

When context matters: The impact of different probability sizes and risk reductions on graphical display effects

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Abstract

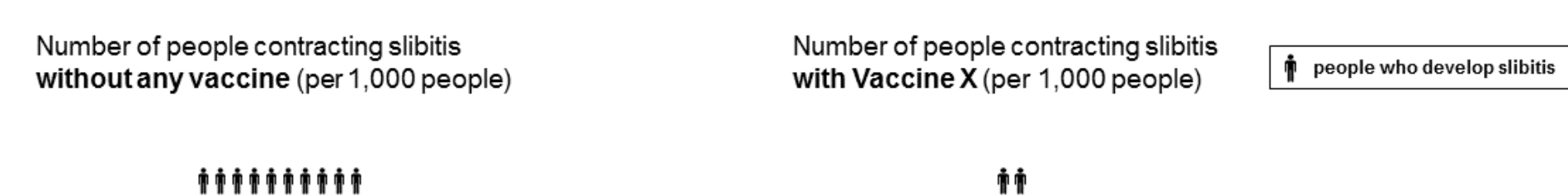
Graphical displays have been shown to be effective tools in risk communication. Graphs depicting only the number of people affected by a risk ('foreground-only' graphs) can increase risk aversion, as compared to graphs that also depict the number of people at risk of harm. However, recent research suggests this 'foreground-only' effect may not hold under all circumstances. In a large online study, we systematically examined the robustness of the foreground-only effect at various combinations of probability sizes and risk reductions. The effect held only for low probabilities and was substantially reduced for small risk reductions. Theoretical implications are discussed.

Background

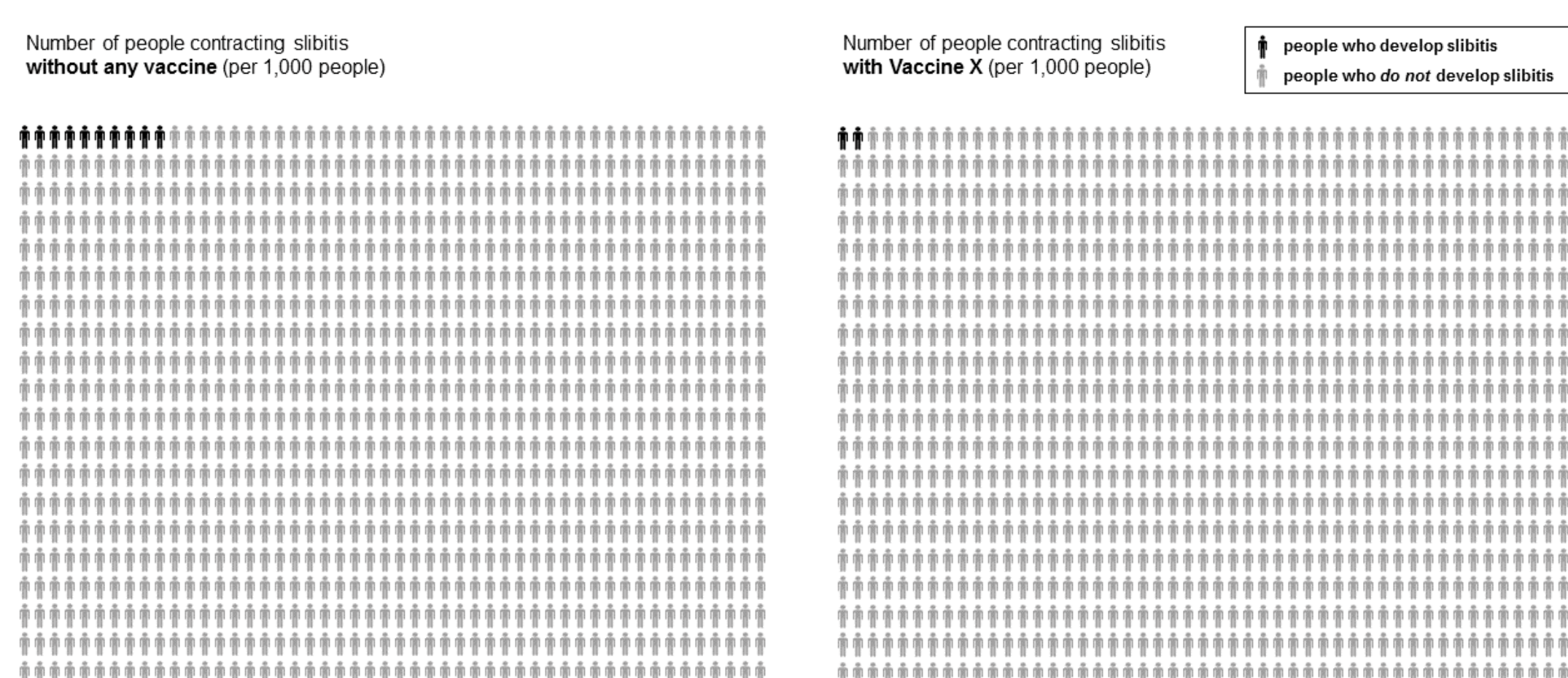
- Risk communication research has demonstrated a foreground-only effect, whereby foreground-only graphical displays, in comparison to foreground/background displays, increase perceived risk and risk aversion for low-probability risks (Stone et al., 2003).
- Shepperd et al. (2013), however, did not find support for the foreground-only effect when using larger probabilities and smaller risk reductions than had been used previously (Stone et al., 2003).

