



How do drought news, emotions, and restrictions influence patterns of water consumption? The case of Cape Town and the Day Zero crisis

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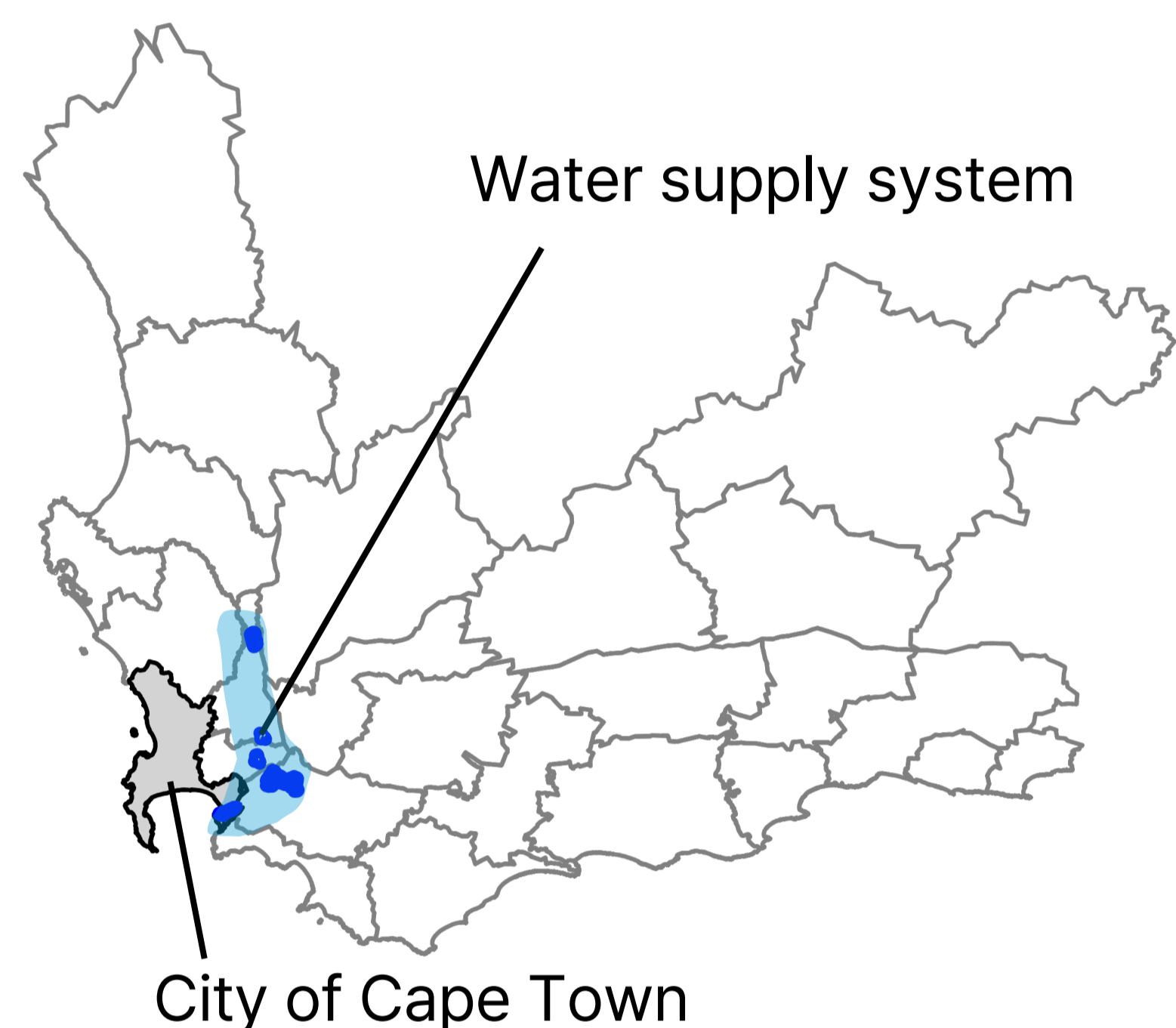


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1. Introduction

South Africa



Background: Anthropogenic droughts are shaped by human water consumption, in turn influenced by water restrictions and public awareness.

