
Tax	.02	.01	.01	.03
Regulatory	.02	.01	.01	.02

Average GCI Predicting Trust in Government and Policy Support

I ran a series of mediation analyses to assess the relationship between average GCI, trust in government, and policy support (Figure 7). Results indicated that participants from more collectivistic regions, operationalized by greater GCI, had greater trust in their government, $b = .08$, $SE = .02$, $t(7343) = 4.70$, $p < .001$, and exhibited higher levels of policy support, $b = .19$, $SE = .02$, $t(7343) = 10.16$, $p < .001$. Trust in government was also associated with higher levels of policy support, $b = .16$, $SE = .01$, $t(7342) = 13.32$, $p < .001$. There was a significant indirect effect of trust in government on GCI and policy support, a$b = .01$, 95%CI[.01, .02]. After accounting for the mediator, the relationship between GCI and policy support was significant but reduced, $b = .17$, $SE = .02$, $t(7342) = 9.54$, $p < .001$, providing support for a partial mediation.

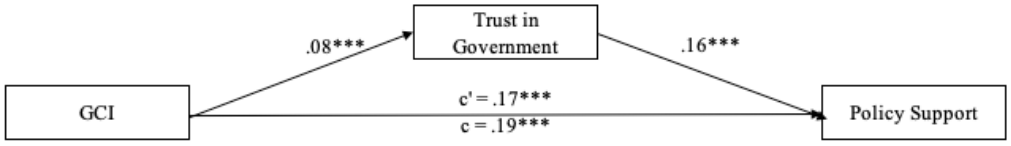

Figure 7. The relationship between continuous measure of culture and policy support as mediated by confidence in government.

I ran three additional mediation models for each policy type to examine whether the patterns were consistent. Across the different types of climate change policies (i.e., incentive-, tax- or regulatory-based), trust in government consistently mediated the relationship between collectivism and policy support. Refer to Table 10B for full coefficients.

Table 10B

Study 3 - Regression Coefficients for Mediation Models (Continuous Measure of Culture)

	β	*SE of β*	*t*	*p*
Total Effects (c)				
GCI → Policy Support (Composite)	.19	.02	10.17	<.001
GCI → Incentive	.14	.02	9.45	<.001
GCI → Tax	.12	.01	8.44	<.001
GCI → Regulatory	.13	.02	8.22	<.001
Separate Effect Paths				
GCI → trust in gov.	.08	.02	4.69	<.001
Trust in gov → Policy Support (Composite)	.16	.01	13.33	<.001
Trust in gov → Incentive	.10	.01	10.11	<.001
Trust in gov → Tax	.13	.01	13.52	<.001
Trust in gov → Regulatory	.01	.01	9.68	<.001
Indirect Effect Paths (c')				
GCI → Trust in gov. → Policy Support (Composite)	.17	.02	7.99	<.001
GCI → Trust in gov. → Incentive	.13	.02	8.95	<.001
GCI → Trust in gov. → Tax	.11	.01	7.79	<.001
GCI → Trust in gov. → Regulatory	.12	.02	7.73	<.001

ab Estimates	*β*	*BootSE*	*Boot LLCI*	*BootULCI*
Policy Support (Composite)	.01	.01	.01	.02
Incentive	.01	.01	.01	.02
Tax	.01	.01	.01	.02
Regulatory	.01	.01	.01	.02

Average IND Predicting Trust in Government and Policy Support

Similarly, I ran a series of mediation analyses to assess the relationship between average Hofstede's IND, trust in government, and policy support. Participants from more individualistic regions, operationalized by greater IND, had lower levels of trust in their government, b = -.002, SE = .001, t(7343) = -2.77, p = .01, and exhibited lower levels of policy support, b = -.004, SE = .001, t(7343) = -5.83, p <.001. Trust in government was associated with higher levels of policy support, b = .17, SE = .01, t(7342) = 13.63, p <.001. However, there was no significant indirect effect of trust in government on IND and policy support, ab <.001, 95%CI[.00, .00], suggesting that that trust in government did not mediate the relationship between IND and policy support. See Table 10C for full regression coefficients and specific paths for each types of policies.

Table 10C

Study 3 - Regression Coefficients for Mediation Models (Continuous Measure of Culture using Individualism)

	β	*SE of β*	*t*	*p*
Total Effects (c)				
Individualism → Policy Support (Composite)	-.004	.001	-5.83	<.001
Individualism → Incentive	-.003	.001	-6.57	<.001
Individualism → Tax	-.002	.001	-3.87	<.001
Individualism → Regulatory	-.003	.001	-5.62	<.001
Separate Effect Paths				
Individualism → trust in gov.	-.002	.001	-2.77	.01
Trust in gov → Policy Support (Composite)	.170	.012	13.63	<.001
Trust in gov → Incentive	.100	.010	10.38	<.001
Trust in gov → Tax	.130	.009	13.81	<.001
Trust in gov → Regulatory	.103	.010	9.91	<.001
Indirect Effect Paths (c')				
Individualism → Trust in gov. → Policy Support (Composite)	-.004	.001	-6.20	<.001
Individualism → Trust in gov. → Incentive	.100	.010	10.38	<.001
Individualism → Trust in gov. → Tax	-.002	.001	-3.47	<.001

Individualism → Trust in gov. → Regulatory	-.003	.001	-5.62	<.001

ab Estimates	*β*	*BootSE*	*Boot LLCI*	*Boot ULCI*
Policy Support (Composite)	<.001	<.001	.00	.00
Incentive	<.001	<.001	.00	.00
Tax	<.001	<.001	.00	.00
Regulatory	<.001	<.001	.00	.00

Study 3 Discussion

As expected, Study 3 provided further evidence that trust in government was an integral component of the relationship between collectivism and policy support. Regardless of whether the proposed policies were providing incentives, imposing taxes, or general regulation of sustainability practices, the correlational patterns were consistent: people from more collectivistic regions supported climate change policies more possibly because they placed greater trust in government.

Nonetheless, there were a few limitations for Study 3. The primary limitation was the operationalization of individualism and collectivism. Culture was categorized based on respondents' reported geographical regions *when they participated in the study*. Geographical regions were not only too broad a category to make inference of respondents' country of origin or personal cultural worldviews, but it was also possible that participants' stay in the reported geographical region was temporary. Although I used both binary and continuous approaches to operationalize culture, artificially categorizing respondents' culture orientation led to an imbalance sample size for each category (82% vs. 18%), and computing continuous GCI or IND scores based on the top three most populous countries in that particular geographical region may not accurately reflect participants' true demographic distributions. Most importantly, both approaches failed to account for the diversity of cultural backgrounds

and individual dispositions even if respondents were from the same country (Vandello & Cohen, 1999). Thus, in Study 4, I used established individualism-collectivism measures (Kim et al., 2016; Oyserman & Coon, 2002) for a more accurate representation of participants' cultural orientation.

The second limitation was the single-item trust in government measure. As with the first limitation, it was unclear which "national government" that respondents were referring to when responding to the question, given that there was a possibility that respondents' perception of their national government may not align with the government in their reported geographical regions. Additionally, a single-item measure could not inform us whether participants were reporting their levels of trust based on their perceived government competence, integrity, or benevolence (McEvily & Tortoriello, 2011). Therefore, in the next study, I included a validated trust in government scale for a more comprehensive measure (Grimmelikhuijsen & Knies, 2015).

Third, as with Study 2, findings from this study were correlational. Although the findings have consistently highlighted the importance of trust in government in shaping collectivists' attitudes towards climate change policies, we cannot make strong claims on why collectivists seemed to inherently place greater trust in the government compared to individualists. One plausible explanation pointed to the government's responsibilities of effectively maintaining social orders, facilitating group coordination, and serving a collective group better aligned with collectivistic values. Therefore, when a government proposed measures to serve their constituents and uphold their responsibilities, collectivists' stronger social ties with their group and deference to authorities would more likely shape a more positive views of the government, and subsequently increased their tendencies to follow

government recommendations, compared to less collectivistic people.

Study 4

Across Studies 2 and 3, we found consistent evidence that collectivism was associated with greater trust in government, and in turn, trust in government predicted greater policy support. To overcome the limitations of a correlational design and establish a causal link between both variables, I followed the recommendations of Spencer and colleagues (2005) to manipulate trust in government (i.e., the proposed psychological process) and investigate how differing levels of trust in government affect support for climate policies. I also investigated how collectivism would moderate the relationship between trust and policy support (i.e., moderation-of-process) to provide more compelling evidence on why trust in government was crucial in shaping the relationship between collectivism and policy support.

Although Studies 1 to 3 has established that trust in government was a key component in encouraging support for public initiatives, there was a notable gap in understanding precisely what aspects people trust the government for. For example, some individuals may support policies based on their perceived government competence and reliability in carrying out initiatives while others may support policies based on how much they believe the government is acting in their best interest (Kitt et al., 2021; Liu et al., 2020; Terwel et al., 2009). To better understand why collectivists placed greater trust in government, Study 4 manipulated government levels of competence and corruption to test specific aspects of the government that collectivists were more attuned to. In Study 4, we adapted an experimental paradigm from Liu and colleagues (2020) and asked participants to imagine themselves moving to a new country where the government exhibited varying degrees of competence and corruption. Given that climate change issues had been so polarized within the United

States, asking participants to imagine themselves moving to a new country can minimize some bias and pre-established views about the government and climate mitigation policies. Furthermore, some participants may be more familiar with the implementation of climate change policies within the United States than others. By encouraging participants to distance themselves from their current social context, they can more objectively assess the feasibility of each proposed policy.

Study 4 was a 2 (competence: high vs low) by 2 (corruption: high vs. low) between-subject experimental design that investigated the causal role of trust in government and support for climate change policies. There were three hypotheses in Study 4: First, participants who moved to a country with a government that exhibited high (vs. low) levels of competence would more likely support climate change policies. Second, participants who moved to a country with a government that exhibited low (vs. high) levels of corruption would more likely support climate change policies. Third, in line with prior evidence that perceived integrity played a more profound role in garnering support for climate related project (Liu et al., 2020), it was hypothesized that different levels of government corruption had a more profound impact of policy support when a government exhibited high (vs. low) levels of competence.

Additionally, Study 4 also examined the moderating role of collectivism on government characteristics and policy support. It was hypothesized that more collectivistic individuals would be more attuned to a government's levels of competence and corruption respectively (i.e., two significant two-way interactions); and the two-way interactions between perceived competence and corruptions were stronger for more collectivistic individuals compared to less collectivistic individuals (i.e., a significant three-way

interaction). All hypotheses were pre-registered.

