

Climate change, safety threat, and consumer food responses

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Abstract

Consumers today live under the menace of climate change. They respond to this menace based on the type of needs that climate change frustrates. Adopting a need frustration perspective, we investigate the needs climate change frustrates and the downstream self-protective responses consumers develop. Using a mixed-method approach, we find that climate change majorly frustrates immediate physiological and safety needs, posing an existential threat to consumers (Study 1). A higher existential threat activates flight responses (Study 2), especially when consumers perceive themselves as having a low impact on climate change (Study 3). Flight responses relating to emotions of fear and anxiety stimulate emotion regulation consumption (hedonic consumption) among consumers with low self-control (Study 4).

Keywords: *climate change threat; need frustration; flight responses.* **TRACK:** Consumer Behavior and Marketing Research

1) Introduction

Consumers today live under the menace of climate change (WHO, 2021). Previous studies in marketing (e.g., Egea & de Frutos, 2013) and environmental psychology (e.g., Wullenkord & Reese, 2021) show that consumers' exposure to information about climate change threat generates negative responses (e.g., anxiety, worry; Boluda-Verdu et al., 2022). However, these studies overlook to explore consumer responses to climate change from a need frustration perspective. This gap is unfortunate because consumers may engage in different responses depending on the type of need that climate change frustrates and the intensity of such frustration (e.g., Griskevicius & Kenrick, 2013).

In this study, we address this gap. Using a mixed-method approach, we first explore the need that climate change majorly frustrates using semi-structured interviews (Study 1). Next, with three online experimental studies with adult U.S. consumers, we investigate the predominant response that climate change's need frustration generates in consumers (Study 2), the boundary conditions for such a response to occur (Study 3), and the unintended downstream consumption effects that may negatively affect consumers' well-being (Study 4).

2) Conceptual Framework

2.1 *Climate change and consumers under threat*

Recent literature in consumer research and marketing focuses on consumer responses to external threats (Campbell et al., 2020), such as those posed by climate change and environmental disasters (e.g., Kemp et al., 2014; Liu et al., 2022). In this work, we focus on climate change as a source of need frustration. Need frustration is the most threatening deprivation that occurs when the fulfillment of a need is thwarted (Deci & Ryan, 2000). Climate change may frustrate a variety of needs (e.g. Swim et al., 2009). However, this literature is fragmented, and it focuses *a priori* on a specific need.

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The type of need that is majorly frustrated and the extent of such frustration may activate diverse consumer responses (Griskevicius & Kenrick, 2013). We opt for a mixed method to offer a more complete picture of the phenomenon under study and produce robust findings (Davis et al., 2011).

2.2 Study 1 – Exploring the needs climate change frustrates

In Study 1, we conducted a qualitative study based on in-depth interviews to explore: (a) the needs that climate change majorly frustrates, (b) the resulting consumer responses, and (c) the implications for consumption. We adopted a convenience sampling procedure to select respondents. We collected the data in Italy until theoretical saturation was met; 40 participants took part in the study. Participants ranged from 19 to 63 years old, 55% were female and 45% were male. The in-depth interviews lasted approximately 1 hour. We recorded and transcribed all interviews. Data analysis followed a thematic approach, where we identified the key themes using a coding process (King & Horrocks, 2010). We asked two independent expert coders to confirm the coding results. The “agreement ratio” proved to be satisfactory (89%). The insights gained from the qualitative study, combined with prior literature, provided the basis for developing a conceptual model and related research hypotheses, which we report in Figure 1.

3) Hypotheses Development

The majority of participants perceived climate change as a source of frustration of self-protection needs, an existential threat from which they want to flee. They felt fearful and anxious: «I imagine climate change as a lion that instills fear and anxiety to me. I'm a gazelle that needs to escape» (Interviewee 10). When there is an existential threat, specific flight responses – more than fight or freeze ones - work synergically to protect people against it (Neuberg et al., 2012). Formally:

H1: Existential threat posed by climate change generates flight response.

