

# Trust in Maps: Investigating the Role of Cognitive Biases

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Understanding trust within map contexts is presently limited but gaining attention in recent cartography research agendas. This study aims to enhance our understanding of the factors shaping trust in maps by examining the psychological mechanisms influencing individuals' trust, mainly focusing on cognitive biases during map interpretation.

Recognizing how people trust and interpret maps is crucial for map design and decision-making. Hence, this research explored the existence of specific cognitive biases—such as truth-bias, aesthetics bias, and authoritative bias—during map interpretation.

## MAIN OBJECTIVE

This main objective of this thesis is to gain insights into the existence of selected cognitive biases during the map interpretation process and whether these biases modulate trust in maps.

## RESEARCH QUESTIONS

1. How are 'trust' and 'trustworthiness' defined in cartography and related fields?
2. Are map viewers in a truth-default state when they read a map? And is there a positive truth-bias towards maps?
3. Do readers place more trust in maps they perceive as aesthetically pleasing?
4. What are authoritative sources that produce maps? What are their primary design traits? Which of these traits impact trust?
5. What do the findings show, and are they aligned with the proposed working definition? How can these findings help understand trust in maps and promote critical map viewing?

## DEFINITION & SCOPE

To define trust in maps, the literature review focused on exploring how trust has been conceptualized in cartography, geographic information systems (GIS), and information science (IS). Especially, borrowing concepts from the Truth-Default Theory (TDT) by Timothy Levine [1]. The thesis focused selected categories of maps deemed most relevant to user trust at present, such as thematic maps and only analyzed static maps.

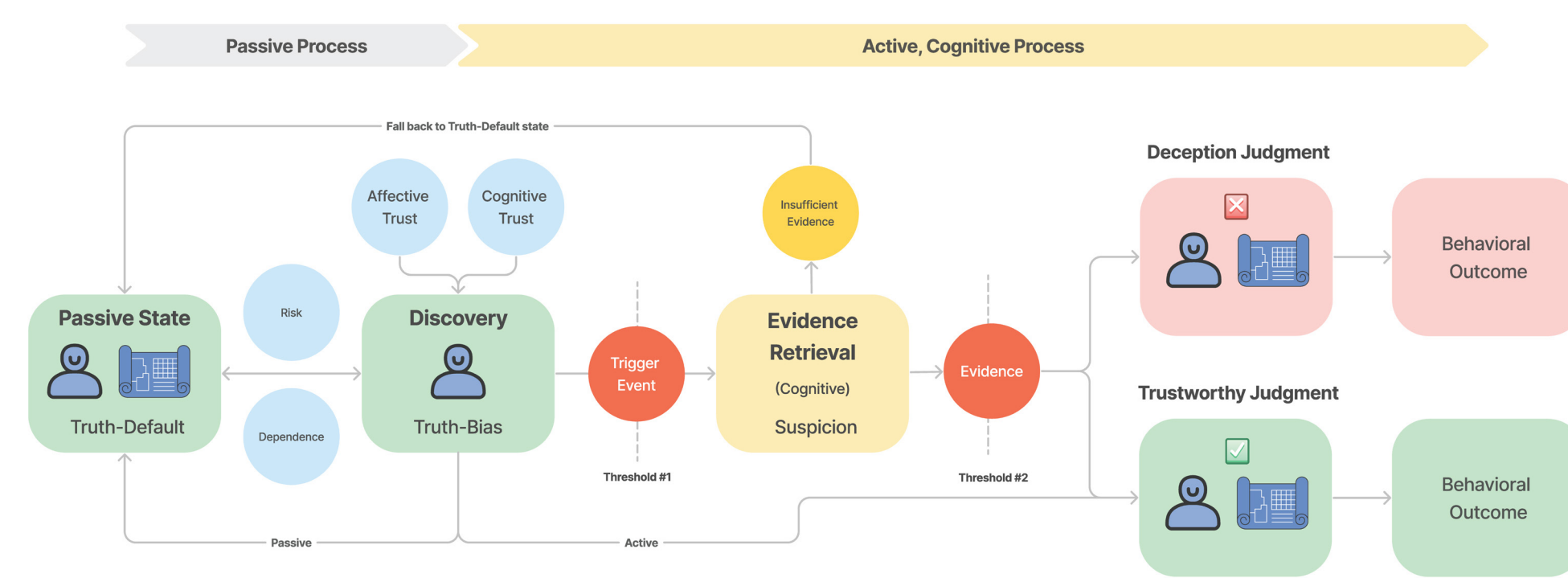


Fig 1. Conceptual framework for how trust in maps works, integrating TDT during the map communication process.

## METHODOLOGY

Expert interviews were conducted to define authoritative sources of maps in the present context and design traits of authoritative maps were characterized using human observation. A user study was then designed and executed to investigate truth-default, truth-bias, aesthetics bias, and authoritative bias in relation to maps, with the results also used to evaluate the proposed definition and conceptual framework.

The user study employed an unprompted vs. prompted approach using two versions of a user survey, drawing on previous TDT experiments, and involved 100 participants. The age range of participants for responses used for analysis was limited to adults between 18 and 44 (up to the Millennial generation), who are most affected by social media and representative of a 'post-trust' society.

## RESULTS

A proposed definition of trust in maps was formulated based on related work, namely the TDT in communication science. The definitions is supplemented with the conceptual frame work shown in Fig 1.

The user study findings provide significant evidence for the existence of truth-default, truth-bias, and authoritative bias during the map-reading process. However, the results for aesthetics bias were mixed. Additionally, the findings contributed to the creation of a concise prebunking checklist aimed at boosting resistance to misinformation in maps (Fig 2).

## CONCLUSION

Based on these findings, along with the biases, the proposed definition and conceptual framework for understanding trust in maps appear promising and warrant further development in future research.

Using A B C D E's for Prebunking Maps	
<b>A</b>	Analyze the <b>data</b>
<b>B</b>	Beware of <b>bias</b> and <b>impersonation</b>
<b>C</b>	Check the <b>Five Cs</b> : Currentness, Coherence, Completeness, Context, Credibility
<b>D</b>	Detect <b>design</b> influence & <b>emotional</b> manipulation
<b>E</b>	Evaluate the <b>source</b>

Fig 2. Proposed prebunking checklist for maps.

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## KEYWORDS

trust in maps, truth-default theory, authoritative sources, cognitive biases

## REFERENCES

- [1] Levine, T. R. (2014). Truth-Default Theory (TDT): A Theory of Human Deception and Deception Detection. *Journal of Language and Social Psychology*, 33(4), 378–392. <https://doi.org/10.1177/0261927X14535916>