Method

Participants

Sample size was determined prior to data collection using G*Power (Faul et al., 2007). An estimated sample of 251 participants were needed to detect an effect size of .25 and power of .8 across 4 groups (high vs. low competence and high vs. low corruption). However, we recruited more participants to ensure that the sample has sufficient statistical power to test the interaction effects of collectivism and government characteristics on policy support. Thus, 347 participants were recruited from Prolific. After excluding participants who did not permit the use of their data (N = 4), and those who failed more than 2 attention check questions (N = 4), the final sample consist of 339 participants. 64% identified as female, 34% male, and 2.1% identified as non-binary/other. The ethnicity breakdown of this sample was: 59% White/European American, 12% Asian/Asian American, 11% Hispanic/Latino, 9.4% Black/African American, 7.4% Multi-Racial, 0.6% American Indian/Alaska Native, 0.3% Native Hawaiian/Pacific Islander, and 0.3% Other. The average participant age was 39.03 (*SD* = 14.13). On a scale from 1 (extremely liberal) to 7 (extremely conservative), participants' mean political ideology was 3.14 (*SD* = 1.68). In terms of political party affiliation, 49% identified as Democrats, 30% Independent, 16% Republicans, and 4.7% others. Refer to Table 11 for full demographic information.

Table 11

Study 4 – Participants' Demographic Characteristics

Characteristics	M(SD)	n	%
Age	39.03 (14.13)		
Income	6.61 (3.39)		
Political Ideology	3.14 (1.68)		
Gender			

	Male	115	34%
	Female	217	64%
	Other	7	2%
Ethnicity			
	American Indian/Alaska Native	2	1%
	Asian/Asian American	41	12%
	Black/African American	32	9%
	Hispanic/Latino American	36	11%
	Native Hawaiian/Pacific Islander	1	0%
	White/European American	201	59%
	Multi-Racial	25	7%
	Other/Unspecified	1	0%
Party Affiliation			
	Democrats	167	49.0
	Republicans	54	16.0
	Independent	102	30.0
	Other	16	4.7

Procedure

The survey was conducted online in January 2024. At the start of their survey, participants provided their consent through checking the "Yes, I agree to participate" option after reading a consent form that included study information. After indicating their willingness to take part in the study, participants responded to measures of cultural orientation (i.e., individualism-collectivism). Then, they were presented some information about how a government's level of competence and corruption could affect people's views and subsequent support for policies and public initiatives. Next, participants were asked to imagine themselves immigrating to a new country for a new job and were provided some information about that country's government. Participants were randomly assigned to one of the four conditions with varying levels of government competence and corruption. After spending some time learning about the government of their new country of residence, participants rated how much they trust that government as a manipulation check and

indicated their levels of support for a series of climate change policies proposed by the government of their new country of residence. Participants also responded to a series of measures, including their perception of how much residents in their new country support or oppose the proposed climate policies; climate beliefs, and provided their demographic information. All participants were debriefed in writing at the end of the survey. The survey took approximately 15 minutes to complete, and participants were compensated $2.50. This study was reviewed and approved by UCSB Office of Research Application for the use of Human Subjects.

Manipulation

Cover Story

Participants were randomly assigned to one out of four conditions: high competence, low corruption; high competence, high corruption; low competence, low corruption; and low competence, high corruption. An example of a high competence, low corruption government was as followed:

"*The country you are moving to is classified as a developed nation and is known for its **exceptional** government and **minimal** levels of corruption.*

*According to the Government Effectiveness Index, this country's government is ranked **5th out of 33** developed countries for its efficiency in implementing their proposed initiatives and **high** levels of competence in delivering public services. **This country's extensive infrastructure, high-quality education, and accessible community programs are some examples that reflect the government's high competence in ensuring citizen's access to vital public services**.*

*Additionally, this country's government is often **praised** by the public as there is a*

perception that corrupt practices, such as embezzlement and bribery among public officials, exist at ***minimal*** *levels. According to the Corruption Perception Index, this country is ranked* ***3rd*** *out of 33 developed countries in levels of corruption within the government, making it the* ***third least-corrupt among developed countries****.* ***This country's government exemplifies its commitment to maintaining a culture of integrity through regular audits and strict enforcement of transparency measures****.*"

The bolded phrases were replaced with the corresponding prompts for differences in competence and corruption.

Manipulation Check

Trust in Government. After reading the cover story, participants responded to an 8-item adapted trust in government measure on a scale from 1(strongly disagree) to 5 (strongly agree; Grimmelikhuijsen & Knies, 2015). Within this measure, four items measured participants perceived competence of a government (e.g., "I think the national government of my new country of residence is likely to carry out its duty very well"; $M = 2.97$, $SD = 1.28$, $a = .91$), two items measured perceived benevolence of a government (e.g., "I think the national government of my new country of residence is likely to think in the long term"; $M = 2.91$, $SD = 1.40$, $a = .93$), and two items measured perceived integrity ("I think the national government of my new country of residence is likely to fulfill its promises"; $M = 2.85$, $SD = 1.34$, $a = .64$). All items were averaged and formed a composite score, with higher values indicating greater trust in government, $M = 2.93$, $SD = 1.25$, $a = .93$).

Comprehension Check

Towards the end of the survey, participants responded to two comprehension check questions. The first question was a close-ended measure where participants were asked to

"select a statement that best reflected the characteristics of the government in their new country of residence". They were presented with four choices that reflected the 2 by 2 experimental design. An example item was "the government in my new country of residence has **high (vs. low)** levels of competence and **high (vs. low)** levels of corruption". Then, they were also asked to describe the government characteristics in their own words using an open-ended measure.

Measures

Outcome Variables

Policy Support. Participants rated their support for 10 climate change policies on a scale from 1 (*strongly oppose*) to 5 (*strongly support*) adapted from Kukowski and colleagues (2023). Among the 10 climate change policies, 3 policies involved implementing a tax (i.e., tax-based) or imposing financial cost on individuals if successfully implemented (e.g., "the government will adopt a tax on air travel", $M = 3.02$, $SD = 1.10$, $a = .82$). 3 policies involved providing incentives (i.e., incentive-based) and financial benefits to promote voluntary participation (e.g., "subsidize long-distance train and bus travel"; $M = 3.98$, $SD = .92$, $a = .71$). Lastly, 4 policies were general regulation (i.e., regulatory-based) of sustainability practices (e.g., "require energy providers to make renewable energy the default options for consumers"' $M = 3.82$, $SD = 1.13$, $a = .76$). All items were averaged and formed a composite policy support variable ($M = 3.39$, $SD = .91$, $a = .89$), as well as three separate composites for each type of policies.

Individualism-Collectivism. Participants completed a 14-item validated individualistic and collectivistic value orientation measure (Kim et al., 2016; Oyserman et al., 2002). Individualism items included "it is important for me to develop my own personal

style", while collectivism items included "it is important for me to think of myself as a member of my religious, national, or ethnic group." All items were assessed on a 7-point scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Individualism and collectivism items were averaged and each form a composite score, with higher values indicating higher endorsement of each cultural value orientation (Individualism: $M = 5.56$, $SD = .82$, $a = .72$; Collectivism: $M = 4.33$, $SD = 1.11$, $a = .79$).

Covariates

Demographics. Participants provided some demographic information about themselves, including their age, ethnicity, political ideology, and income. Political ideology was measured on a 7-point scale ranging from 1 (*very liberal*) to 7 (*very conservative*); and income was measured on a 12-point scale ranging from 1 (*less than $10,000*) to 12 (*more than $150,000)*.

Results

First, I examined the zero-order correlation and descriptive statistics of all key variables across conditions. Support for climate policies was significantly correlated with trust in government, $r(339) = .22$, $p<.001$, and negatively correlated with political ideology, $r(339) = -.53$, $p<.001$. There was no significant correlation between individualism and policy support, $r(339) = .02$, $p = .77$, or trust in government, $r(339) = -.01$, $p = .91$. There was also no significant correlation between collectivism and policy support, $r(339) = -.06$, $p = .23$, and trust in government, $r(339) = .08$, $p = .14$. Table 12 contains information about descriptive statistics and correlation coefficient with all key variables.

Table 12

Study 4 - Descriptive Statistics and Zero-Order Correlations between Key Variables across Conditions

		M	SD	*a*	1	2	3	4	5	6	7	8
1	Individualism	5.57	.84	.72	-							
2	Collectivism	4.34	1.14	.79	.22	-						
3	Trust in Gov.	2.91	1.26	.93	-.01	.08	-					
4	Policy Support (Composite)	3.51	.93	.89	.02	-.06	.22***	-				
5	Support (Incentive)	3.99	.92	.71	.02	-.03	.20***	.85***	-			
6	Support (Tax)	3.03	1.10	.82	-.06	-.09	.24***	.90***	.62***	-		
7	Support (Regulatory)	3.69	1.06	.76	.11*	-.04	.12*	.89***	.72***	.68***	-	
8	Political Ideology	3.14	1.68	-	.04	.30**	.01	-.53***	-.48***	-.45***	-.49***	-

Manipulation Check

First, I ran a 2 (competence: high vs. low) by 2 (corruption: high vs. low) ANOVA with trust in government as the dependent variable to test whether the manipulation worked. As expected, there was a main effect of competence, $F(1, 335) = 162.18$, $p<.001$, $\eta_p^2 = .33$. Participants in the high competence condition reported greater trust in government ($M = 3.47$, $SD = 1.16$), compared to those in the low competence condition ($M = 2.36$, $SD = 1.11$). There was a main effect of corruption, $F(1, 335) = 349.82$, $p <.001$, $\eta_p^2 = .51$. Participants in the low corruption condition reported greater trust in government ($M = 3.73$, $SD = .96$), compared to those in the high corruption condition ($M = 2.11$, $SD = .97$). There was no significant interaction between competence and corruption on trust in government, $F(1, 335) = .14$, $p = .71$, $\eta_p^2<.001$.