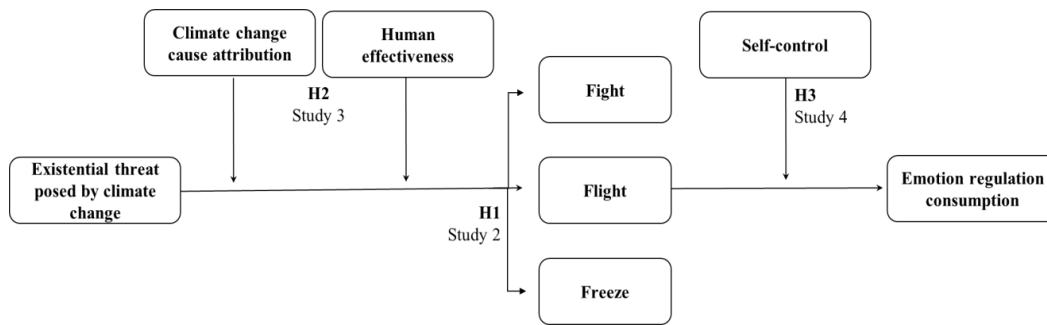
Human effectiveness is the degree of belief in human's ability to resolve a problem (e.g., Alzubaidi et al., 2021). Low human effectiveness may lead consumers to flee the threat instead of dealing with it (van Zomeren et al., 2010). Prior research also shows that consumers' attribution of the primary cause of climate change (natural vs. man-made) may influence how they respond to it (e.g., Swim et al., 2009). Because nature-made climate change is beyond human will, consumers may feel that flight is the only way to respond successfully to danger. Formally:

H2: The effect of existential threat posed by climate change on flight response is moderated by human effectiveness and the attributed cause of climate change. Consumers exhibit higher levels of flight response when human effectiveness is low (vs. high) (H2a), and when they attribute the cause of climate change to natural's actions (vs. man actions) (H2b).

When feeling flight-related negative emotions (e.g., fear and anxiety), individuals with low self-control may turn to hedonic consumption to regulate them (Kemp & Kopp, 2011). The lack of ability to override emotions and response tendencies may increase the pursuit of short-term sources of pleasure as hedonic consumption (Tice et al., 2001): «When my attempts to avoid falling into fear and anxiety fail, sweet and fatty foods become my refuge. I strive to resist, but it makes me feel better» (Interviewee 28). Formally:

H3: Flight response leads to emotion regulation consumption, as increased hedonic consumption, amongst consumers with low self-control.

Figure 1. Conceptual model and hypothesis tested in each study



4) Overview of studies

To test our predictions, we conducted three online experimental studies, recruiting adult U.S. respondents through Prolific. Study 2 tests H1, as we determine that increasing levels of existential threat posed by climate change (no vs. moderate vs. high) enhance flight response. We also show that such existential threat stimulates flight responses more than fight or freeze responses. In Study 3, we keep climate change’s existential threat high and constant and test H2. We determine whether the magnitude of flight response varies depending on the attributed cause of climate change (natural vs. man-made) and human effectiveness in tackling climate change (low vs. high). With Study 4, we test H3. We determine whether flight-related emotions of fear and anxiety induced by climate change’s existential threat generate emotion regulation consumption that enhances hedonic consumption among consumers with low self-control. In Studies 1 and 2, age, gender, educational level, race, economic status, economic status during childhood, green self-identity, and newspaper article credibility served as covariates. In Study 3, we also controlled for participants’ levels of hunger.

4.1 Study 2

Study 2 tests the hypothesis that higher levels of existential threat posed by climate change generate flight responses (more than fight or freeze responses) (H1).

Participants and study design. We recruited 282 participants (49.3% women, 49.3% men, 1.4% other; $M_{age} = 39.16$ years, $SD = 14.55$) from Prolific to take part in a 7-minute study.

Procedure. All respondents read a fictitious newspaper article about climate change (Uenal et al., 2021). We manipulated the severity of the existential threat posed by climate change (existential threat: no vs. moderate vs. high) and randomly assigned participants to one of the three conditions. A pretest of the stimuli ($N = 150$) showed a significant difference in climate change threat levels across the three conditions. Next, participants rated their *flight* response (five-item, 7-point Likert scale, e.g., “I am willing to escape,” 1 = “strongly disagree,” 7 = “strongly agree”), *fight* response (four-item, 7-point Likert scale, e.g., “I am ready to fight,” 1 = “strongly disagree,” 7 = “strongly agree”), *freeze* response (four-item, 7-point Likert scale, e.g., “I am detached,” 1 = “strongly disagree,” 7 = “strongly agree”; all adapted from Maack et al., 2015). Also, they rated the credibility of the newspaper article, green self-identity, and provided demographic information (age, gender, education, race, economic status, and economic status during childhood).