Case study: The 2018 Cape Town "Day Zero" crisis, threatened to shut off water supplies to nearly 4 million residents.

We develop a sociohydrological model to investigate how social dynamics interact with anthropogenic drought in Cape Town, South Africa.

1. How do water-use restrictions and emotional narratives in drought-related news media influence the Cape Town water crisis?

2. What is the role the interactions between water shortages, public awareness, and water consumption behavior play in the dynamics?

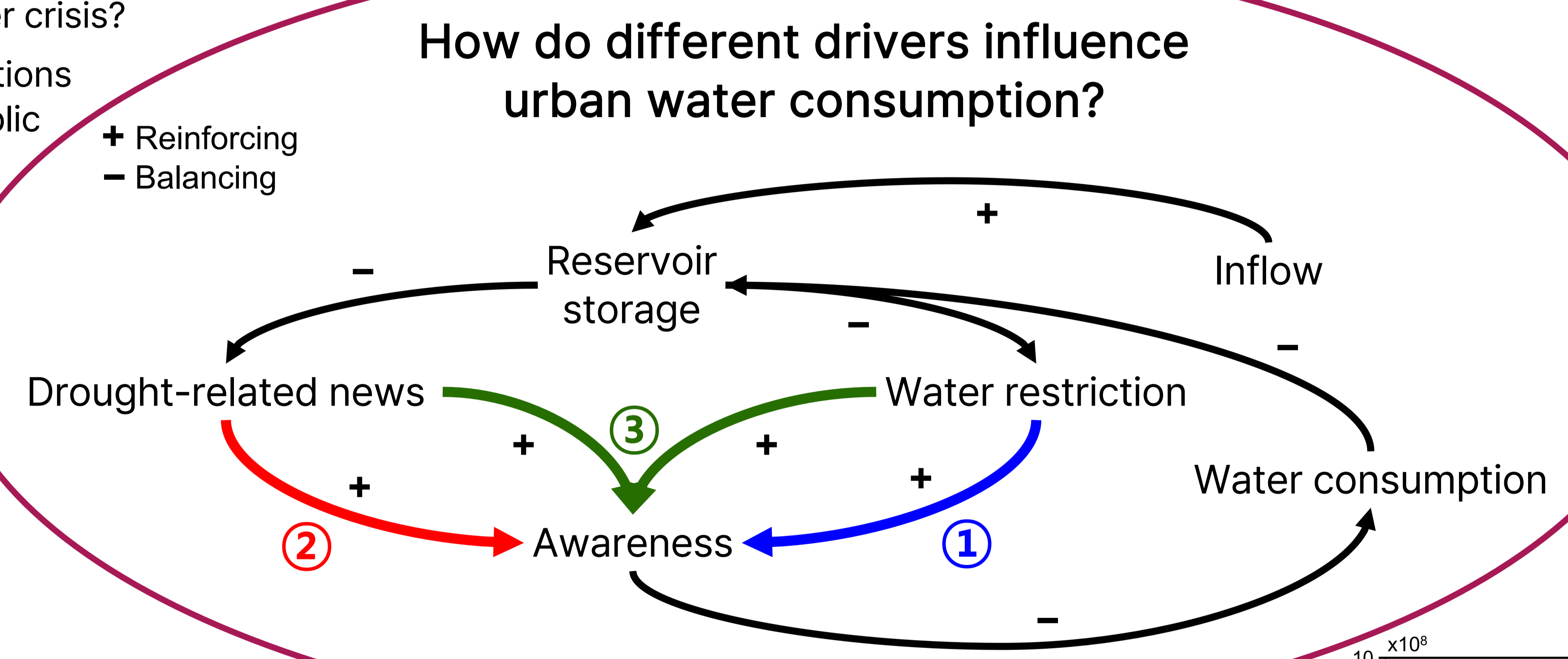
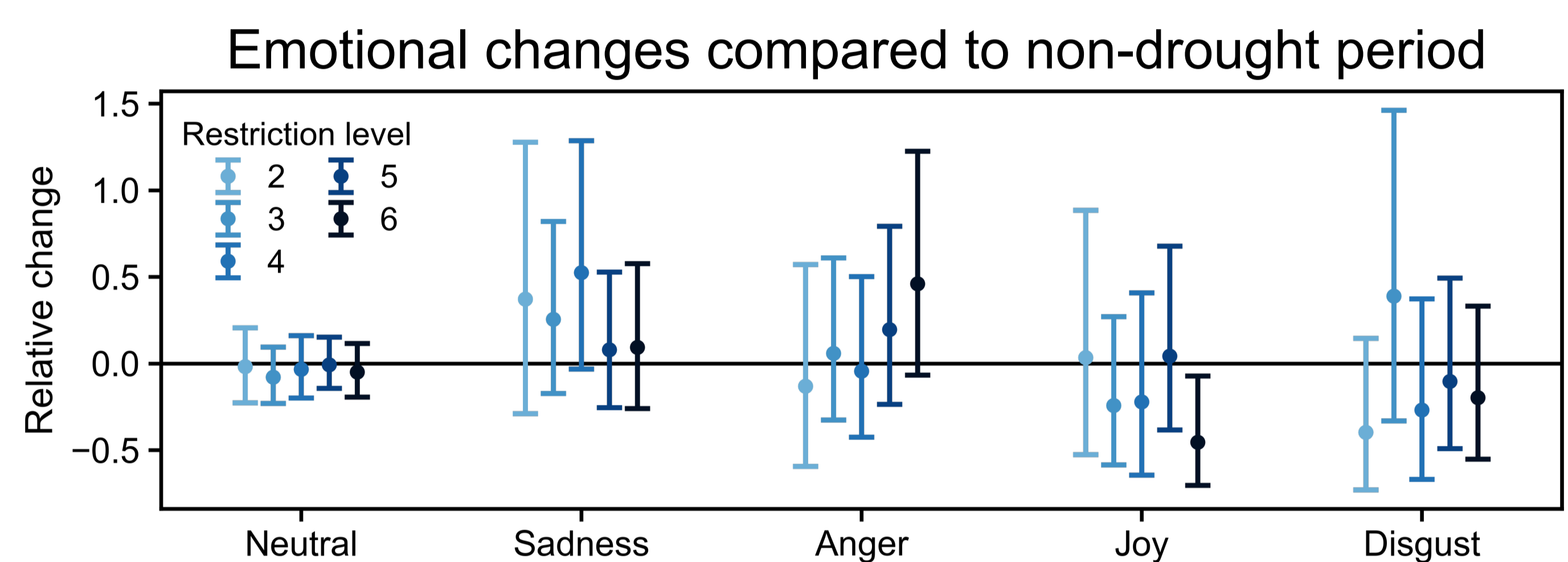
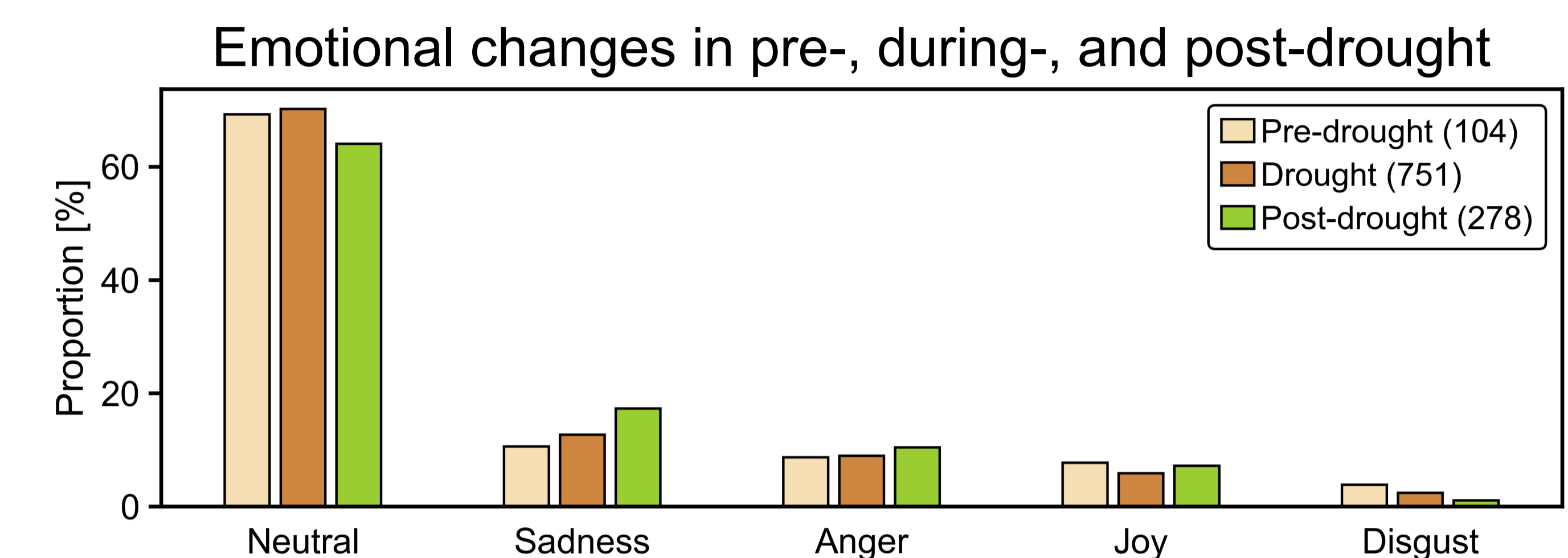
3. Results: Emotional changes