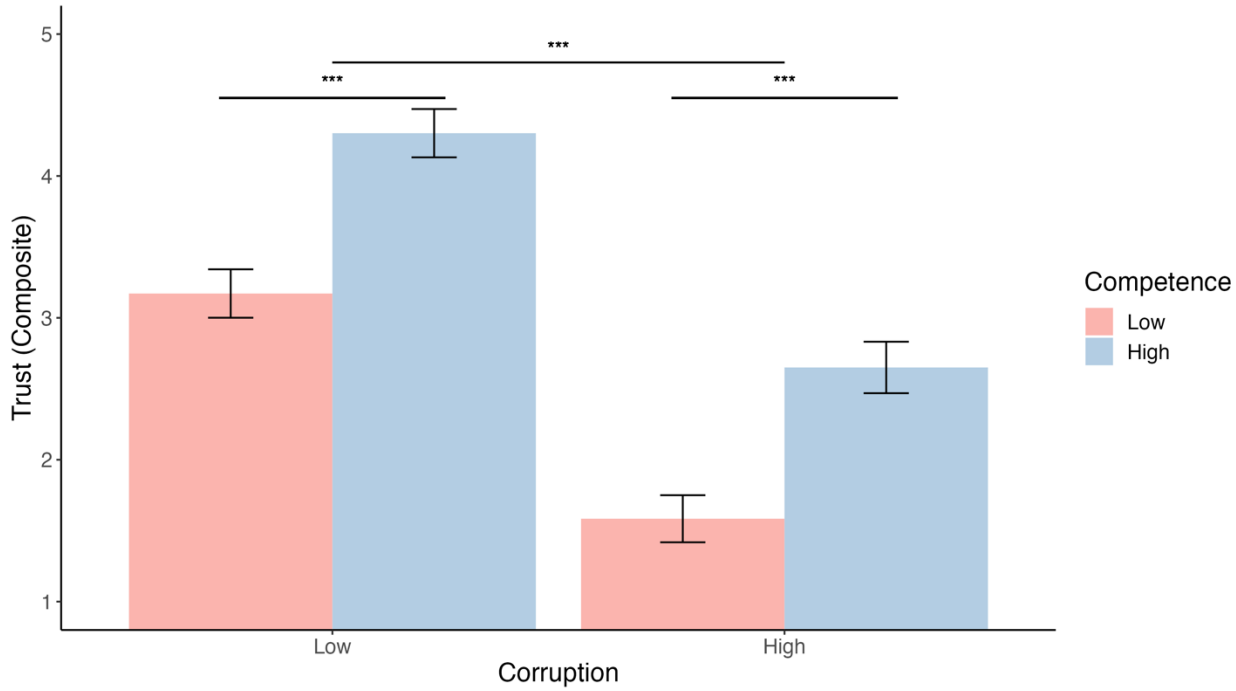

Figure 8. Main effect and interaction between government characteristics and trust in government (composite). Levels of trust in government as a function of government competence and corruption

The results were similar when the three aspects of trust were treated as separate dependent variables. High competence and low corruption independently predicted greater perceived competence, benevolence, and integrity of the government. There was no significant interaction between the two manipulated variables. Refer to Tables 13A and 13B for detailed coefficients and descriptive statistics.

Table 13A

Study 4 - Descriptive Statistics for Trust in Government by Condition

Trust in Government	Low Competence		High Competence		Low Corruption		High Corruption	
	M	SD	M	SD	M	SD	M	SD
Composite	2.36	1.11	3.47	1.16	3.73	.96	2.11	.97
Competence	2.26	1.06	3.70	1.07	3.59	1.15	2.37	1.11
Benevolence	2.35	1.27	3.47	1.31	3.73	1.12	2.10	1.17
Integrity	2.48	1.28	3.23	1.30	3.87	.93	1.86	.84

Table 13B

Study 4 - Main Effects and Interaction of Competence and Corruption on Trust

		df	SS	MS	F	p	η_p^2
Composite	Competence	1	102.96	102.96	162.18	<.001	.33
	Corruption	1	222.09	222.09	349.82	<.001	.51
	Competence * Corruption	1	.09	.09	.14	.71	<.001
	Error	335	212.68	.63			
Competence	Competence	1	173.94	173.94	227.96	<.001	.40
	Corruption	1	124.50	124.50	163.17	<.001	.33
	Competence * Corruption	1	1.37	1.37	1.79	.18	<.001
	Error	335	255.61	.76			
Benevolence	Competence	1	106.20	106.20	105.80	<.001	.24
	Corruption	1	224.70	224.80	224.00	<.001	.40
	Competence * Corruption	1	<.001	<.001	<.001	.99	<.001
	Error	335	336.10	1.00			
Integrity	Competence	1	48.40	48.40	74.89	<.001	.18
	Corruption	1	343.90	343.90	532.40	<.001	.61
	Competence * Corruption	1	.10	.10	.14	.71	<.001
	Error	335	216.40	.60			

Government Characteristics on Policy Support

Next, I ran a series of 2 (competence: high vs. low) by 2 (corruption: high vs. low) ANOVA predicting policy support as the outcome variable, while controlling for demographic variables. There was marginal main effect of competence, $F(1, 321) = 2.74$, $p = .099$, $\eta_p^2 < .001$. Participants' support for climate change policies were marginally higher in high competence ($M = 3.58$, $SD = .93$) compared to low competence conditions ($M = 3.44$, $SD = .92$). There was a main effect of corruption, $F(1, 321) = 4.60$, $p = .03$, $\eta_p^2 = .01$. Participants in the low corruption ($M = 3.60$, $SD = .94$) condition reported greater policy support compared to participants in the high corruption condition ($M = 3.42$, $SD = .91$). There was no significant interaction between corruption and competence, $F(1, 321) = 1.71$, $p = .19$, $\eta_p^2 < .001$.

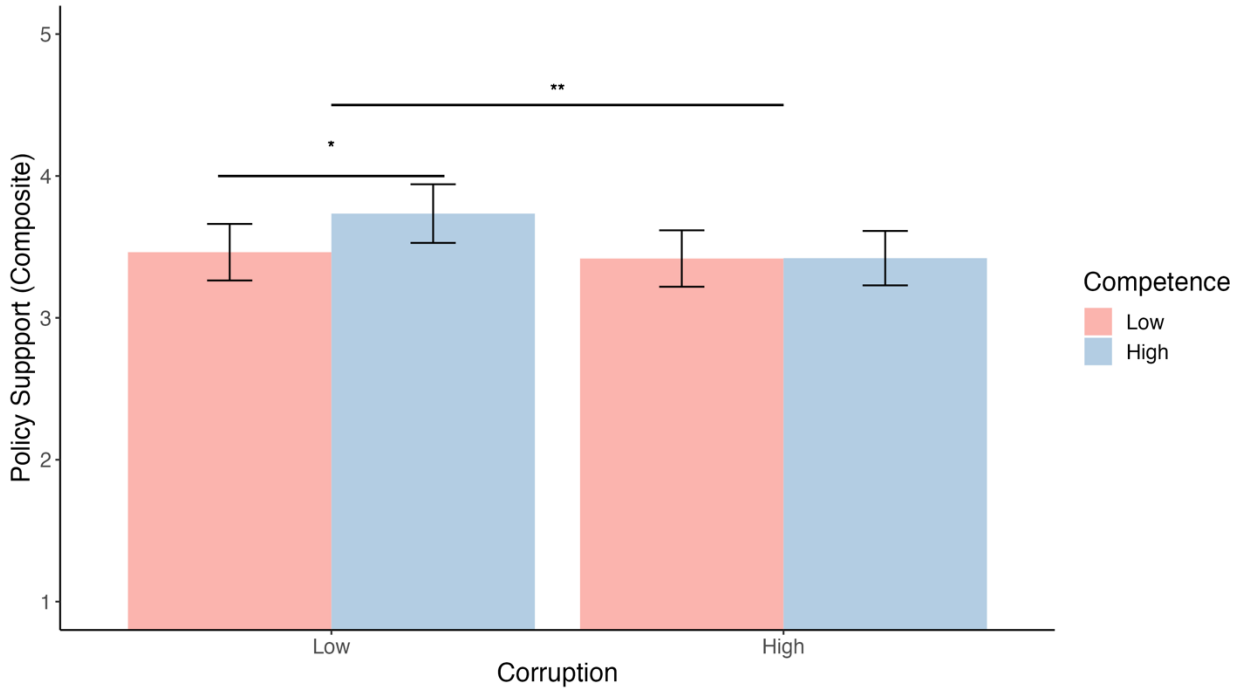

Figure 9. Main effect and interaction between government characteristics and policy support (composite). Levels of policy support as a function of government competence and corruption.

I also ran separate analyses with support for tax-, incentive-, and regulatory-based policies as dependent variables. Findings for incentive- and regulatory-based policies were consistent with the composite items. There was a main effect of corruption on support for tax- and regulatory-based policies, but there was no main effect of competence or interaction. Participants in low corruption condition supported tax- and regulatory-based policies more, compared to those in the high corruption condition.

On the other hand, there was a marginal main effect of competence, $F(1, 321) = 3.39$, $p = .07$, $\eta_p^2 = .01$, and main effect of corruption $F(1, 321) = 4.95$, $p = .03$, $\eta_p^2 = .02$ on support for incentive-based policies. Participants in the high competence condition ($M = 4.07$, $SD = .90$) reported higher levels of support for incentive-based policies compared to those in the low competence condition ($M = 3.91$, $SD = .94$); and participants in the low corruption condition ($M = 4.08$, $SD = .88$) reported higher levels of support for incentive-based policies, compared to those in the high corruption condition ($M = 3.89$, $SD = .94$). There was no significant interaction, $F(1, 321) = .12$, $p = .73$, $\eta_p^2 < .001$. See Tables 14A and 14B for full descriptive statistics and coefficients.

Table 14A

Study 4 - Descriptive Statistics for Policy Support by Condition

Policy Support	Low Competence		High Competence		Low Corruption		High Corruption	
	M	SD	M	SD	M	SD	M	SD
Composite	3.44	.92	3.58	.93	3.60	.94	3.42	.91
Incentive	3.91	.09	4.07	.09	4.08	.88	3.89	.94
Tax	2.98	1.10	3.07	1.10	3.16	1.13	2.89	1.06
Regulatory	3.62	1.07	3.77	1.04	3.72	1.06	3.67	1.06

Table 14B

Study 4 - Main Effects and Interaction of Competence and Corruption on Policy Support

		df	SS	MS	F	p	η_p^2
Composite	Competence	1	1.58	1.58	2.74	.09	<.01

	Corruption	1	2.67	2.67	4.60	.04	.01
	Competence * Corruption	1	.99	.99	1.71	.19	<.01
	Error	321	185.91	.58			
Incentive	Competence	1	2.11	2.11	3.39	.06	.01
	Corruption	1	3.08	3.08	4.95	.02	.02
	Competence * Corruption	1	.07	.07	.12	.73	<.001
	Error	321	199.39	.62			
Tax	Competence	1	.86	.86	.92	.34	<.01
	Corruption	1	6.02	6.02	6.44	.01	.02
	Competence * Corruption	1	2.03	2.03	2.17	.14	<.01
	Error	321	299.85	.93			
Regulatory	Competence	1	2.00	2.00	2.57	.11	<.01
	Corruption	1	.25	.25	.33	.57	<.01
	Competence * Corruption	1	1.64	1.64	2.10	.15	<.01
	Error	321					

The Moderating Role of Collectivism

Prior to testing the moderating role of collectivism, I first ran a regression to test whether collectivism was associated with greater policy support, controlling for government characteristics (i.e., no interaction terms) and demographic variables, to replicate the findings of Studies 2 and 3. In line with prior evidence, collectivism was associated with greater policy support, $b = .09$, $SE = .04$, $p = .03$.

