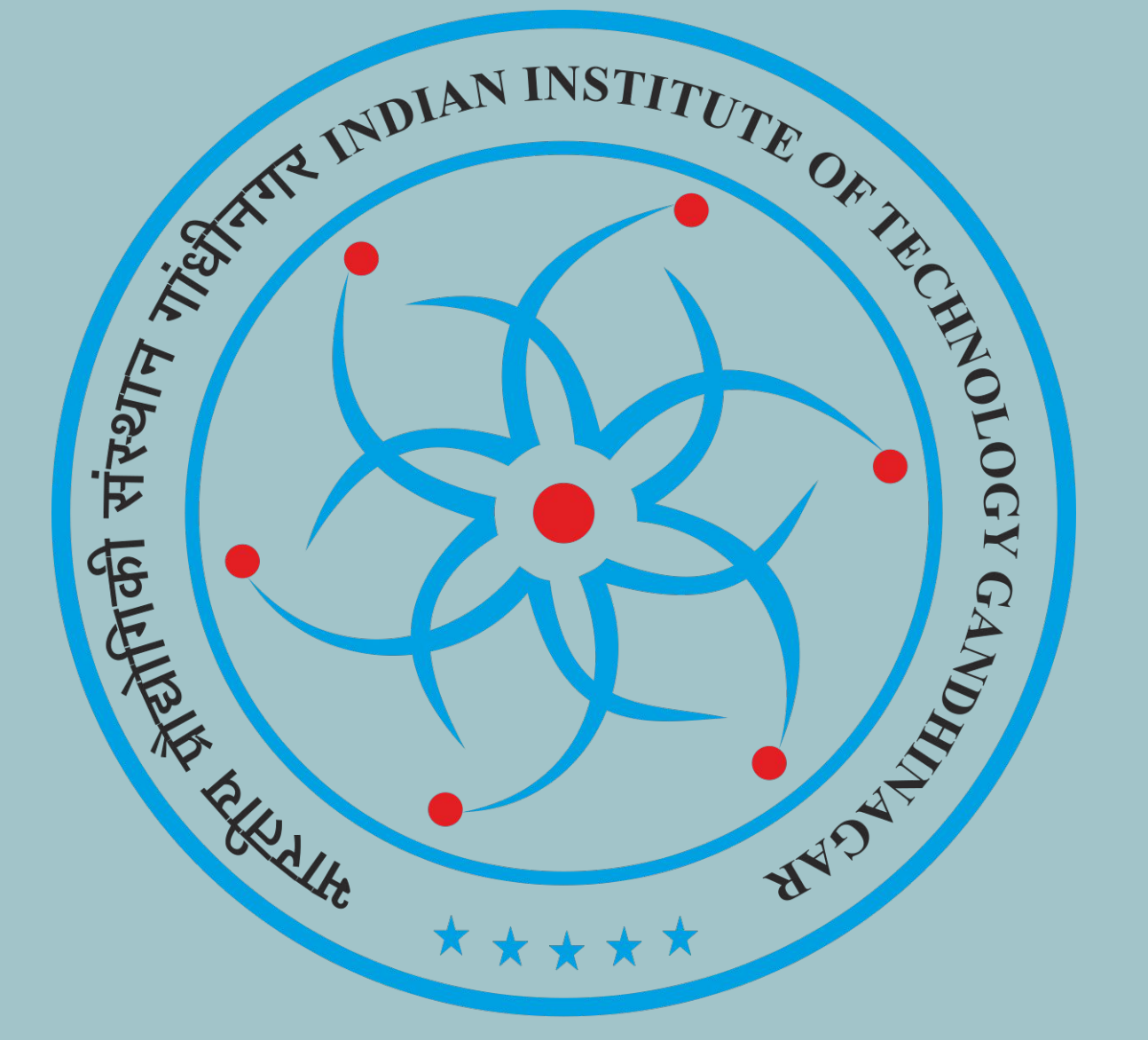




# Lay, Professional and Artificial Intelligence perspectives on risky choice framing for clinical trials: Number of lives matter in gain frames but not in loss frames