Emotions in drought-related news

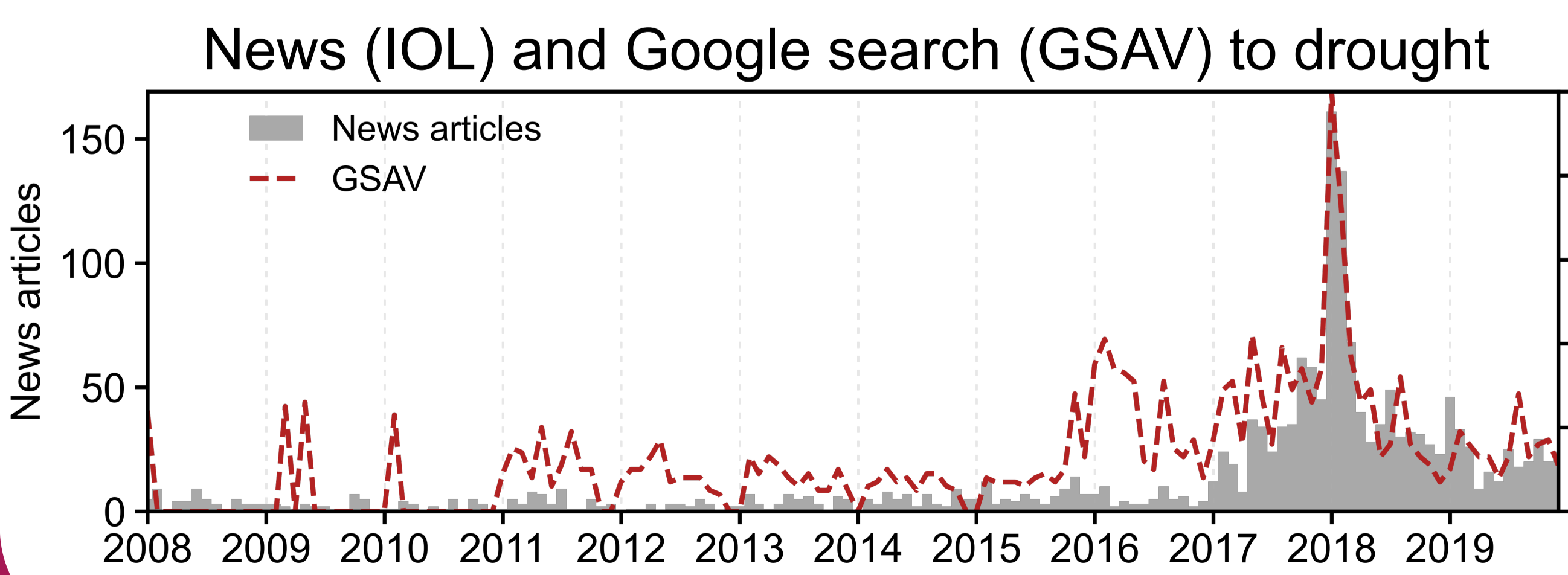