Example Stimuli

Foreground-only Condition



Foreground-background Condition



Goals

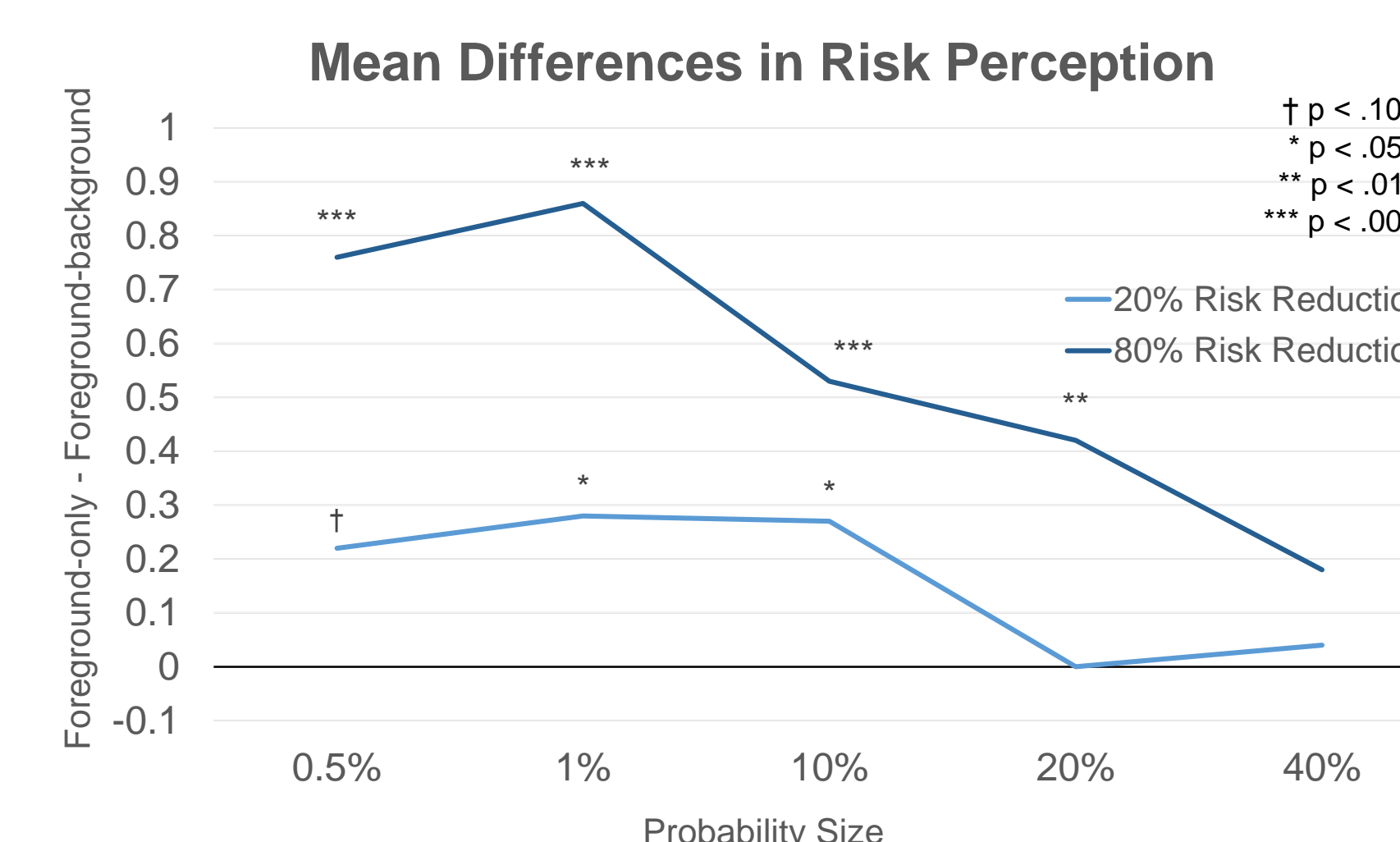