Next, to explore whether collectivists are more attuned to government characteristics, I ran a series of 2 (competence: low vs. high) by 2 (corruption: low vs. high) by continuous (collectivism) multiple regressions with policy support as the dependent variable, and demographic variables as covariates. Neither competence, $b = .28$, $SE = .04$, $p = .57$, nor corruption, $b = -.05$, $SE = .47$, $p = .91$, predicted policy support. Instead, there was a marginally positive association between collectivism and policy support, $b = .13$, $SE = .08$, $p = .08$. There was no significant two-way interaction between collectivism and competence, $b = .01$, $SE = .11$, $p = .98$; or collectivism and corruption, $b = -.01$, $SE = .10$, $p = .90$. There was

also no significant three-way interaction, b = -.14, SE = .15, p = .33. In other words, regardless of government's level of competence or corruption, policy support was greater among people who were more collectivistic (M = 3.62, SE = .06), compared to those who were less collectivistic (M = 3.40, SE = .06). When separated by the types of policies, the findings suggested that the association between collectivism and policy support was strongest when the policies were incentive-based, b = .20, SE = .08, p = .01. The relationship was nonsignificant when the policies were tax-based, b = .10, SE = .10, p = .31, or general regulation, b = .11, SE = .09, p = .21. See Table 14 for full regression coefficients.

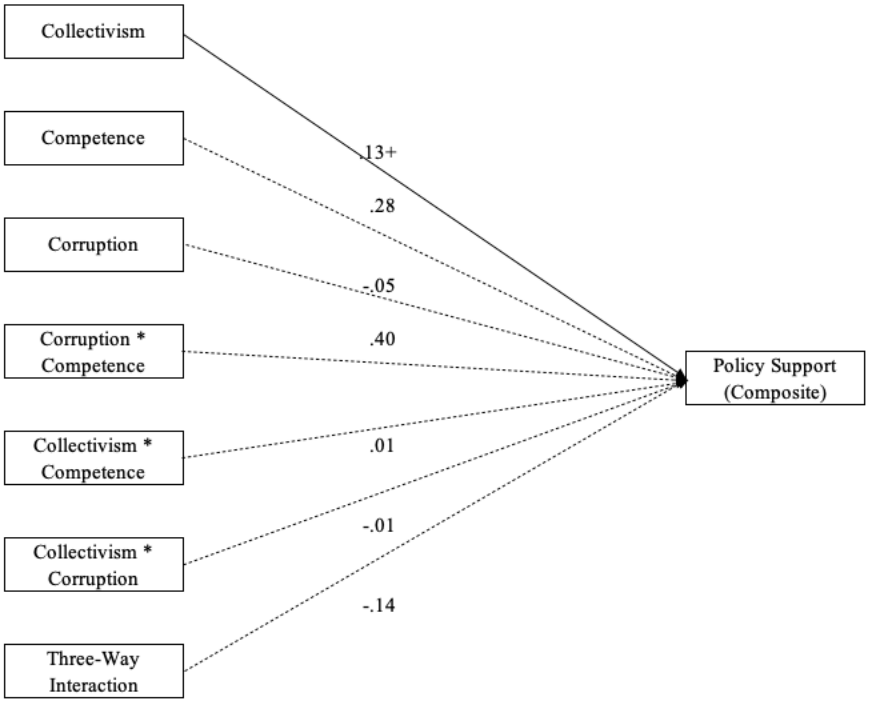

Figure 10. Multiple regressions between collectivism and government characteristics predicting policy support. Dotted lines indicated non-significant associations.

Table 15

*Study 4. Regression Coefficients for Collectivism*Competence*Corruption Predicting Policy Support*

	Variable	β	*SE* of β	*t*	*p*
Policy Support (Composite)	Intercept	3.58	.44	8.06	<.001
	Competence	.28	.49	.58	.57
	Corruption	-.05	.47	-.11	.91
	Collectivism	.13	.08	1.75	.08+
	Competence * Corruption	.40	.67	.61	.54
	Competence * Collectivism	.01	.11	.02	.98
	Corruption * Collectivism	-.01	.10	-.12	.91
	Competence * Corruption * Collectivism	-.14	.15	-.97	.33
Policy Support (Incentive)	Intercept	3.87	.45	8.55	<.001
	Competence	.10	.49	.19	.85
	Corruption	.18	.48	.38	.71
	Collectivism	.20	.08	2.49	.01**
	Competence * Corruption	.78	.67	1.14	.25
	Competence * Collectivism	.03	.11	.28	.78
	Corruption * Collectivism	-.09	.11	-.81	.42
	Competence * Corruption * Collectivism	-.19	.15	-1.26	.21
Policy Support (Tax)	Intercept	3.56	.56	6.36	<.001
	Competence	.27	.61	.45	.66
	Corruption	-.15	.59	-.25	.81
	Collectivism	.10	.10	1.01	.31
	Competence * Corruption	.23	.84	.28	.78
	Competence * Collectivism	.01	.14	.04	.97
	Corruption * Collectivism	-.01	.13	-.02	.99
	Competence * Corruption * Collectivism	-.12	.19	-.66	.51

Policy Support (Regulatory)	Intercept	3.36	.52	6.41	<.001
	Competence	.38	.58	.66	.51
	Corruption	-.16	.56	-.29	.77
	Collectivism	.11	.09	1.25	.21
	Competence * Corruption	.31	.79	.40	.69
	Competence * Collectivism	-.01	.13	-.07	.94
	Corruption * Collectivism	.05	.12	.40	.69
	Competence * Corruption * Collectivism	-.14	.18	-.80	.42

Across varying degrees of competence and corruption, the relationship between collectivism and policy support remained robust. Based on prior correlational evidence where trust in government was a key mediator that explained this robust relationship, a follow-up analysis was conducted to test whether collectivists just inherently have elevated trust in government. I conducted a regression analysis with collectivism as the predictor variable, controlling for government competence and corruption (i.e., no interaction-term), and demographic covariates (i.e., political ideology, individualism, age, income). Collectivism was positively associated with greater trust in government, $b = .14$, $SE = .04$, $p < .001$. Across varying levels of competence and corruption, more collectivistic participants were more likely to trust the government.

Study 4 Discussion

Study 4 manipulated government competence and corruption to test whether there is a causal role of government characteristics on policy support. Findings revealed mixed evidence for the ways government competence and corruption affect policy support. As hypothesized, high government competence marginally predicted higher support for climate change policies, compared to low government competence. Similarly, low government

corruption predicted higher support for climate change policies, compared to low government corruption. Research on public trust and policy support has often focused on competence as the core government characteristics. Yet, more often than not, people relied on their views of their government benevolence and integrity to inform their decisions on whether they wanted to support a public initiative. In line with prior evidence (Liu et al., 2020), Study 4 findings highlighted that a government's level of integrity may be an even more crucial factor in shaping people's attitudes, compared to the levels of competence. Future research should evaluate public trust in a more holistic manner and focus on improving people's views about a government's integrity.

A secondary objective of this study was to examine the moderating role of collectivism, and to test whether collectivists inherently trusted their governments more. While it was initially expected that collectivists would be more attuned to either or both government characteristics, findings revealed that the relationship between collectivism and policy support remained robust across varying levels of government competence and corruption. Follow up analyses suggested that this was possibly because high collectivists inherently placed greater trust in the government compared to low collectivists. In other words, people higher in collectivism support climate change policies in a hypothetical new country more than people lower in collectivism, across different levels of manipulated trust factors.

Although Study 4 strengthened the correlational findings through experimentally manipulating government characteristics, it was possible that the paradigm might not have successfully instilled a sense of realism when responding to the dependent variables. Participants were being tasked with imagining themselves moving to an unspecified new

country and hypothetically indicating their support for climate policies proposed by that country's government. While not specifying a country could mitigate some biases towards a particular country, this approach left a lot of room for ambiguity, as reflected in the findings. Despite statistical significance, the small effect size of competence and corruption on policy support suggested that participants' responses to the dependent variables may be more reflective of their personal views, rather than being influenced by the manipulation. As more countries develop and promote climate policies, future studies should examine people's attitudes for a more realistic evaluation of their support.

Chapter 3 Discussion

Correlational findings across all studies have demonstrated that collectivism was positively associated with willingness to make financial sacrifices to prevent environmental pollution (Study 2), and greater support for climate change policies (Studies 3 and 4), in part because they placed greater trust in government. Using a causal chain approach (Spencer et al., 2005), Study 4 manipulated government competence and corruption, and found that government corruption was a more integral factor in establishing public trust and informing people's attitudes, compared to government competence. Yet, despite varying degrees of government competence and corruption, the association between collectivism and policy support remained robust.

Across three studies with global and American samples, I used various approaches to assess culture orientation, including the two-item allocentrism-idiocentrism measure (Iglehart et al., 2014; Schwartz et al., 2005), categorizing participants based on their reported geographical regions (Kukrowski et al., 2023), and using individual-level culture orientation scales (Oyserman & Coon, 2002; Kim et al., 2014). I have also used multiple dependent

variables for pro-environmental intentions, including willingness to make financial sacrifices for environment (Iglehart et al., 2014) and climate policies that had different financial impact on individuals and households (Kukowski et al., 2023). The findings have consistently demonstrated the positive associations between collectivism and the targeted outcome variables; and this relationship remained robust even when the government, who was typically in charge of carrying out public initiatives, had (manipulated) varying degrees of competence and corruption.

Additionally, collectivism has been consistently associated with greater trust in government across different measures, including a single-item confidence in government question (Iglehart et al., 2014), single-item generalized trust in government question (Kukowski et al., 2023), and a validated trust in government scale (Grimmelikhuijsen & Knies, 2015). Although future research could examine factors that gave rise to collectivist's inherent trust in government, the consistent patterns highlighted the importance of considering the role of culture, an often overlooked individual characteristic, in the context of public trust and policy support. In practice, policymakers and politicians could also leverage collectivists' greater trust in government to garner support for climate initiatives. In the current climate where trust has been declining at a rapid rate (Pew, 2023), it is possible that instilling some sense of community, or reminding people of some collectivistic values, could negate some negative sentiment towards a government and increase public trust.