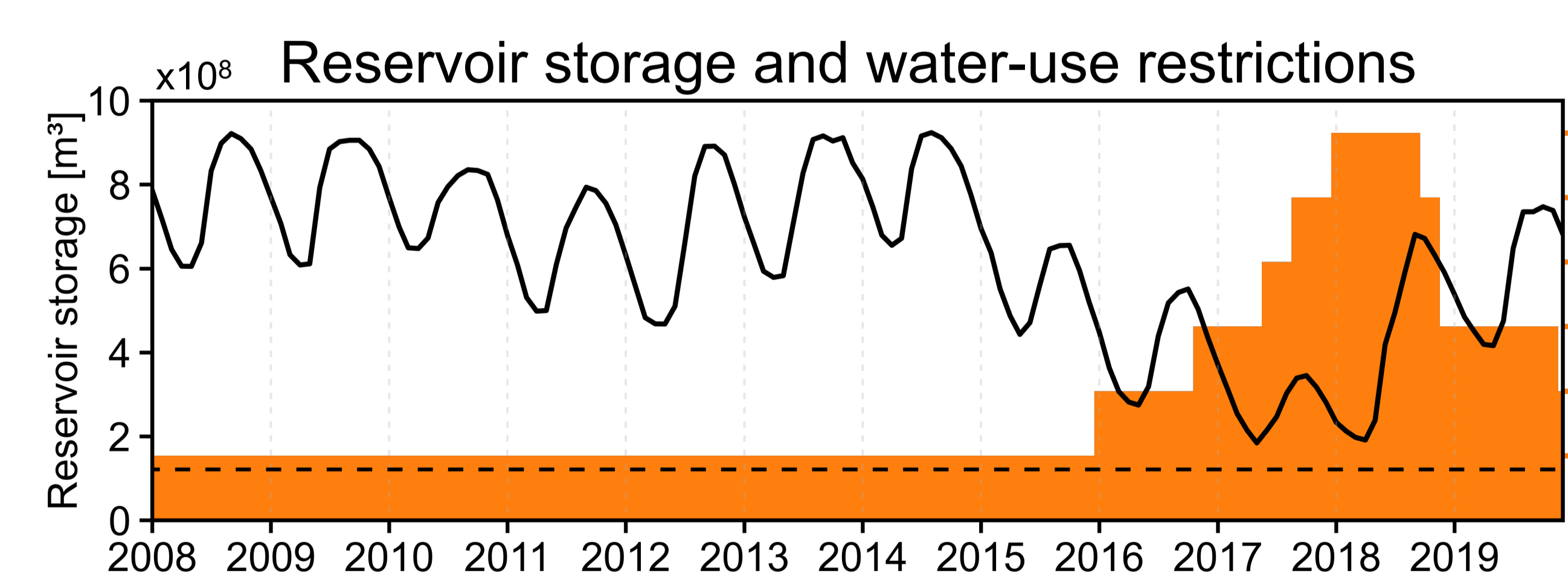
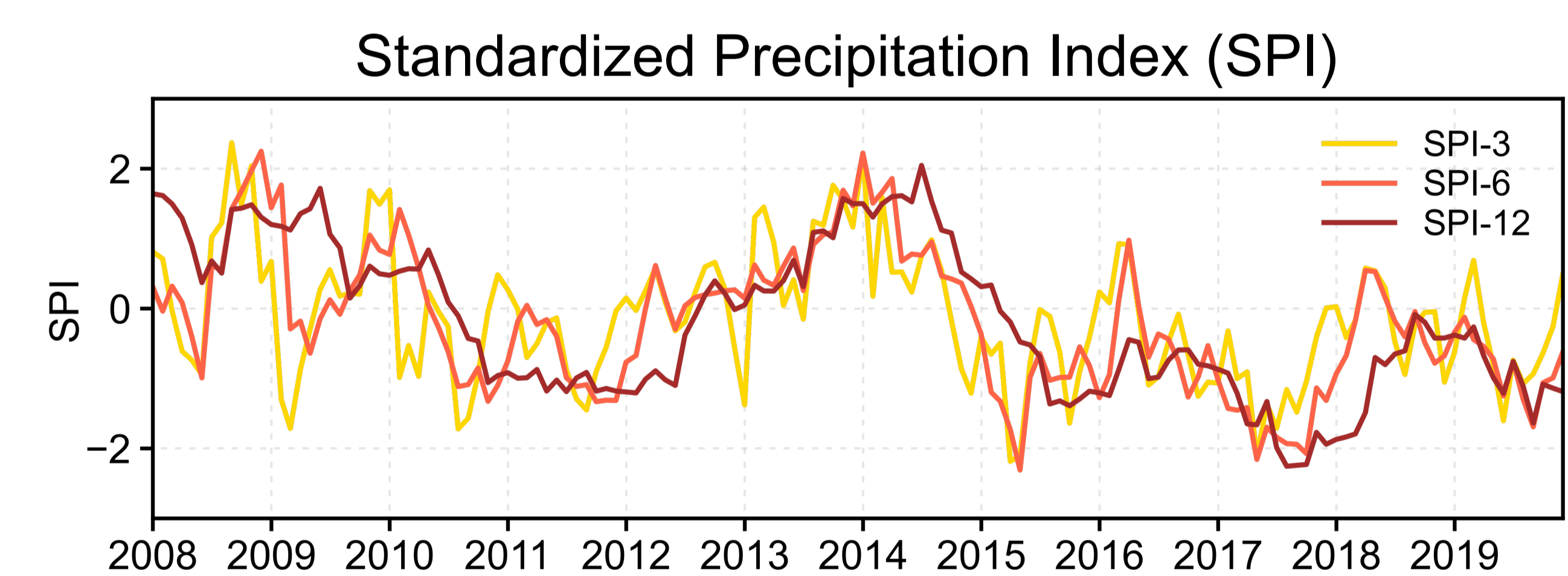
Neutral > Sadness > Anger

