

**The Health Belief Model as an
Explanatory Framework for Climate Change Cultivation Effects**

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Introduction:

Climate change has had severe impacts on human and natural systems in a variety of modes. Large-scale, inter-disciplinary reports, such as the Intergovernmental Panel on Climate Change (IPCC) and the National Climate Assessment (NCA) have directly attributed the unequivocal warming of the Earth's climate system to human influences (IPCC, 2014). This warming will continue to create new risks and influence existing risks for natural and human systems. One such set of risks is the adverse effects climate change poses on health, such as increased ozone exposure, wildfires, and temperature extremes. These risks are especially omnipresent among those with a lower socioeconomic status (Melillo et al., 2014) and can be seen as a potentially efficacious communication strategy when attempting to curb health disparities associated with climate change. Unfortunately, communication-oriented research linking climate change to human health and well-being is extremely limited and this is especially the case within the domain of mass media effects. This area of study is particularly important because the general public's understanding of climate change and attitudes towards pro-environmental behavior is largely informed by what they see on television.

Drawing upon Cultivation Theory (Gerbner & Gross, 1976), the first aim of this study is to examine the effect of television viewing on participants' climate change risk estimates and intentions. We take a genre-specific approach to cultivation, focusing on the effect of television shows related to the environment, nature, weather, and climate change. We hypothesize that exposure will positively predict perceptions regarding the percentage of people worldwide that have been personally affected by hurricanes, wildfires, and other natural events linked to climate change (H1). We also predict that television exposure will positively predict intentions to engage in pro-environmental behaviors (H2).

The second aim of this study is to identify mechanisms of the cultivation effect. In doing so, we use the Health Belief Model as an explanatory framework (HBM; Becker, 1974; Champion & Skinner, 2008; Rosenstock, 1974). According to this model, behavior is largely determined by four primary constructs -- severity, susceptibility, benefits, and barriers. Perceived severity is defined as an individual's belief regarding the seriousness of consequences associated with a particular health issue. Perceived susceptibility is defined as the degree to which an individual believes he or she is vulnerable to the condition. Perceived benefits are the positive aspects of engaging in a recommended behavior. The fourth construct -- perceived barriers -- relates to obstacles that impede behavior change.

The HBM has been applied to a variety of health communication contexts, including nutrition (Feldman & Mayhew, 1984; Orji et al., 2012), bicycle helmet use (Quine et al., 2000), smoking habits (Knight & Hay, 1989), colonoscopy screening (Frank et al., 2003), and vaccination (Chen et al., 2011; De Wit et al. 2005). Despite the promise of severity, susceptibility, benefits, and barriers as determinants of environmental behavior, applications of the HBM in this domain are few and far between. Lindsay and Strathman (1997) provided early support for the HBM constructs in the context of recycling behaviors, although perceived benefits was not a significant

predictor. A subsequent attempt to connect the HBM to climate change (Semenza et al., 2011) demonstrated that voluntary mitigation was dependent on perceived severity and susceptibility. In the present study, we hypothesize that participants' pro-environmental intentions will be negatively associated with perceived barriers but positively associated with benefits, severity, and susceptibility (H3a through H3d). We further predict that these four constructs will mediate the relationship between television exposure and behavioral intentions (H4a through H4d).

Method:

Participants ($N=571$) were recruited in November 2014 from a large public university in the United States. Their average age was 19 ($SD=1.15$). Participants first reported how often they watched television shows related to the environment, nature, weather, and climate change using a 7-point scale ranging from never to very often ($M=2.18$, $SD=1.21$). The four constructs of the HBM were then measured using items from prior research, adapted to climate change. Finally, participants responded to an 8-item scale assessing their estimates of climate change risks. They were specifically asked to guess the percentage of people worldwide that have been affected by the following eight events: hurricanes, flooding/sea-level rise, poor air quality, extreme heat, droughts, wildfires, melting ice, and ocean acidification. Responses were averaged to form a composite ($M=34.6$, $SD=17.4$; $\alpha=.91$). Finally, participants reported their intentions to engage in eight pro-environmental behaviors related to energy consumption, recycling, consumer purchasing, and voting for environmentally-friendly politicians ($M=3.69$, $SD=.58$; $\alpha=.92$).

Results & Conclusions:

Providing support for H1, a Pearson correlation revealed that television viewing positively predicted estimates of the percentage of people affected by climate change ($r=.16$, $p<.001$). In support of H2, television viewing positively predicted behavioral intentions ($r=.21$, $p<.001$). Although small, these effects are similar in size to others reported in the cultivation literature. Future work might explore moderators of the cultivation effect, such as political ideology or environmental attitudes. Regression was used to test H3 and H4. Benefits ($\beta=.37$, $p<.001$) and severity ($\beta=.23$, $p<.05$) significantly predicted intentions, however, susceptibility ($\beta=.06$, $p=.56$) and barriers ($\beta=.05$, $p=.42$) did not. The HBM explained approximately 44% of the variance in intentions. To examine whether any of the constructs mediated the cultivation effect, we performed a parallel mediation analysis using Hayes' (2013) PROCESS macro for SPSS. A total of 5000 bootstrap samples were generated, producing bias-corrected and accelerated 95% confidence intervals for assessing the significance of the four hypothesized indirect effects. Mirroring the previous analysis, benefits ($\beta=.03$; 95% BCa CI = .011 to .058) and severity ($\beta=.03$; 95% BCa CI = .014 to .058) mediated the cultivation effect but susceptibility and barriers did not. Overall, our findings provide mixed support for the HBM. In other studies, susceptibility and barriers are often shown to be the two most important predictors, but our data suggest the opposite may be true in an environmental context. Future studies should attempt to replicate our findings and examine why susceptibility and barriers failed to predict intentions and mediate the cultivation effect.

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