Manipulation checks and preliminary analysis. The manipulation of climate change’s existential threat was successful. Respondents perceived the three conditions as significantly different in terms of perceived threat ($F(2, 279) = 9.91, p < .01$). Planned contrasts with Bonferroni correction confirmed that respondents in the high threat condition perceive climate change as more threatening ($M_{high} = 4.68$) than those in the moderate condition ($M_{moderate} = 3.85, p = .02$) and no threat condition ($M_{no} = 3.14, p < .01$). Finally, the results of exploratory factor analysis (EFA) with Principal Component Analysis (PCA) and Promax rotation on the response items revealed the occurrence of three dimensions (total variance extracted = 83.24%) mirroring the three hypothesized responses, *flight* ($M = 3.16; SD = 1.98; \alpha = .98$), *fight* ($M = 2.38; SD = 1.52; \alpha = .93$), and *freeze* ($M = 1.96; SD = 1.18; \alpha = .84$).

Direct effects. To test the effect of existential threat posed by climate change on *flight*, *fight*, and *freeze* responses, we applied a multivariate analysis of covariance (MANCOVA) to the between-subjects design with three levels (existential threat: 0 = no; 1 = moderate; 2 = high), with respondents' age, gender, education, race, economic status, economic status during childhood, green self-identity, and newspaper article credibility as covariates. We found a significant multivariate effect (Wilks' $\lambda = .95$, $F(6, 540) = 538$, $p = .03$). Subsequent univariate analysis revealed that the level of existential threat posed by climate change has a significant effect on flight response ($F(2, 271) = 5.95$, $p < .01$), along with a significant effect of age ($F(1, 271) = 4.16$, $p = .04$), green self-identity ($F(1, 271) = 50.42$, $p < .01$), and newspaper article credibility ($F(1, 271) = 11.04$, $p < .01$). Planned contrasts with Bonferroni correction further confirmed that a high existential threat increases flight response more ($M_{high} = 4.05$) than a moderate existential threat ($M_{moderate} = 2.45$, $p < .01$) or no existential threat ($M_{no} = 2.54$, $p = .03$). Notably, the effects of moderate and no existential threats on flight response do not differ significantly ($p = 1.00$). Conversely, climate change existential threat has no significant influence on either *fight* response ($F(2, 271) = 1.36$, $p = .26$) or *freeze* response ($F(2, 271) = 7.87$, $p = .77$). Overall, the results of Study 2 support H1: Higher levels of existential threat posed by climate change increase *flight* responses more than moderate and no threats; the effects of moderate threat and no threat on flight response do not differ. Levels of climate change's existential threat influence neither fight nor freeze responses.

4.2 Study 3

Study 3 focuses on *flight* response. It tests the hypothesis that the interplay between the attributed cause of climate change (natural vs. man-made) and the effectiveness of human actions in tackling climate change (low vs. high) moderates the effects of climate change's existential threat on flight response (H2).

Participants and study design. We recruited 460 paid participants (50.0% women, 48.9% men, 1.1% other; $M_{age} = 39.2$ years, $SD = 14.55$) from Prolific to take part in an 8-minute study. We randomly assigned them to a 2 (climate change cause: natural vs. man-made) \times 2 (human effectiveness: low vs. high) between-subjects design. The existential threat posed by climate change is high and constant in this study.

Procedure. All respondents read a fictitious newspaper article about climate change. We manipulated the cause of climate change (natural vs. man-made) by showcasing interviews with specialists with opposing perspectives, and human effectiveness by showing interviews with specialists supporting low (vs. high) human effectiveness in limiting climate change. We randomly assigned respondents to one of the four conditions. A pretest of the stimuli ($N = 200$) confirmed that the four conditions differed in terms of climate change's cause attribution and perceived human effectiveness. After reading the stimuli, participants in each condition rated their *flight* response, newspaper article credibility, and green self-identity, and provided socio-demographic data, all measured as in Study 2.

Manipulation checks. Manipulations were successful. Respondents in the man-made condition attributed climate change to human actions ($M_{man-made} = 6.80$) more than those in the natural condition ($M_{natural} = 2.89$, $t(458) = -39.84$, $p < .01$). Respondents in the high effectiveness condition rated higher levels of human effectiveness in limiting climate change ($M_{high\ effect} = 6.62$) than those in low effectiveness condition ($M_{low\ effect} = 1.46$; $t(458) = -57.63$, $p < .01$). Conversely, as intended, the severity of the existential threat posed by climate change did not differ across conditions (cause attribution: $p = .42$; human effectiveness: $p = .96$).