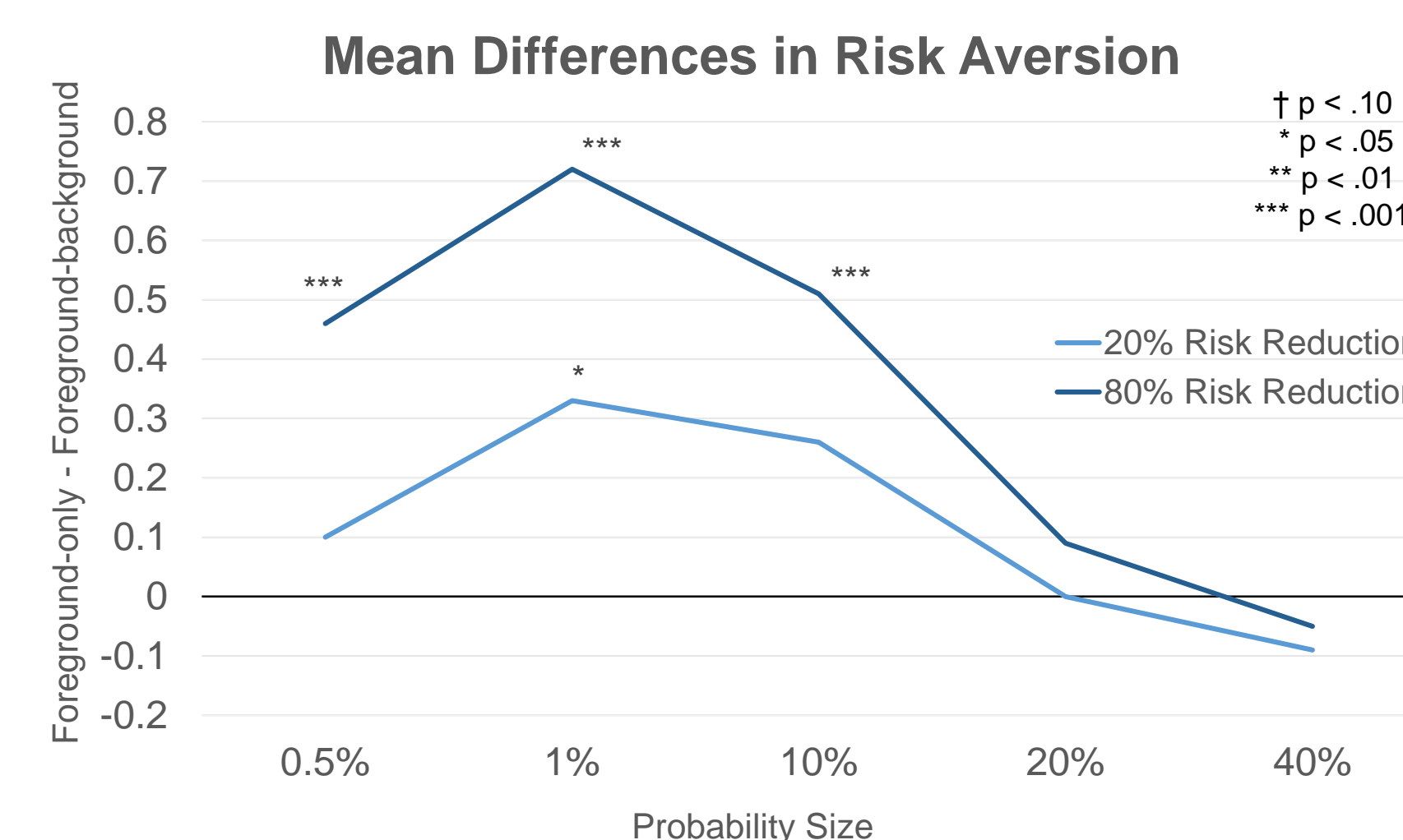
- Determine how the size of the foreground-only effect varies according to 1) probability size and 2) risk-reduction size.