CHAPTER 4: HARNESSING COLLECTIVISM TO ADDRESS COLLECTIVE ACTION PROBLEMS

The present research investigated the influence of collectivism in addressing large-scale collective action problems, such as the COVID-19 pandemic and climate change crisis. Chapter 2 demonstrated that collectivism can be powerful in encouraging compliance with public health measures, even if these measures imposed some personal cost. Study 1 also provided initial insights about how different aspects of collectivism - other-orientation, susceptibility to social norms, and trust in government - can distinctly shape and explain how and why people engage in certain behaviors. Then, Chapter 3 generalized the findings to the context of climate change crisis, and further examined the relationship between collectivism, trust in government and climate change policy support. Findings from the three studies highlighted the robustness of collectivism and climate change policy support, and this relationship remained strong across varying levels of government competence and corruption. Although the latter parts of my dissertation focused on trust in government as a key psychological mechanism that predicts collective actions in the context of climate change crisis, the following section synthesized insights from the COVID-19 pandemic and climate change crisis to shed greater nuances of other-orientation and susceptibility to social norms could distinctly influence people's tendencies to engage in collective actions.

First, other-orientation did not significantly predict greater compliance with COVID-19 health preventative measures. When facing a common pathogen threat, the present way of measuring other-orientation, where participants were asked to prioritize their own (vs. community) health, was neither practical nor realistic. Along with the propositions that collectivists tend to make less distinctions between themselves and others (Hui & Triandis,

1986; Triandis, 1989), it was not meaningful to pit oneself and against their surrounding other. Therefore, it was likely that we did not observe an impact of other-orientation using the approach in the present research.

Second, the present research found some evidence supporting the mutual influence of personal and contextual factors on collectivists' susceptibility to social norms. More specifically, Study 1 suggested that collectivists complied to health preventative measures during COVID-19, in part because they perceived that more people in their community would engage in such behaviors. The mediating role of perceived social norms stemmed from collectivists' *personal* views and inferences about what others in their social context might be doing. In comparison, Study 2 suggested that collectivists in more collectivistic countries were more willing to make financial sacrifices for the environment. The interaction between *individual* cultural orientation (ie., allocentrism) and *contextual* cultural orientation (i.e., Global Collectivism Index, Pelham et al., 2022) was in line with the intersubjective norms perspective, where perhaps collectivists relied on *contextual* information to inform their *personal* behaviors and attitudes (Eom & Kim, 2015; Zou et al., 2009). For example, a collectivistic individual in a highly collectivistic society may be more sensitive to social norms towards certain issues. When deciding on whether to support climate change policies, more collectivistic individuals may rely on what they think other people's attitudes were, and align their attitudes accordingly. While future studies should keep examining the influence of personal and contextual influences of social norms, the present research demonstrated that social norms remained an important and powerful factor that shaped people's attitudes and behaviors, especially among collectivists (Eom et al., 2016; Sherman et al., 2022).

Third, the present study also revealed collectivists' inherent trust in government and

its role in shaping collectivists' attitudes and behaviors. When the targeted outcome was led by the government, collectivists tend to align their behaviors with government recommendations even when the targeted behaviors imposed personal costs, because they trusted the government more (Studies 1-3). This trust remained strong even when the government exhibited varying levels of competence and corruption (Study 4). The present study was one of the few that examined the joint influence of collectivism and trust in government on collective actions, future research should identify the psychological mechanisms that gave rise to collectivists' inherent trust in government, as it could potentially inform strategies to increase public trust among low collectivists.

Boundaries of Collectivism and Future Directions

There were a few boundaries to consider when using collectivism to address collective action problems. First, collectivists drew clearer distinctions between in-group and out-group members (Iyengar et al., 1999). While collectivists showed greater concern over the welfare of their in-group members, they showed less consideration than individualists do for the welfare of strangers, and may even exclude marginalized communities to a greater extent (Leung & Bond, 1984; Triandis, 1989). For example, in Japan, day laborers, who were often perceived as outsiders and were never fully accepted in the larger society, were excluded from health promotions practices and were denied of public support (Kawabata, 2013). Furthermore, the greater in-group favoritism among collectivists suggested that, if there was no accountability measure in place, corruption was more rampant and detrimental to group effort, especially when authorities were involved (Li et al., 2006). Thus, in the process of addressing collective action problems, it is even more important for leaders to consider potential members of society that they have left out, to highlight the benefit of

engaging in collective actions beyond the in-group members, and to keep leaders accountable among more collectivistic social contexts (Tsai et al., 2022).

Second, social norms were more difficult to establish in collectivistic societies, but once established, social changes take place much more rapidly (Muthukrishna & Schaller, 2020). Establishing a new norm face greater resistance among more collectivistic individuals, as they were less prone to change and preferred maintaining the status quo (Stamkou et al., 2019). Thus, to alter an existing behavior or introduce new behaviors, leaders and authorities have to put in more effort in the beginning before reaching the threshold where rapid changes take place.

Third, greater reliance on authority may not always be a positive thing. When there was too much dependence on a single entity to make decisions, poor decisions or inactions could backfire. For example, individuals within authoritarian states that prioritize economic interest over sustainability would less likely take actions when there is a lack of top-down influence from authorities (Beeson, 2018). Even if there were policies in place, poor formation and implementation vastly decrease its effectiveness (Gilley, 2012). For many collectivistic states, addressing a collective action problem largely depends on how much value their authorities place in them. If a problem is deemed unworthy, it is more unlikely that collective actions will take place. Even worse, if a problem is placed of high values but detrimental to society (e.g., wars), collectivists' allegiance to authorities can even bring in more devastating consequences.

Lastly, the dissertation did not regard individualism as useless or even detrimental in addressing collective action problems. Rather, the discussion referred specifically to collective action problems that imposed individual cost to yield collective benefits and

required group coordination and public compliance. In fact, individualism was more helpful when collective action problems involved creative solutions and greater risk (Goncalo & Stat, 2006; Stamkou et al., 2019); and collectivism could be more harmful when problem arise because of the greater interdependence among community members (Wei et al., 2023). More individualistic cultures led to more innovations and higher economic growth (Gorodnichenko & Roland, 2017). The record-breaking rapid development of COVID-19 vaccines, for example, was a great demonstration and fruitful result of individualistic societies' and individuals' greater emphasis on exploration, being unique and standing out. Divergent thinking, creative solutions, public compliance and cooperation were equally valuable when facing a large-scale collective action problem. Ideally, each country or group would be able to utilize their strengths and develop a well-rounded approach.

Nevertheless, the present research depicted a coherent story of collectivism in addressing large-scale collective action problems. Findings from all studies emphasized the importance of integrating cultural dimensions into strategies aimed at fostering collective engagement. Moving forward, future research could identify ways to evoke people's collectivistic orientation and develop more effective interventions and policies that resonate with a diverse population.

Closing Thoughts

Over the course of the years, there has been an increasing number of scholars and researchers that urge the need of considering culture influence when addressing collective action problems (e.g., van Bavel et al., 2020; Eom et al., 2019; Kitayama et al., 2022). Research has also identified distinct sociocultural determinants of collective actions (e.g., Eom et al., 2016; Sherman et al., 2022). The premise of my dissertation research stemmed

from a simple question that I had during the COVID-19 pandemic – why, despite having less resources, were collectivistic countries much more efficient in mobilizing the public that resulted in lower positive and mortality rates, compared to more individualistic countries? Upon theoretical review, I began to realize the overlapping characteristics of collective action problems and collectivism. This theorized relationship was put to the test through four empirical studies, and the findings remained consistent across different types of collective action problems, and different ways of operationalizing collectivism. Collectivism, on both the country- and individual-level has been consistently associated with increased likelihood of engaging in community-benefitting behaviors. Furthermore, my dissertation research identified several psychological mechanisms that explained these robust relationships. This dissertation has not only advanced our understanding of the intricate relationship between collectivism and collective action problems, but more importantly, holds the potential to inform practical solutions to advance our collective well-being by incorporating cultural influence to encourage actions that impose short-term personal sacrifices but have the potential for long-term collective benefits.

References

Allo, M. & Louriro, M. L. (2014). The role of social norms on preferences towards climate change policies: A meta-analysis. *Energy Policy, 73,* 563-574. https://doi.org/10.1016/j.enpol.2014.04.042

Bakhit, M., Krzyzaniak, N., Scott, A. M., Clark, J., Glasziou, P., & Del Mar, C. Downsides of face masks and possible mitigation strategies: A systematic review and meta-analysis. *BMJ Open, 11*(2), e044364. 10.1136/bmjopen-2020-044364.

Banai, I. P., Banai, B. & Miklousic, I. (2022). Beliefs in COVID-19 conspiracy theories, compliance with the preventative measures, and trust in government medical officials. *Current Psychology, 41*, 7448-7468. https://doi.org/10.1007/s12144-021-01898-y

Barcelo, H. & Capraro, V. (2015). Group size effect on cooperation in one-shot social dilemmas. *Scientific Reports, 5*, 7937. https://doi.org/10.1038/srep07937

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2021). lme4: Linear mixed-effects models using Eigen and S4. *R package version 1.1-27*. Retrieved from https://CRAN.R-project.org/package=lme4

Beeson, M. (2018). Coming to terms with the authoritarian alternative: The implications and motivations of China's environmental policies. *Asia & the Pacific Policy Studies*, *5*(1), 34–46. https://doi.org/10.1002/app5.217

Bochner, S. (1994). Cross-cultural differences in the self concept: A test of Hofstede's individualism/collectivism distinction. *Journal of Cross-Cultural Psychology*, *25*(2), 273–283. https://doi.org/10.1177/0022022194252007

Bond, R., & Smith, P. B. (1996). Culture and conformity: A meta-analysis of studies using

Asch's (1952b, 1956) line judgment task. *Psychological Bulletin*, *119*(1), 111–137.

Bonsall, D., & Fraser, C. (2020). Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. *Science*, *368*(6491). https://doi.org/10.1126/science.abb6936

Bornstein, G. (1992). The free-rider problem in intergroup conflicts over step-level and continuous public goods. *Journal of Personality and Social Psychology*, *62*(4), 10.