From Sadness to Anger

Emotion responses intensify as water-use restrictions become more severe.



2. Data and Methods



AI-based emotion classification

A DistilRoBERTa-based model¹ fine-tuned to classify emotions into 7 categories:

Anger, Sadness, Disgust, Fear, Joy, Surprise, and Neutral.

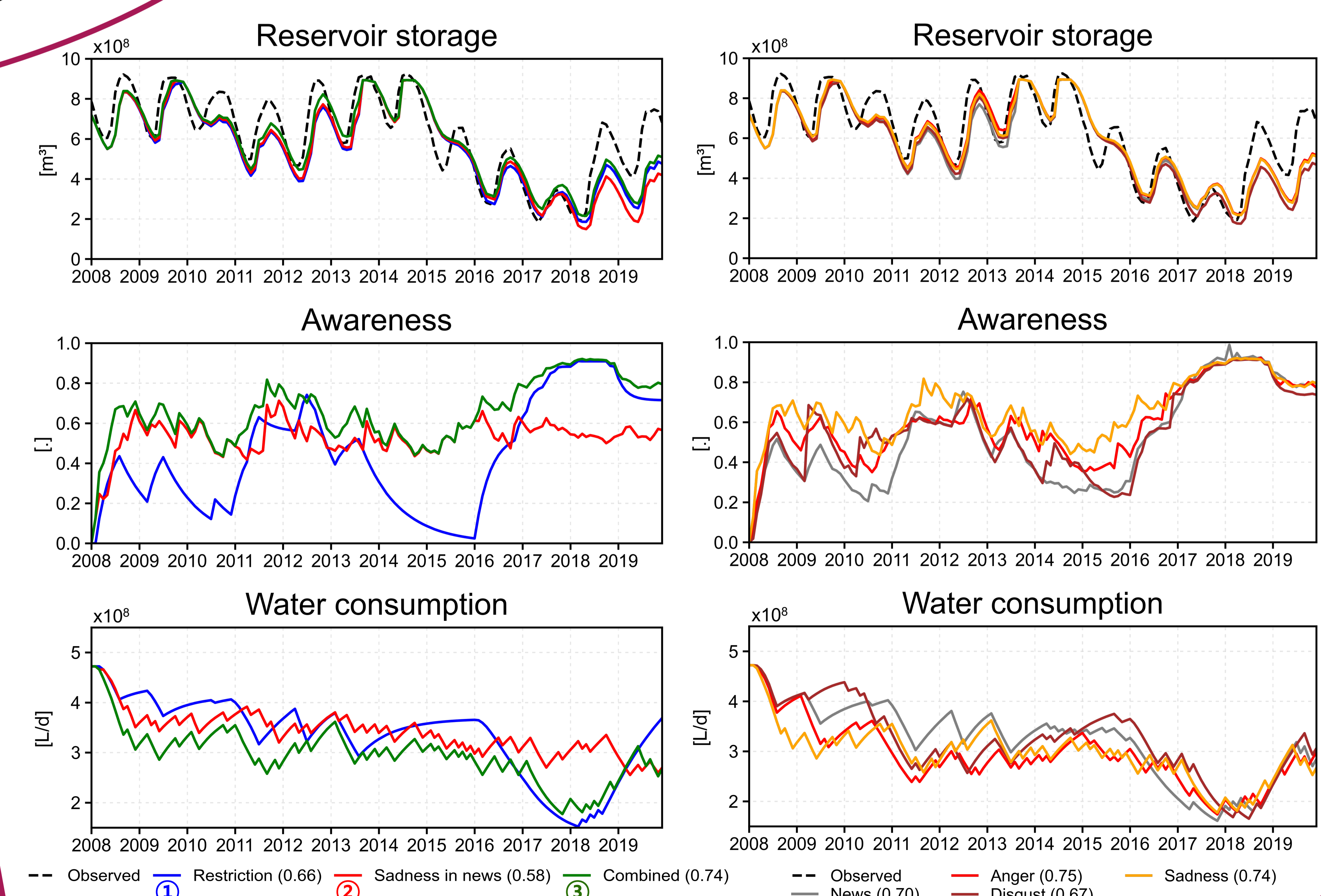
Example) Department points finger at City over high water tariffs as anger rises