Methodology

- 2,061 Mturk participants were provided with information about a fictitious disease called "silitis."
- Within-subjects manipulation:
 - Risk reduction level:** Each participant was presented with two different scenarios, one in which a vaccine reduced the likelihood of contracting Silitis by 20%, another by 80%.
- Between-subjects manipulations:
 - Display type:** Foreground-only icon display vs. foreground/background icon display
 - Probability size:** .5%, 1%, 10%, 20% and 40%
- Questions assessed participants' risk aversion, risk perception, worry and understanding.

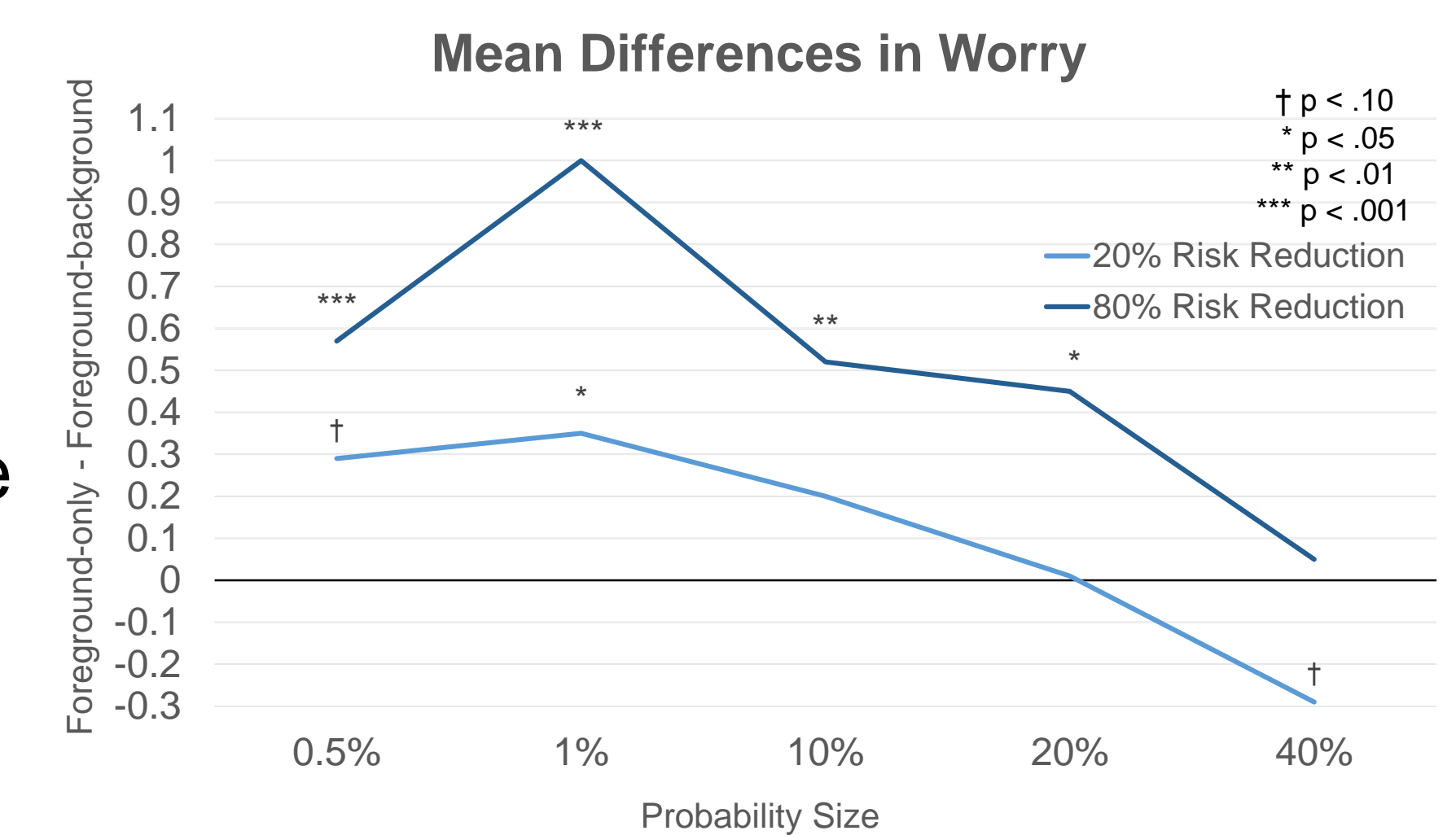
Results

- Risk Aversion:** Average of three measures ranging from not at all risk averse to extremely risk averse (1-7 scale)
- Risk Perception:** "In your opinion, the decrease in the chance of contracting silitis if you receive Vaccine X is..." (1-7 scale)