Conditional direct effects. We tested the predictions using a between-subjects ANCOVA with flight response as the dependent variable, climate change's cause attribution (0 = natural; 1 = man-made) and human effectiveness (0 = low; 1 = high) as the fixed factors. Age, gender, education, race, economic status, economic status during childhood, green self-identity, and newspaper article credibility served as covariates. The results showed that the climate change's cause attribution \times human effectiveness interaction is not significant ($F(1, 448) = .27$, $p = .64$). We found no significant

main effect of climate change's cause attribution ($F(1, 448) = .02, p = .89$), such that respondents in the natural condition ($M_{\text{natural}} = 3.83$) and those in the man-made condition ($M_{\text{human}} = 3.99$) exhibited no significantly different flight response levels. Conversely, we found a significant main effect of human effectiveness ($F(1, 448) = 31.14, p < .01$); respondents in the low human effectiveness condition reported significantly higher levels of flight response ($M_{\text{loweffect}} = 4.16$) than those in high human effectiveness condition ($M_{\text{higheffect}} = 3.67$). These effects arise along with significant effects of age ($F(1, 448) = 16.11, p < .01$), gender ($F(1, 448) = 7.01, p < .01$), educational level ($F(1, 448) = 4.56, p = .03$), green self-identity ($F(1, 448) = 59.84, p < .01$), and newspaper article credibility ($F(1, 448) = 39.33, p < .01$), partially supporting H2. Overall, the findings of Study 2 define important boundary conditions to the influence of existential threat posed by climate change on *flight* response. Consumers exhibit higher *flight* responses when they perceive they have no impact on tackling climate change, regardless of its primary cause.

4.3 Study 4

Study 4 investigates the downstream effects of *flight* response induced by climate change existential threat. It tests the hypothesis that such an existential threat generates a flight response that favours emotion regulation consumption (hedonic consumption) amongst consumers with low self-control (H3).

Participants and study design. We recruited 299 paid participants (47.8% women, 49.5% men, 2.7% other; $M_{\text{age}} = 40.0$ years, $SD = 15.17$) from Prolific to take part in an 8-minute study. We randomly assigned them to a 2 (human effectiveness: low vs. high) between- subjects design. They inferred the cause of climate change, while the climate change existential threat was high and constant.

Procedure. First, all participants provided the demographic data, green self-identity, self-control (three-item scale, e.g., "People would say that I have iron self-discipline," adapted from Tangney et al., 2004), and their hunger state ("How hungry are you right now?", 1 = "not at all," 7 = "very much"). A short unrelated task followed. Next, all respondents read a fictitious newspaper article about climate change. We manipulated human effectiveness in tackling climate change as in Study 3. After reading the stimuli, to measure hedonic consumption, we exposed participants to a picture of a box of sixteen chocolate pralines and asked them to show the number of pralines from ("0" to "16") they would have eaten at that moment. Next, we measured participants' *flight* response by referring to the related emotions of fear (four-item, 7-point Likert scale, e.g., "I am fearful," 1 = "not at all," 7 = "very much"; adapted from Xie et al., 2015) and anxiety (four-item, 7-point Likert scale, e.g., "I am nervous," 1 = "not at all," 7 = "very much"; adapted from Kemp et al., 2014). Finally, they rated the newspaper article credibility and were debriefed.

Manipulation checks and preliminary analysis. Manipulations were successful. Participants in the high human effectiveness condition rated higher levels of perceived human effectiveness ($M_{\text{high effect}} = 6.37$) than those in the low effectiveness condition ($M_{\text{low effect}} = 1.59, t(297) = -33.04, p < .01$). Conversely, as intended, (a) the severity of the existential threat posed by climate change was not significantly different across conditions ($M_{\text{low effect}} = 5.73, M_{\text{high effect}} = 5.89, t(297) = -.88, p = .38$), and (b) the attributed cause of climate change did not vary across conditions ($M_{\text{low effect}} = 5.50, M_{\text{high effect}} = 5.64, t(297) = -.75, p = .45$). Finally, results of an EFA with PCA and Promax rotation on the measurement items of fear and anxiety revealed the occurrence of one construct "fear/anxiety" that we averaged (Total variance extracted = 85.36%; $M = 4.39, SD = 1.75; \alpha = .98$) (Kemp et al., 2014).

