



# Climate change risk perceptions and household-level adaptive capacity of citizens in an inland city in North Carolina



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## Introduction

The level of perceived threat due to climate change is low in the United States. There exists research bias in the vulnerability and climate change perceptions literature to study areas and peoples with a higher level of threat, such as coastal cities or agricultural communities. The perceptions of those living in inland cities is under researched. It is important to understand the public's perceptions of climate change as it can impede or accelerate the translation of policy. It is also important to understand adaptive capacity at the household level as household-scale decisions can affect sustainability and overall vulnerability of a population. This study investigated the climate change perceptions of an inland city in North Carolina in order to identify predictors of threat perception, climate change knowledge, and location based threat perceptions. We also created a scale used to measure adaptive capacity and investigate the underlying constructs of adaptive capacity.

## Methods

A door-to-door paper survey was administered all over Raleigh, NC (n=200) in the summer of 2015. Households were evenly stratified across five social vulnerability classes found in Cutter et al.'s 2006-2010 SOVI data set. The adaptive capacity questions were created utilizing the sustainable livelihoods framework and the following capitals: social, human, physical, and financial.

## Data Analysis

Binary logistic regressions were performed for the following response variables; climate change knowledge, overall threat perception, personal threat perception, and location-based hazards. The following predictor variables were used: age, race, income, education, gender, and past experience with natural disasters. Variables with low item-total correlations for the adaptive capacity scale were removed and a PCA was performed. Cronbach's alpha was found for the overall scale as well as the underlying constructs.

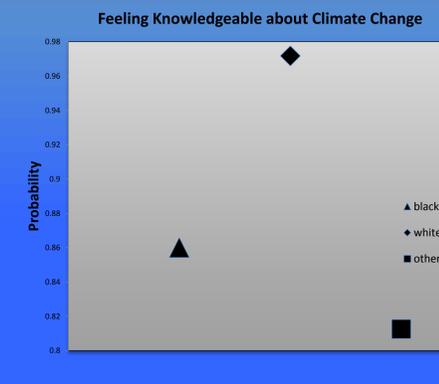
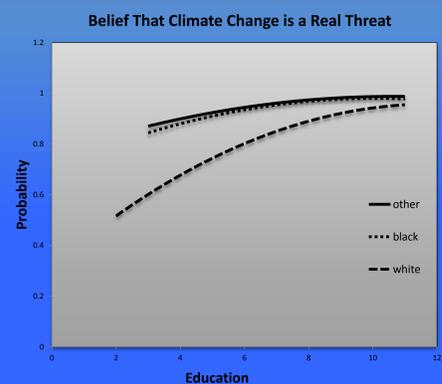
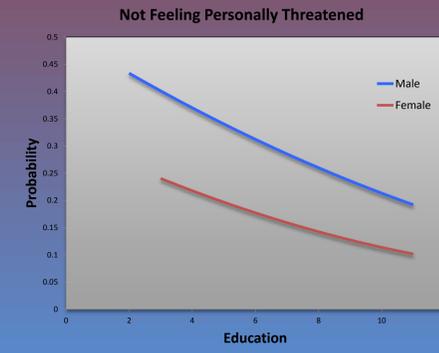
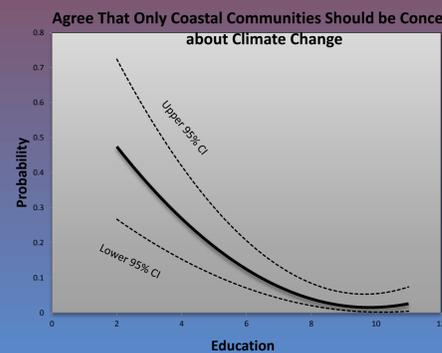
## Results

- 76% of respondents reported that climate change is a real threat
- 80% reported feeling knowledgeable about climate change
- 64% reported that climate change will affect them personally
- 85% felt that non-coastal communities should be concerned about climate effects
- The overall adaptive capacity scale was comprised of 14 questions with high item-total correlations ( $\geq 0.4$ ) positive loadings on the first component, and a Cronbach alpha score of 0.83. The underlying constructs were comprised of the first 3 principal components with loadings  $\geq 0.3$ .

Table 1. Odds Ratios from BIC Selected Models

	Climate change is NOT a real threat (Disagree)threat	I feel Knowledgeable about Climate Change (Agree)	I do not believe I will be PERSONALLY affected by climate change (Disagree)	Only those living on the coast have to worry about climate change effects (Agree)
Age	—	—	—	—
Education	<b>+1.404</b>	—	-0.879	<b>-0.591</b>
Income	—	—	—	—
Gender F vs M	—	—	-0.474	—
Race Other vs Black	+1.211	-0.705	—	—
Race White vs Black	-0.281	<b>+5.589</b>	—	—
Experience with natural disasters	—	—	—	—

\*Bold odds ratios confidence intervals do not have equal odds, and the signs symbolize the direction of the estimates



## Underlying Constructs of Adaptive Capacity

Constructs	Cronbach's Alpha	Question
Financial Capital	0.76	How confident are you that you have the ability to receive a formal loan? (e.g. bank)
		How confident are you that you can always find a source of income when you need it?
		How confident are you that you have the means (e.g. transportation, lodging, money) to temporarily leave the city?
		How confident are you in your financial ability to move if you needed to?
Political Awareness	0.92	How politically aware do you feel of your STATE government?
		How politically aware do you feel of your LOCAL government?
Access to Resources	0.60	How confident are you that you have access to transportation whenever you need it?
		How confident are you that you have access to affordable healthcare?
		How confident are you that you have the ability to receive a formal loan? (e.g. bank)
		How confident are you that you have all the emergency supplies you would need for 72 hours after an emergency?
		How confident are you that you would have access to all your basic goods and services if your primary means of transportation were not available?

## Conclusion

The majority of respondents in Raleigh, NC reported believing that climate change is a real threat. We found education and race to be the strongest predictors of location based threat perception and climate change knowledge, respectively. This study did not find experience with hazards to predict personal threat perception. This result is contrary to similar studies conducted in more at risk geographical locations. The principal components analysis illustrated that the underlying constructs of adaptive capacity are financial capital, awareness of politics, and confidence in the ability to access and gather resources. These results can inform local policy decisions in Raleigh, NC by illustrating a potential for support of climate change mitigation. The measurement of household level adaptive capacity can also help guide local mitigation efforts, particularly in cities of similar composition as Raleigh, NC.

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