Brewer, M. B., & Kramer, R. M. (1986). Choice behavior in social dilemmas: Effects of social identity, group size, and decision framing. *Journal of Personality and Social Psychology, 50*(3), 543-549. https://doi.org/10.1037/0022-3514.50.3.543

Broom, M., Pattni, K., & Rychtar, J. (2019). Generalized social dilemmas: The evolution of cooperation in populations with variable group size. *Bulletin of Mathematical Biology, 81*, 4643-4674. https://doi.org/10.1007/s11538-018-00545-1

Capraro, V., & Barcelo, H. (2015). Group size effect on cooperation in one-shot social dilemmas II: Curvilinear effect. *PLOS ONE, 10*(9), e0138744. https://doi.org/10.1371/journal.pone.0138744

Capstick, S., Whitmarsh, L., Poortinga, W., Pidgeon, N., & Upham, P. (2015). International trends in public perceptions of climate change over the past quarter century. *WIREs Climate Change*, *6*(1), 35–61. https://doi.org/10.1002/wcc.321

CDC. (2020, February 11). *Coronavirus Disease 2019 (COVID-19)*. Centers for Disease Control and Prevention. https://www.cdc.gov/coronavirus/2019-ncov/index.html

CDC. (2020). Timing of state and territorial COVID-19 stay-at-home orders and changes in population movement - United States, March 1-May 31, 2020. *Morbidity and Mortality Weekly Report (MMWR), 69*(35), 1198-1203.

https://www.cdc.gov/mmwr/volumes/69/wr/mm6935a2.htm

Chan, H. W. & Tam, K. P. (2021). Exploring the association between climate change concern and mitigation behavior between societies: A person-context interaction approach. *Asian Journal of Social Psychology, 24*(2), 184-197. 10.1111/ajsp.12430

Chao, R. K., & Chao, R. K. (1994). Beyond parental control and authoritarian parenting style: Understanding Chinese parenting through the cultural notion of training. *Child Development*, *65*(4), 1111–1119. https://doi.org/10.2307/1131308

Chen, D., Peng, D., Rieger, M. O., & Wang, M. (2021). Institutional and cultural determinants of speed of government responses during COVID-19 pandemic. *Humanities and Social Sciences Communications*, *8*(1), 1–9. https://doi.org/10.1057/s41599-021-00844-4

Chiu, C.-Y., Gelfand, M. J., Yamagishi, T., Shteynberg, G., & Wan, C. (2010). Intersubjective culture: the role of intersubjective perceptions in cross-cultural research. *Perspectives on Psychological Science*, *5*(4), 482–493. https://doi.org/10.1177/1745691610375562

Cousins, S. D. (1989). Culture and self-perception in Japan and the United States. *Journal of Personality and Social Psychology*, *56*(1), 124–131. https://doi.org/10.1037/0022-3514.56.1.124

Dietz, T., Gardner, G. T., Gilligan, J., Stern, P. C., & Vandenbergh, M. P. (2009). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *PNAS, 106*(44), 18452-18456. https://doi.org/10.1073/pnas.0908738106

Drews, S. & van den Bergh, J. C. J. M. (2015). What explains public support for climate policies? A review of empirical and experimental studies. *Climate Policy, 16(7)*, 855-

876. https://doi.org/10.1080/14693062.2015.1058240

Edelman. (2024). *2024 Edelman Trust Barometer Global Report.* *https://www.edelman.com/trust/2024/trust-barometer*.

Eikenberry, S. E., Mancuso, M., Iboi, E., Phan, T., Eikenberry, K., Kuang, Y., Kostelich, E., & Gumel, A. B. (2020). To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic. *Infectious Disease Modeling, 5,* 293-308. https://doi.org/10.1016%2Fj.idm.2020.04.001

Eom, K., Kim, H. S., Sherman, D. K., & Ishii, K. (2016). Cultural variability in the link between environmental concern and support for environmental action. *Psychological Science*, *27*(10), 1331–1339. https://doi.org/10.1177/0956797616660078

Eom, K., Papadakis, V., Sherman, D. K., & Kim, H. S. (2019). The psychology of proenvironmental support: In search of global solutions for a global problem. *Current Directions in Psychological Science, 28*(5), 490-495. https://doi.org/10.1177/0963721419854099

Fairbrother, M. (2022). Public opinion about climate policies: A review and call for more studies of what people want. *PLOS Climate, 1*(5), e0000030. https://doi.org/10.1371/journal.pclm.0000030

Fairbrother, M., Johansson Sevä, I., & Kulin, J. (2019). Political trust and the relationship between climate change beliefs and support for fossil fuel taxes: Evidence from a survey of 23 European countries. *Global Environmental Change*, *59*, 102003. https://doi.org/10.1016/j.gloenvcha.2019.102003

Fekete, H., Kuramochi, T., Roelfsema, M., den Elzen, M., Forsell, N., Hohne, N., Luna, L., Hans, F., Sterl, F., Olivier, J., van Soest, H., Frank, S. & Gusti, M. (2021). A review

of successful climate change mitigation policies in major emitting economies and the potential of global replication. *Renewable and Sustainable Energy Reviews, 137*, 110602. https://doi.org/10.1016/j.rser.2020.110602

Ferretti, L., Wymant, C., Kendall, M., Zhao, L., Nurtay, A., Abeler-Dörner, L., Parker, M., Fincher, C. L., Thornhill, R., Murray, D. R., & Schaller, M. (2008). Pathogen prevalence predicts human cross-cultural variability in individualism/collectivism. *Proceedings of the Royal Society B: Biological Sciences*, *275*(1640), 1279–1285. https://doi.org/10.1098/rspb.2008.0094

Fontanet, A., & Cauchemez, S. (2020). COVID-19 herd immunity: Where are we? *Nature Reviews Immunology, 20*, 583-584. https://doi.org/10.1038/s41577-020-00451-5

Fu, A. S., & Markus, H. R. (2014). My mother and me: Why tiger mothers motivate Asian Americans but not European Americans. *Personality and Social Psychology Bulletin*, *40*(6), 739–749. https://doi.org/10.1177/0146167214524992

Gavrilets, S. (2015). Collective action problem in heterogeneous groups. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *370*(1683), 20150016. https://doi.org/10.1098/rstb.2015.0016

Geiger, N., Gore, A., Squire, C. V. & Attari, S. Z. (2021). Investigating similarities and differences in individual reactions to the COVID-19 pandemic and the climate crisis. *Climatic Change, 167*, 1. https://doi.org/10.1007/s10584-021-03143-8

Gelfand, M. J., Raver, J. L., Nishii, L., Leslie, L. M., Lun, J., Lim, B. C., Duan, L., Almaliach, A., Ang, S., Arnadottir, J., Aycan, Z., Boehnke, K., Boski, P., Cabecinhas, R., Chan, D., Chhokar, J., Ferrer, M., Fischlmayr, I. C., Fischer, R., … Yamaguchi, S. (2011). Differences between tight and loose cultures: A 33-nation study. *Science*,

332, 6.

Gilley, B. (2012). Authoritarian environmentalism and China's response to climate change. *Environmental Politics*, *21*(2), 287–307. https://doi.org/10.1080/09644016.2012.651904

Goncalo, J. A., & Staw, B. M. (2006). Individualism–collectivism and group creativity. *Organizational Behavior and Human Decision Processes*, *100*(1), 96–109. https://doi.org/10.1016/j.obhdp.2005.11.003

Gorodnichenko, Y., & Roland, G. (2017). Culture, institutions, and the wealth of nations. *The Review of Economics and Statistics*, *99*(3), 402–416. https://doi.org/10.1162/REST_a_00599

Grimmelikhuijsen, S. & Knies, E. (2015). Validating a scale for citizen trust in government organizations. *International Review of Administrative Sciences, 83*(3), 583-601. https://doi.org/10.1177/0020852315585950

Hagmann, D., Ho, E.H., & Loewenstein, G. (2019). Nudging out support for a carbon tax. *Nature Climate Change, 9*, 484-489. https://doi.org/10.1038/s41558-019-0474-0

Hamm, J. A., Smidt, C. & Mayer, R. C. (2019). Understanding the psychological nature and mechanisms of political trust. *PLOS One, 14*(5), e0215835. https://doi.org/10.1371/journal.pone.0215835

Hammar, H., & Jagers, S. C. (2006). Can trust in politicians explain individuals' support for climate policy? The case of CO2 tax. *Climate Policy, 5*(6), 613-625. https://doi.org/10.1080/14693062.2006.9685582

Hardin, G. (1968). The tragedy of the commons. *Science*, 162(3859), 1243-1248. 10.1126/science.162.3859.1243

Harring, N. (2013). Understanding the effects of corruption and political trust on willingness to make economic sacrifices for environmental protection in a cross-national perspective. *Social Science Quarterly*, *94*(3), 660–671. https://doi.org/10.1111/j.1540-6237.2012.00904.x

Harring, N., & Jagers, S. C. (2013). Should we trust in values? Explaining public support for pro-environmental taxes. *Sustainability, 5,* 210-227. doi:10.3390/su5010210

He, Y., Yatsuya, H., Ota, A., & Tabuchi, T. (2022). The association of public trust with the utilization of digital contact tracing for COVID-19 in Japan. *Public Health in Practice, 4*, 100279. https://doi.org/10.1016/j.puhip.2022.100279

Hofstede, G. (1980). Culture and organizations. *International Studies of Management & Organization*, *10*(4), 15–41. https://doi.org/10.1080/00208825.1980.11656300

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change*, *6*(6), 622–626. https://doi.org/10.1038/nclimate2943

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W. & Gupta, V. (2004). Culture, leadership and organizations: the GLOBE study of 62 societies. *Administrative Science Quarterly, 49*(4), 641-647. https://www.jstor.org/stable/4131493 https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html

Huang T., Leung, A. K. Y., Eom, K. & Tam, K. P. (2022). Important to me and my society: How culture influences the roles of personal values and perceived group values in environmental engagements via collectivistic orientation. *Journal of Environmental Psychology, 80*, 101774. https://doi.org/10.1016/j.jenvp.2022.101774

Hui, C. H., & Triandis, H. C. (1986). Individualism-collectivism: A study of cross-cultural researchers. *Journal of Cross-Cultural Psychology*, *17*(2), 225–248. https://doi.org/10.1177/0022002186017002006

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen. (2014). *World Values Survey: Round Five - Country-Pooled Datafile Version*. www.worldvaluessurvey.org/WVSDocumentationWV5.jsp.

International Social Survey Program (ISSP). (2020). *The International Social Survey Programme.* https://issp.org/

Isaac, R. M., Walker, J. M., & Williams, A. W. (1994). Group size and the voluntary provision of public goods: Experimental evidence utilizing large groups. *Journal of Public Economics, 54,* 1-36. https://doi.org/10.1016/0047-2727(94)90068-X

Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of Personality and Social Psychology*, *76*(3), 349–366.