Conditional direct and indirect effects. To test H3, we first used an ANCOVA to see the effect of human effectiveness on fear/anxiety. Age, gender, education, race, economic status, economic status during childhood, green self-identity, and newspaper article credibility served as covariates. The results suggested that human effectiveness significantly influences fear/anxiety ($F(1, 289) = 10.47, p < .01$). Respondents in the low human effectiveness condition reported significantly higher levels of fear/anxiety ($M_{\text{loweffect}} = 4.71$) than those in high human effectiveness condition ($M_{\text{higheffect}} =$

4.08). These effects arise along with significant effects of economic status ($F(1, 289) = 3.91, p = .04$), green self-identity ($F(1, 289) = 34.83, p < .01$), and newspaper article credibility ($F(1, 289) = 33.40, p < .01$). Similarly, we used a between-subjects ANCOVA with the number of selected chocolate pralines as the dependent variable and human effectiveness as the fixed factor. Age, gender, education, race, economic status, economic status during childhood, green self-identity, newspaper article credibility, and hunger state served as covariates. The results showed that human effectiveness significantly influences the number of selected chocolate pralines ($F(1, 289) = 4.05, p = .04$). Respondents in the low human effectiveness condition selected a significantly higher number of chocolate pralines ($M_{loweffect} = 3.62$) than those in high human effectiveness condition ($M_{higheffect} = 3.08$). These effects arise along with significant effects of educational level ($F(1, 289) = 4.54, p = .03$) and hunger state ($F(1, 289) = 22.32, p < .01$). Finally, to assess the hypothesized moderated mediation model, we used Hayes (2018) PROCESS model 14 with confidence intervals (CI) and 10,000 bootstrap iterations, in which human effectiveness (0 = low, 1 = high) was the independent variable, fear/anxiety the mediator, the number of selected chocolate pralines the dependent variable, and self-control the moderator of the path between fear/anxiety and chocolate praline consumption. Age, gender, education, race, economic status, economic status during childhood, green self-identity, newspaper article credibility, and hunger state served as covariates. The results showed that self-control moderates the effect of fear/anxiety on hedonic product consumption (Int. Coeff. = $-.16, p < .01$). For low levels of self-control (bindirect = $-.22, 95\% \text{ CI: } -.46 \text{ to } -.05$), the indirect effect of human effectiveness on hedonic product consumption is significant. For medium levels and high levels of self-control, the indirect effects are not significant (self-control medium: bindirect = $-.07, 95\% \text{ CI: } -.22 \text{ to } .02$; self-control high: bindirect = $.07, 95\% \text{ CI: } -.07 \text{ to } .21$). Overall, Study 4 results support H3. High existential threat induced by climate change, accompanied by low human effectiveness, increases flight emotional response of fear/anxiety. Enhanced fear/anxiety thus leads to hedonic consumption among consumers with low self-control.

5) General discussion

Understanding how consumers respond to the biggest threat of climate change has the crucial twofold aim of combating climate change and regulating consumers' well-being. Using a mixed-method approach, we find that climate change majorly poses an existential threat to consumers (Study 1). A higher existential threat activates flight responses (Study 2), especially when consumers perceive themselves as having a low impact on climate change (Study 3). Flight responses relating to emotions of fear and anxiety stimulate emotion regulation consumption (hedonic consumption) among consumers with low self-control (Study 4). The findings of our study make three main theoretical contributions. First, we contribute to climate change research from a need-frustration perspective. Empirical evidence shows that climate change may frustrate different needs (e.g., IPCC, 2023; Swim et al., 2009), though this research is fragmented and focuses a priori on a specific need. Conversely, we first conduct a qualitative study to explore all needs that climate change may frustrate and understand the need that climate change frustrates the most. We show that climate change poses an existential threat thwarting consumers' self-protection (safety) needs. Acquiring this knowledge is crucial because it sheds light on how consumers respond to climate change and why. Second, we show that the existential threat posed by climate change triggers flight-related emotions. This effect is stronger when consumers perceive they have low effectiveness in tackling climate change. Third, we contribute to climate change, consumer behavior, and emotion regulation research by showing that climate change existential threat can cause an increase in hedonic consumption. This is the first demonstration of such an effect. The research can inform official communication about climate change for policymakers and practitioners. Our research shows that consumers have a more intense flight response when human efficacy is low. If policymakers provide consumers with the tools and support to understand how their efforts can help mitigate climate change, they might be less inclined to experience escalating feelings of fear and anxiety (Kemp et al., 2021). Furthermore, we found that

participants with low self-control engaged in increased hedonic consumption to manage the felt emotions of fear and anxiety. Official communication may consider enlightening consumers about the reasons behind their consumption and then promoting healthier choices (e.g., meditation), which reduce hedonic consumption's side effects (Kemp & Kopp, 2011) and refocus their attention on solving climate change.

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