Anger	0.98
Sadness	0
Disgust	0.01
Fear	0
Joy	0
Surprise	0
Neutral	0.01

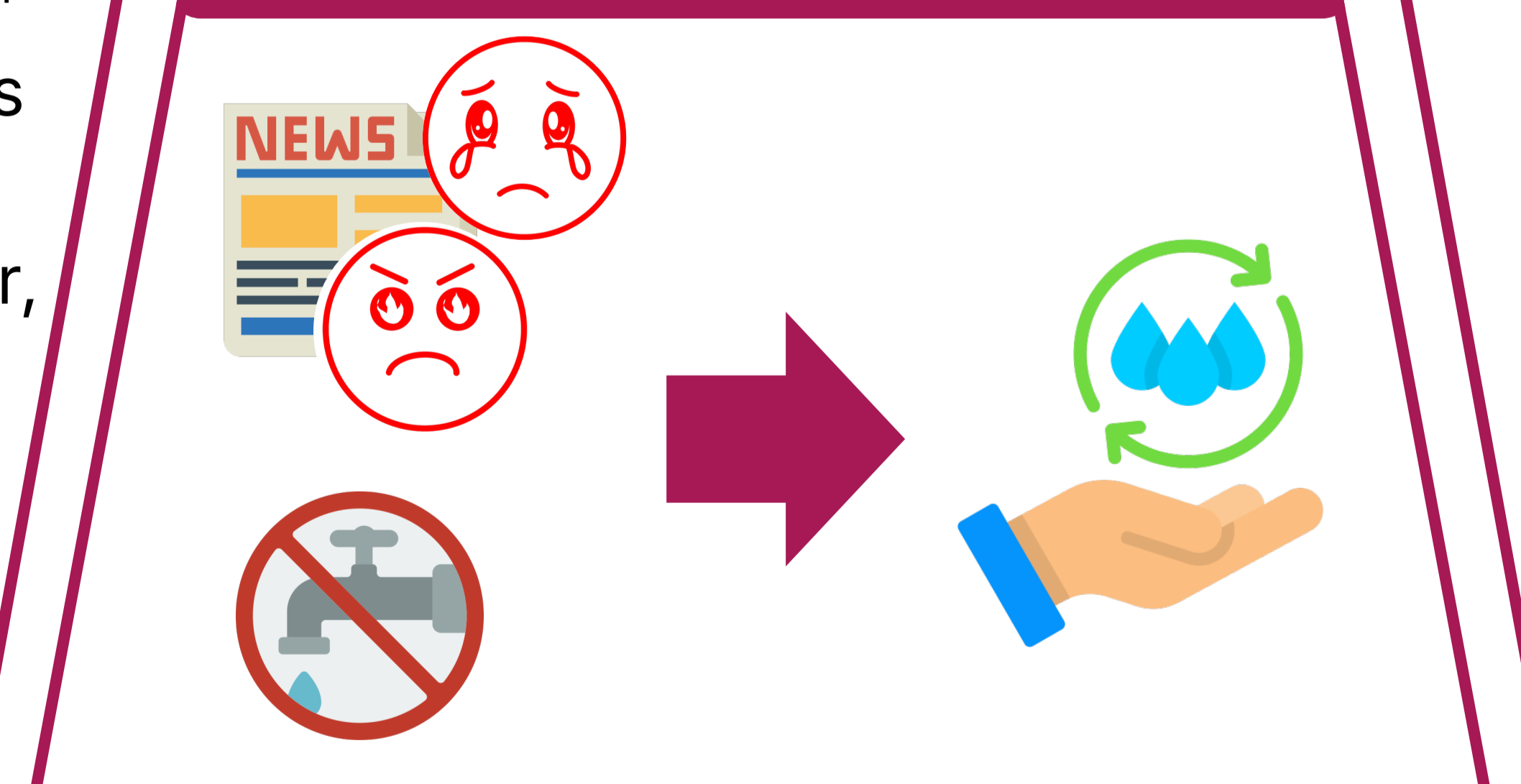
¹huggingface.co/j-hartmann/emotion-English-distilroberta-base

4. Results: System dynamics

The system dynamics model combined with water-use restriction and Anger (Sadness) emotion shows the highest NSE score of 0.75 (0.74) in simulating reservoir storage.



5. Conclusions



Our findings suggest that news media not only reflect public concern but also shape emotional responses and water-use behavior. This insight underscores the value of integrating media-based emotional analysis into drought preparedness strategies and public engagement plans.

Icon Source: Flaticon