Jagers, S. C., Harring, N., Löfgren, A., Sjöstedt, M., Alpizar, F., Brulde, B., Langste, D., Nilsson, A., Amroth, B. C., Dupont, S., & Steffen, W. (2020). On the preconditions for large-scale collective action. *Ambio, 49,* 1282-1296. https://doi.org/10.1007/s13280-019-01284-w

Kawabata, M. (2013). Is collectivism good for health promotion? Experiences of day labourers in Japan. *Global Health Promotion*, *20*(4), 44–51. https://doi.org/10.1177/1757975913503384

Kerr, N. L., & Kaufman-Gilliland, C. M. (1994). Communication, commitment, and

cooperation in social dilemmas. *Journal of Personality and Social Psychology, 66*(3), 513-529. https://doi.org/10.1037/0022-3514.66.3.513

Kim, H. S., Sherman, D. K., & Updegraff, J. A. (2016). Fear of Ebola: The influence of collectivism on xenophobic threat responses. *Psychological Science*, *27*(7), 935–944. https://doi.org/10.1177/0956797616642596

Kim, H., & Markus, H. R. (1999). Deviance or uniqueness, harmony, or conformity? A cultural analysis. *Journal of Personality and Social Psychology*, *77*(4), 785–800.

Kinias, Z., Kim, H. S., Hafenbrack, A. C., & Lee, J. J. (2014). Standing out as a signal to selfishness: Culture and devaluation of non-normative characteristics. *Organizational Behavior and Human Decision Processes*, *124*(2), 190–203. https://doi.org/10.1016/j.obhdp.2014.03.006

Kitayama, S., Camp, N. P., & Salvador, C. E. (2022). Culture and the COVID-19 pandemic: Multiple mechanisms and policy implications. *Social Issues and Policy Review, 16*(1), 164-211. 10.1111/sipr.12080.

Kitt, S., Axsen, J., Long, Z., & Rhodes, E. (2021). The role of trust in citizen acceptance of climate policy: Comparing perceptions of government competence, integrity, and value similarity. *Ecological Economics, 183*, 106958. https://doi.org/10.1016/j.ecolecon.2021.106958

Kukowski, C., Hoffman, W., Roozenbeek J., van der Linden, S., Vandengbergh, M. P. & Nielsen, K. S. (2023). The perceived feasibility of behavior change is positively associated with support for domain-matched climate policies. *OneEarth, 6*(11), 1554-1563. https://doi.org/10.1016/j.oneear.2023.10.017

Kulin, J., & Seva, I. J. (2021). Who do you trust? How trust in partial and impartial

government institutions influences climate policy attitudes. *Climate Policy, 21*(1), 33-46. https://doi.org/10.1080/14693062.2020.1792822

Kumar, R. (2021). Impact of societal culture on COVID-19 morbidity and mortality across countries. *Journal of Cross-Cultural Psychology*, 00220221211025100. https://doi.org/10.1177/00220221211025100

Leong, S., Eom, K., Ishii, K., Aichberger, M. C., Fetz, K., Muller, T. S., Kim, H. S. & Sherman, D. K. (2022). Individual costs and community benefits: Collectivism and individuals' compliance with public health interventions. *PLOS One, 17*(11), e0275388. https://doi.org/10.1371/journal.pone.0275388

Leonhardt, J. M., & Pezzuti, T. (2021). Vaccination acceptance across cultures: The role of collectivism, empathy, and homophily. *Journal of International Marketing, 30*(2), 13-27. https://doi.org/10.1177/1069031X211073179

Leung, K., & Bond, M. H. (1984). The impact of cultural collectivism on reward allocation. *Journal of Personality and Social Psychology*, *47*(4), 793–804. https://doi.org/10.1037/0022-3514.47.4.793

Li, S., Triandis, H. C., & Yu, Y. (2006). Cultural orientation and corruption. *Ethics & Behavior*, *16*(3), 199–215. https://doi.org/10.1207/s15327019eb1603_2

Lim, V. W., Lim, R. L., Tan, Y. R., Soh, A. S. E., Tan, M. X., Othman, N. B., Dickens, S. B., Thein, T., Lwin, M. O., Ong, R. T., Leo, Y., Lee, V., J., & Chen, M. I. C. (2021). Government trust, perceptions of COVID-19 and behavior change: cohort surveys, Singapore. *Bulletin of the World Health Organization, 99*(2), 92-101. 10.2471/BLT.20.269142

Liu, J., Shahab, Y., & Hoque, H. (2022). Government response measures and public trust

during the COVID-19 pandemic: Evidence from around the world. *British Journal of Management, 33*, 571-602. 10.1111/1467-8551.12577

Liu, L., Bouman, T., Perlaviciute, G. & Steg., L. (2020). Effects of competence- and integrity-based trust on public acceptability of renewable energy projects in China and in the Netherlands. *Journal of Environmental Psychology, 67*, 101390. https://doi.org/10.1016/j.jenvp.2020.101390

Lou, X., & Li, M. W. L. (2022). The mediating role of self-enhancement value on the relationship of power distance and individualism with pro-environmental attitudes: Evidence from multilevel mediation analysis with 52 societies. *Society for Cross-Cultural Research, 56*(5), 445-466. https://doi.org/10.1177/10693971221093122

Lu, J. G., Jin, P., & English, A. S. (2021). Collectivism predicts mask use during COVID-19. *Proceedings of the National Academy of Sciences*, *118*(23), e2021793118. https://doi.org/10.1073/pnas.2021793118

Maaravi, Y., Levy, A., Gur, T., Confino, D., & Segal, S. (2021). "The tragedy of the commons": How individualism and collectivism affected the spread of the covid-19 pandemic. *Frontiers in Public Health*, *0*. https://doi.org/10.3389/fpubh.2021.627559

Manson, J. H. (2020). Right-wing authoritarianism, left-wing authoritarianism, and pandemic mitigation authoritarianism. *Personality and individual differences, 167*, 110251. doi: 10.1016/j.paid.2020.110251

Manzanedo, R. D. & Manning, P. COVID-19: Lessons for the climate change emergency. *Science of the Total Environment, 742,* 140563. https://doi.org/10.1016/j.scitotenv.2020.140563

Markus, H., & Kitayama, S. (1991). Culture and the self: Implications for cognition,

emotion, and motivation. *Psychological Review*, *98*(2), 30.

Matsumoto, D., & Yoo, S. H. (2006). Toward a new generation of cross-cultural research. *Perspectives on Psychological Science*, *1*(3), 234–250. https://doi.org/10.1111/j.1745-6916.2006.00014.x

McEvily, B., & Tortoriello, M. (2011). Measuring trust in organizational research: Review and recommendations. *Journal of Trust Research, 1*(1), 23-63. https://doi.org/10.1080/21515581.2011.552424

Megnin-Viggars, O., Carter, P., Melendez-Torres, G. J., Weston, D., & Rubin, G. J. (2020). Facilitators and barriers to engagement with contact tracing during infectious disease outbreaks: A rapid review of the evidence. PloS one, 15(10), e0241473. https://doi.org/10.1371/journal.pone.0241473

Messick, D. M., Wilke, H., Brewer, M. B., Kramer, R. M., Zemke, P. E. & Lui, L. (1983). Individual adaptations and structural change as solutions to social dilemma. *Journal of Personality and Social Psychology, 44*(2), 294-309. https://doi.org/10.1037/0022-3514.44.2.294

Min, C., Shen, F., Yu, W., & Chu, Y. (2020). The relationship between government trust and preventative behaviors during the COVID-19 pandemic in China: Exploring the role of knowledge and negative emotion. *Preventative Medicine, 141,* 106288. *https://doi.org/10.1016/j.ypmed.2020.106288*

Morling, B., & Fiske, S. T. (1999). Defining and measuring harmony control. *Journal of Research in Personality*, *33*(4), 379–414. https://doi.org/10.1006/jrpe.1999.2254

Mullen, E., & Skitka, L. J. (2009). Comparing Americans' and Ukrainians' allocations of public assistance: The role of affective reactions in helping behavior. *Journal of*

Cross-Cultural Psychology, *40*(2), 301–318. https://doi.org/10.1177/0022022108328916

Murray, D. R., & Schaller, M. (2010). Historical prevalence of infectious disease within 230 geopolitical regions: A tool for investigating origins of culture. *Journal of Cross-Cultural Psychology, 41*(1), https://doi.org/99-108. 10.1177/0022022109349510

Muthukrishna, M., & Schaller, M. (2020). Are collectivistic cultures more prone to rapid transformation? computational models of cross-cultural differences, social network structure, dynamic social influence, and cultural change. *Personality and Social Psychology Review*, *24*(2), 103–120. https://doi.org/10.1177/1088868319855783

NASA. (2023, January 12). *NASA Says 2022 Fifth Warmest Year on Record, Warming Trends Continue.* NASA Global Climate Change. https://climate.nasa.gov/news/3246/nasa-says-2022-fifth-warmest-year-on-record-warming-trend-continues/#:~:text=Continuing%20the%20planet's%20long%2Dterm,GISS)%20in%20New%20York%20reported.

National Centers for Environmental Information (NCEI). (2023). *U.S. Billion-Dollar Weather and Climate Disasters.* https://www.ncei.noaa.gov/access/billions/

National Conference of State Legislatures. (2021, January 11). *COVID-19: Essential workers in the States.* Report. https://www.ncsl.org/labor-and-employment/covid-19-essential-workers-in-the-states

Noar, S. M. & Austin, L. (2020). (Mis)communication about COVID-19: Insights from health and crisis communication. *Health Communication, 35*(14), 1735-1739. https://doi.org/10.1080/10410236.2020.1838093

Oh, H., & Hong, J. H. (2012). Citizen's trust in government and their willingness-to-pay. *Economics Letters*, 115(3), 345-347. https://doi.org/10.1016/j.econlet.2011.12.010

Olson, Mancur. (1965). The logic of collective action: Public goods and the theory of groups / Mancur Olson, Jr. In *The logic of collective action: Public goods and the theory of groups*. Harvard University Press.