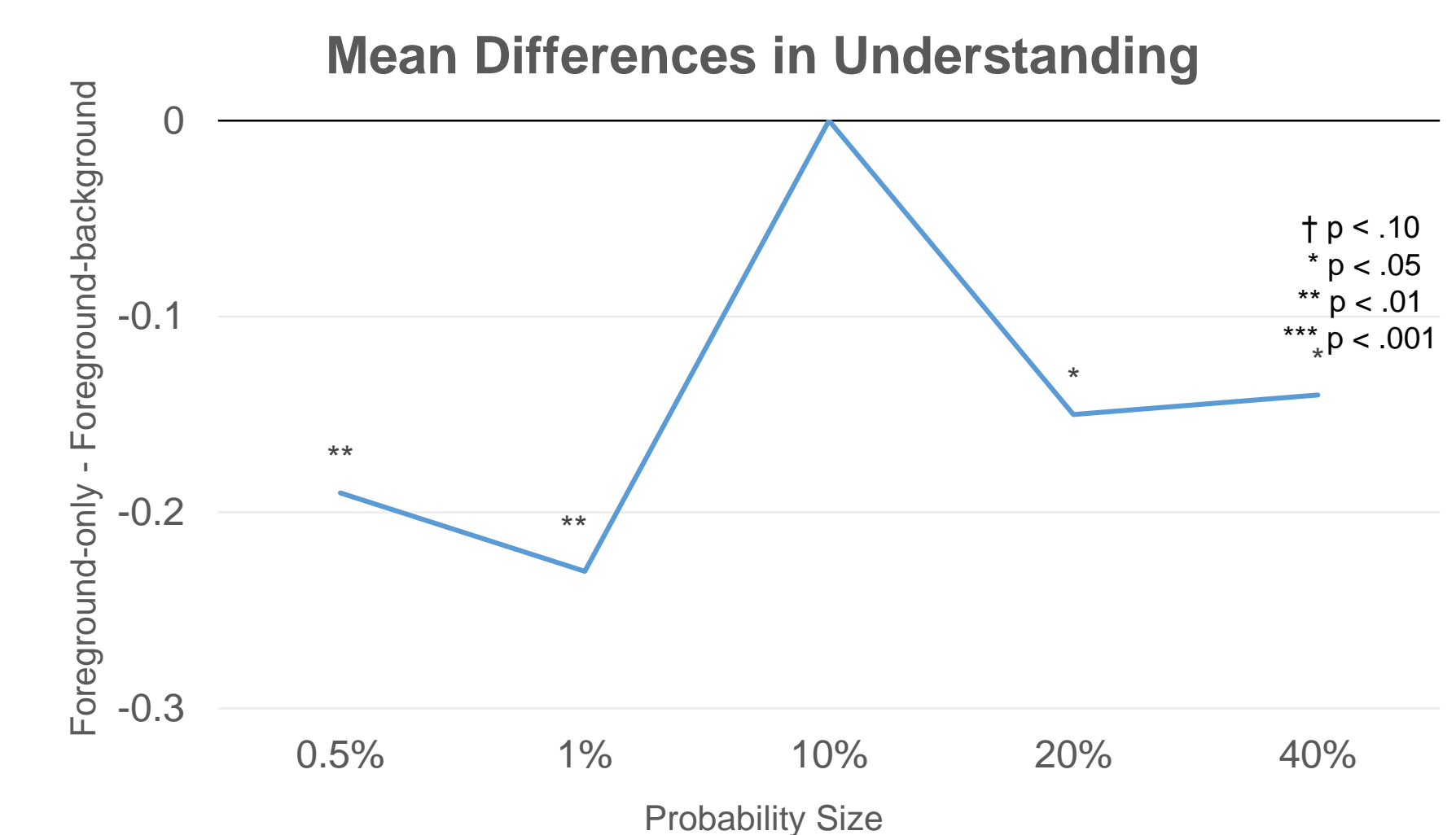


Results (continued)

- Worry:** "How much less worried would you be about contracting silitis if you received Vaccine X rather than no vaccine?" (1-7 scale)



- Understanding:** average of three measures testing comprehension of graphs (how many people out of 1,000 would contract silitis)



Discussion

- These results suggest that, as probability sizes increase, the foreground-only effect weakens, perhaps because people no longer overestimate the risk when considering larger numbers of affected people in foreground-only displays.
- Additionally, for low probability risks, small risk reductions appear trivial regardless of whether the background is visible. Thus, for small risk reductions, the risk is seen as negligible in both display types.
- Consistent with previous research, foreground-only displays increased risk aversion at the expense of decreasing people's understanding of the graphs.

References

- Shepperd, J. A., Lipkus, I. M., Sanderson, S. C., McBride, C. M., O'Neill, S. C., & Docherty, S. (2013). Testing different communication formats on responses to imagined risk of having versus missing the GSTM1 gene. *Journal of health communication, 18*(1), 124-137.
- Stone, E. R., Sieck, W. R., Bull, B. E., Yates, J. F., Parks, S. C., & Rush, C. J. (2003). Foreground:background salience: Explaining the effects of graphical displays on risk avoidance. *Organizational Behavior and Human Decision Processes, 90*, 19-36.
- Stone, E. R., Okan, Y., Bonapart, J., Parker, A. M., & Bruine de Bruin, W. (2015, November). Examining graphical display effects at different probability levels: Do effects only hold for low-probability risks? Poster presented at the annual meeting of the Society for Judgment and Decision Making, Chicago, Illinois.