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## SUMMARY

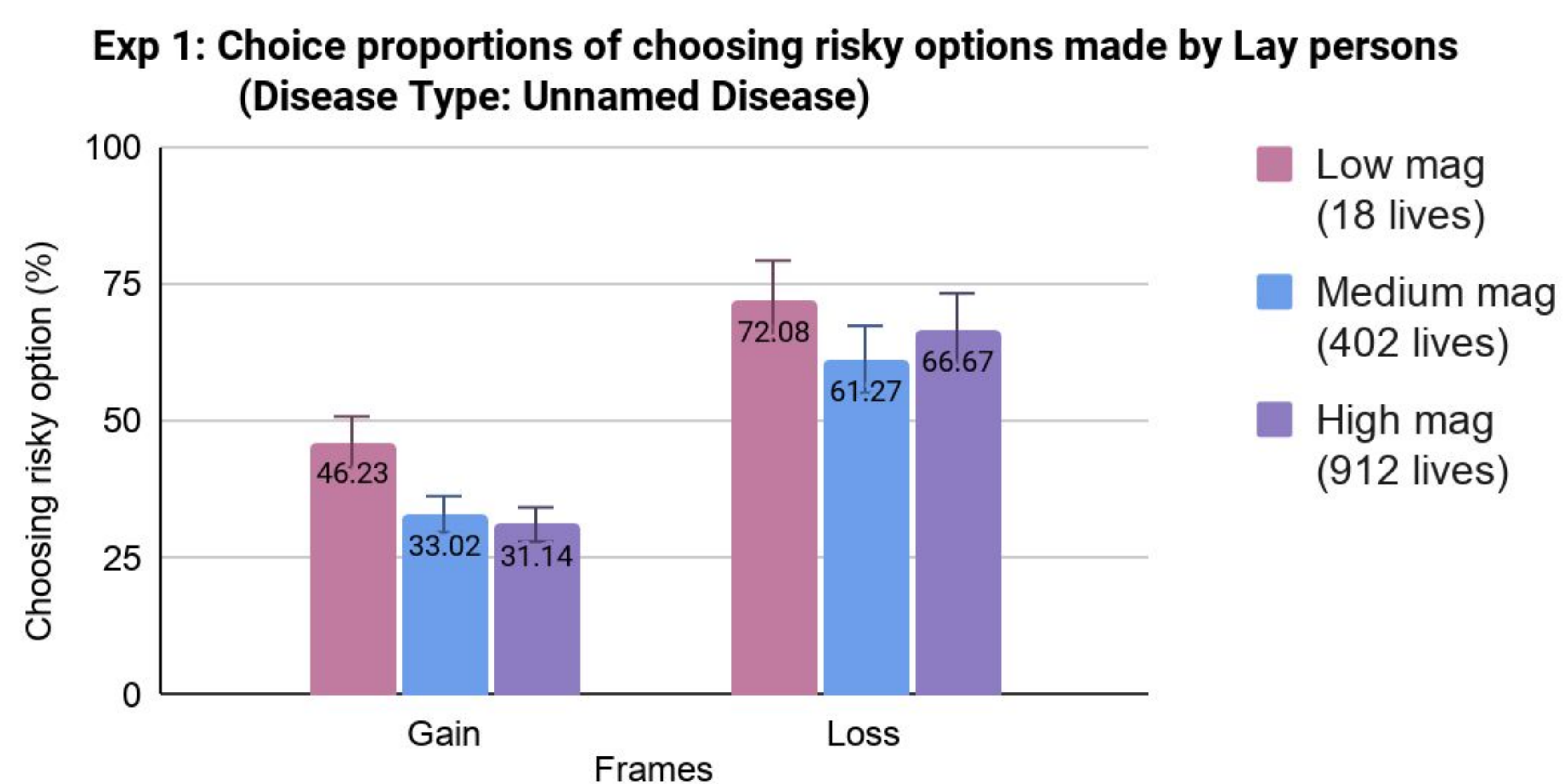
- With the recent upsurge and need for clinical trials and vaccines, understanding the valuation of people's lives is crucial when making any medical decision.
- Beyond the effect of frames (Tversky and Kahneman, 1981), would people's choices depend on how many patients (say, 10 or 800) have signed up for the trials? Is it similar for gain versus loss frames?
- We found risk-aversion in the gain frame was dependent on the magnitude of lives, but risk-seeking in loss frame was not.

## METHOD

- Based on the 'Asian Disease Problem' (Diederich et al., 2018), participants were asked to make a choice between two hypothetical drugs (one with a sure outcome, the other with risky outcome) to be tested on patients who signed up for trials.
- Frame (Gain: people will be saved vs Loss: people will die) was manipulated between subjects.
- Magnitude (number of patients in the trial) was manipulated within subjects.
- The responses were collected online, or in person.
- We measured three perspectives: Lay, Professional and Artificial Intelligence