Ostrom, E. (1990). Collective action and the evolution of social norms. *The Journal of Economic Perspectives, 14*(3), 137-158. http://www.jstor.org/stable/2646923

Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, *128*(1), 3–72. https://doi.org/10.1037/0033-2909.128.1.3

Parboteeah, K. P., Addae, H. M. & Cullen, J. B. (2012). Propensity to support sustainability initiatives: A cross-national model. *Journal of Business Ethics, 105,* 403-413. 10.1007/s10551-011-0979-6

Pelham, B., Hardin, C., Murray, D., Shimizu, M., & Vandello, J. (2022). A truly global, non-WEIRD examination of collectivism: The Global Collectivism Index (GCI). *Current Research in Ecological and Social Psychology, 3*, 100030. https://doi.org/10.1016/j.cresp.2021.100030

Pew Research Center. (2015). *Beyond distrust: How Americans view their government*. https://www.pewresearch.org/wp-content/uploads/sites/4/2015/11/11-23-2015-Governance-release.pdf

Plans-Rubio, P. (2022). Percentages of vaccination coverage required to establish herd immunity against SAR-CoV-2. *Vaccines, 10*(5), 10050736. 10.3390/vaccines10050736

Poortinga, W., Latter, B., & Wang, S. (2022). Comparing coronavirus (COVID-19) and climate change perceptions: Implications for support for individual- and collective-level policies. *Frontiers in Psychology,* 13, 996546. https://doi.org/10.3389/fpsyg.2022.996546

R Core Team. (2021). *R: A language and environment for statistical computing.* R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/.

Rhodes, E., Axsen, J. & Jaccard, M. Exploring citizen support for different types of climate policy. (2017). *Ecological Economics, 137*, 56-69. http://dx.doi.org/10.1016/j.ecolecon.2017.02.027

Rieger, M. O. & Wang, M. (2022). Trust in government actions during the COVID-19 crisis. *Social Indicators Research, 159,* 967-989. https://doi.org/10.1007/s11205-021-02772-x

Riemer, K., Ciriello, R., Peter, S., & Schlagwein, D. (2020). Digital contact tracing adoption in the COVID-19 pandemic: IT governance for collective action at the societal level. *European Journal of Information Systems, 29*(6), 731-745. 10.1080/0960085X.2020.1819898

Rosseel Y (2012). "lavaan: An R Package for Structural Equation Modeling." *Journal of Statistical Software, 48*(2), 1–36. doi:10.18637/jss.v048.i02.

Sato, K. (1988). Trust and group size in social dilemma. *Japanese Psychological Research, 30*(2), 88-93.

Savani, K., Morris, M. W., & Naidu, N. V. R. (2012). Deference in Indians' decision making: Introjected goals or injunctive norms? *Journal of Personality and Social*

Psychology, *102*(4), 685–699. https://doi.org/10.1037/a0026415

Schwartz, S. H. (1990). Individualism-collectivism: Critique and proposed refinements. *Journal of Cross-Cultural Psychology*, *21*(2), 139–157. https://doi.org/10.1177/0022022190212001

Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture*, *2*(1). https://doi.org/10.9707/2307-0919.1116

Shanka, M. S., & Menebo, M. M. (2022). When and how trust in government leads to compliance with COVID-19 precautionary measures. *Journal of Business Research, 139*, 1275-1283. https://doi.org/10.1016/j.jbusres.2021.10.036

Sherman, D. K., Updegraff, J. A., Handy, M. S., Eom, K. & Kim, H. S. (2022). Beliefs and social norms as precursors of environmental support: The joint influence of collectivism and socioeconomic status. *Personality and Social Psychology Bulletin, 48*(3), 463-477. https://doi.org/10.1177/01461672211007252

Sotgiu, G., & Dobler, C. C. (2020). Social stigma in the time of coronavirus disease. *European*

Respiratory Journal, *56*(2), 2002461. https://doi.org/10.1183/13993003.02461-2020

Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology, 89*(6), 845–851. https://doi.org/10.1037/0022-3514.89.6.845

Stamkou, E., van Kleef, G. A., Homan, A. C., Gelfand, M. J., van de Vijver, F. J. R., van Egmond, M. C., Boer, D., Phiri, N., Ayub, N., Kinias, Z., Cantarero, K., Efrat Treister, D., Figueiredo, A., Hashimoto, H., Hofmann, E. B., Lima, R. P., & Lee, I.-C.

(2019). Cultural collectivism and tightness moderate responses to norm violators: Effects on power perception, moral emotions, and leader support. *Personality and Social Psychology Bulletin*, *45*(6), 947–964. https://doi.org/10.1177/0146167218802832

Tam, K. P. & Milfont, T. L. (2020). Towards cross-cultural environmental psychology: A state-of-the-art review and recommendations. *Journal of Environmental Psychology, 71*, 101474. https://doi.org/10.1016/j.jenvp.2020.101474

Tam, K. P., & Chan, H. W. (2017). Environmental concern has a weaker association with pro-environmental behavior in some societies than others: A cross-cultural psychology perspective. *Journal of Environmental Psychology, 53*, 213-223. 10.1016/j.jenvp.2017.09.001

Terwel, B. W., Harinck, F., Ellemers, N. & Daamen, D. D. L. (2009). Competence-based and integrity-based trust as predictors of acceptance of Carbon Dioxide capture and storage (CCS). *Risk Analysis, 29*(8), 1129-1140. https://doi.org/10.1111/j.1539-6924.2009.01256.x

Tetteh, J. N. A., Nguyen, V. K. & Hernandez-Vargas, E. A. (2021). Network models to evaluate vaccine strategies towards herd immunity in COVID-19. *Journal of Theoretical Biology, 531*, 110894. https://doi.org/10.1016/j.jtbi.2021.110894

The Washington Post. (2021, March 12). Hundreds of covid cases reported at Tesla plant following Musk's defiant reopening, county data shows. https://www.washingtonpost.com/technology/2021/03/12/hundreds-covid-cases-reported-tesla-plant-following-musks-defiant-reopening-county-data-shows/

The World Bank. (2023). *Carbon Pricing Dashboard.*

https://carbonpricingdashboard.worldbank.org/map_data

Thoni, C., & Volk, S. (2018). Conditional cooperation: Review and refinement. *Economics Letters, 171*(C), 37-40. 10.1016/j.econlet.2018.06.022

Travaglino, G. A., & Moon, C. (2021). Compliance and self-reporting during the COVID-19 pandemic: A cross-cultural study of trust and self-conscious emotions in the United States, Italy, and South Korea. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.565845

Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, *96*(3), 506–520.

Triandis, H. C. (1996). The psychological measurement of cultural syndromes. *American Psychologist*, *51*(4), 407–415. https://doi.org/10.1037/0003-066X.51.4.407

Tsai, C. G., & Pearson, A. R. (2022). Building diverse climate coalitions: The pitfalls and promise of equity-and identity-based messaging. *Translational Issues in Psychological Science, 8*(4), 518.

Tyler, T. R. & Degoey, P. (1995). Collective restraint in social dilemmas: Procedural justice and social identification effects on support for authorities. *Journal of Personality and Social Psychology, 69*(3), 482-497. https://doi.org/10.1037/0022-3514.69.3.482

Van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M…Willer, R. (2020). Using social and behavioral science to support COVID-19 pandemic response. *Nature Human Behavior, 4*, 460-471. https://www.nature.com/articles/s41562-020-0884-z

Van Lange, P. A. M., Joireman, J., Parks, C. D., & Van Dijk, E. The psychology of social dilemmas: A review. (2013). *Organizational Behavior and Human Decision*

Processes, 120(2), 124-141. https://doi.org/10.1016/j.obhdp.2012.11.003

Van Vugt, M., Jepson, S. F., Hart, C. M., & De Cremer, D. (2004). Autocratic leadership in social dilemmas: A threat to group stability. *Journal of Experimental Social Psychology, 40*(1), 1-13. https://doi.org/10.1016/S0022-1031(03)00061-1

Vandello, J. A. & Cohen, D. (1999). Patterns of individualism and collectivism across the United States. *Journal of Personality and Social Psychology, 77*(2), 279-292. https://doi.org/10.1037/0022-3514.77.2.279

Wang, Y., Ngien, A., & Ahmed, S. Nationwide adoption of digital contact tracing app: Examining the role of privacy concern, political trust, and technology literacy. *Communication Studies, 73*(4), 364-379. https://doi.org/10.1080/10510974.2022.2094982

Wei, X., Talhelm, T., Zhang, K., & Wang, F. (2023). When interdependence backfires: The Coronavirus infected three times more people in rice-farming areas during Chinese New Year. *Personality and Social Psychology Bulletin, https://doi.org/10.1177/01461672231174070*.

Whitelaw, S., Mamas, M. A., Topol, E., & Van Spall, H. G. C. (2020). Applications of digital technology in COVID-19 pandemic planning and response. *The Lancet Digital Health, 2*(8), E435-E440.

WRI. (2021, October 7). *Are countries providing enough to the $100 billion climate finance goal?* World Resources Institute. https://www.wri.org/insights/developed-countries-contributions-climate-finance-goal

Xiang, P., Zhang, H., Geng, L., Zhou, K., & Wu, Y. (2019). Individualist–Collectivist differences in climate change inaction: The role of perceived intractability. *Frontiers*

in Psychology, *10*, 187. https://doi.org/10.3389/fpsyg.2019.00187

Yamagishi, T. (1988). Seriousness of social dilemmas and the provision of a sanctioning system. *Social Psychology Quarterly, 51*(1), 32-42. https://doi.org/10.2307/2786982

Yamagishi, T. (1992). Group size and the provision of a sanctioning system in a social dilemma. In W. B. G. Liebrand, D. M. Messick, & H. A. M. Wilke (Eds.), *Social dilemmas: Theoretical issues and research findings* (pp. 267–287). Pergamon Press.

Yamaguchi, S., Kuhlman, D. M., & Sugimori, S. (1995). Personality correlates of allocentric tendencies in individualist and collectivist cultures. *Journal of Cross-Cultural Psychology*, *26*(6), 658–672. https://doi.org/10.1177/0022022195026006009

Zelmer, J. (2003). Linear public goods experiment: A meta-analysis. *Experimental Economics, 6,* 299-310. https://doi.org/10.1023/A:1026277420119

Zhang, Y., Abbas, M., & Iqbal, W. (2021). Analyzing sentiments and attitudes towards carbon

taxation in Europe, USA, South Africa, Canada, and Australia. *Sustainable Production and Consumption, 28*, 241-253. https://doi.org/10.1016/j.spc.2021.04.010

Zou, X., Tam, K.-P., Morris, M. W., Lee, S., Lau, I. Y.-M., & Chiu, C. (2009). Culture as common sense: Perceived consensus versus personal beliefs as mechanisms of cultural influence. *Journal of Personality and Social Psychology*, *97*(4), 579–597. https://doi.org/10.1037/a0016399