## RESULTS

### Experiment 1: Lay perspective- What drug would you choose to administer?



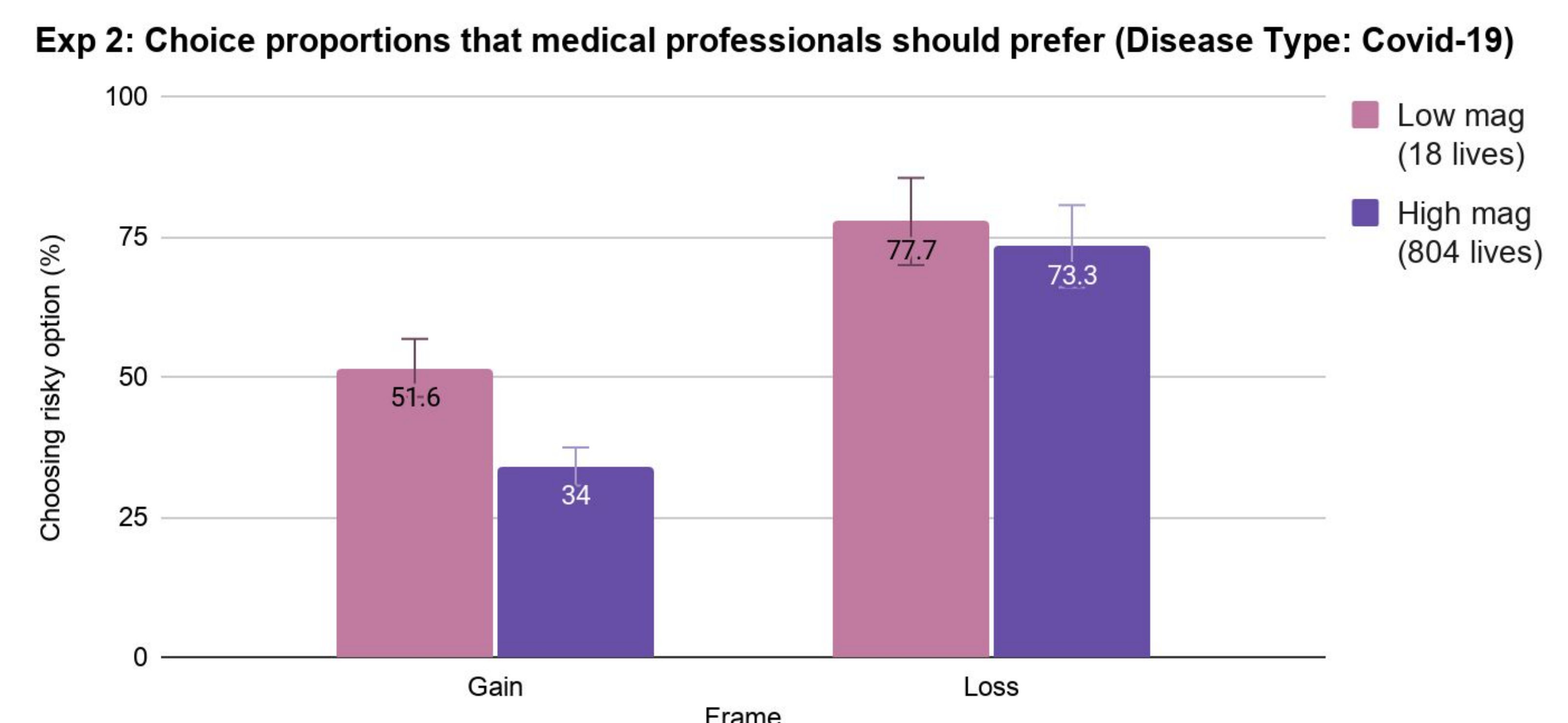
**Binomial Test:** Within the gain frame: No risk aversion in Low magnitude (46% risky,  $p = .469$ ), but observed risk aversion in the medium (33% risky,  $p = .000$ ) and High magnitude (31% risky,  $p = .000$ ).

Within Loss frame: Risk seeking observed across all three levels: Low (72% risky,  $p < .0001$ ), Medium (61% risky,  $p = .022$ ) and High magnitude (66% risky,  $p = 0.0006$ )

**Logistic regression** for frames and magnitude found to be significant. Within the magnitudes we found a difference between low and high magnitude (Wald statistic = 8.846,  $p = 0.003$ ) but none between medium and high magnitude (Wald statistic = .543,  $p = 0.461$ ).

**Finding:** Participants accounted for number of lives when making choices but selectively only in the gain frame.

### Experiment 2: Perspective about Professionals - What should medical professionals do?

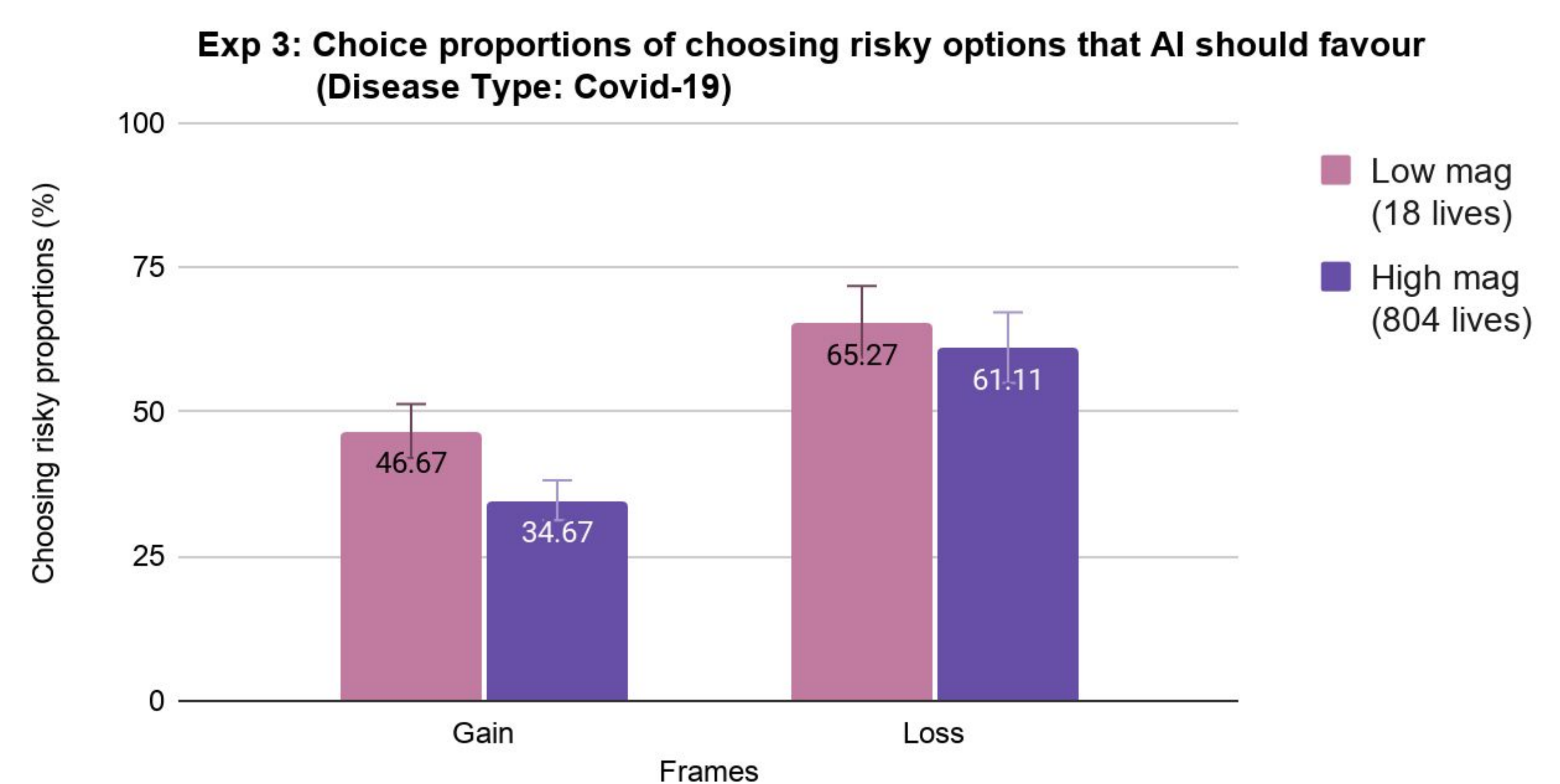


**Binomial Test:** In the Gain Frame: at low magnitude, there was risk-neutrality (51.6% risky,  $p = .834$ ) but risk aversion at high magnitude (34% risky,  $p = 0.003$ ). In the loss frame, people preferred the medical professionals to be risk seeking at both levels, Low magnitude (77.7% risky,  $p < .0001$ ) and High magnitude (73.3% risky,  $p < .0001$ ).

**Logistic regression** found both frames and magnitude to be predictors

**Finding:** Even after naming the disease, contextualising it in the real world, people are found to have magnitude-dependent choices for gain frame.

### Experiment 3: AI perspective: What should a computer program do?



**Binomial Test:** In gain frame, for low magnitude, there was risk neutrality (45% risky,  $p = .278$ ), but for high magnitude, choices were risk averse (39% risky,  $p = 0.015$ ). Within loss frame, risky alternatives were preferred for both levels of magnitude: Low (64.9% risky,  $p = 0.0006$ ) and High (60.59% risky,  $p = 0.016$ ).

**Logistic regression** found frames to be a significant predictor, while magnitude had a marginal effect.

**Finding:** Results were similar to earlier experiments, although magnitude played a lesser role when participants were asked to respond on what choice they thought the AI should favour. People are seen to expect machines to display less affective choices.

## CONCLUSION

Our results show that the number of lives at stake impact choices specifically in the gain frame.

Losses of lives do not loom large enough compared to gains for few patients but do so when many are involved. Such magnitude-dependent valuation for lives is a novel finding and has similarities with how people value money (Mukherjee et al., 2017)

## References

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- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453-458.

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