

Beyond Hypothetical Scenarios: Investigating the Influence of the 1-in-X Numerical Format on Actual Choices

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Abstract

Probability values presented in a 1-in-X format (e.g., 1 in 200) are perceived as greater than those in an N-in-NX format (e.g., 5 in 1,000). However, the generalization of this effect to behaviors remains unexplored. In four online studies (N = 1,039), participants choosing between a sure loss and a lottery with equivalent EV were less likely to select the lottery when presented in the 1-in-X format than the N-in-NX format. This effect persisted when the lottery was described using concrete verbal terms and when represented graphically using arrays. Additionally, the effect remained consistent even when the lottery had a more favorable expected value. The results suggest that the 1-in-X format effect extends beyond judgments and can influence behaviors.

Theoretical Background

In Pighin et al.'s (2011) seminal study, the perceived risk of contracting malaria during a trip to Kenya was perceived as higher when presented as '1 in 200' compared to '5 in 1,000'. The effect generalizes to different hazards (Hepatitis A, Down syndrome) and values (such as '1 in 12' versus '10 in 120') but disappears for numerators different from 1. For this reason, it was termed the 1-in-X effect (Pighin et al., 2011).

Subsequent studies (Pighin et al., 2015; Sirota et al., 2019, 2014; Oudhoff & Timmermans, 2015) have demonstrated the generalizability of the 1-in-X effect across various populations, scenarios, and even real-life situations, such as assessing the risk of having a child with Down syndrome based on maternal age.

Besides subjective probability, the 1-in-X format has been shown to impact behavioral intentions, such as the propensity to purchase a lottery ticket (Oudhoff & Timmermans, 2015), the inclination to cancel a hypothetical trip (Sirota & Juanchich, 2019), and the intention to vacation in a country affected by COVID-19 (Savadori et al., 2023). **Our study is the first to explore the effect of the 1-in-X format on actual behaviors.**

Methodology

Participants faced the following choice:

To take part in this study you are given an endowment of 1 pound. You have to choose between A and B.

A: lose 5 pence of your endowment for sure

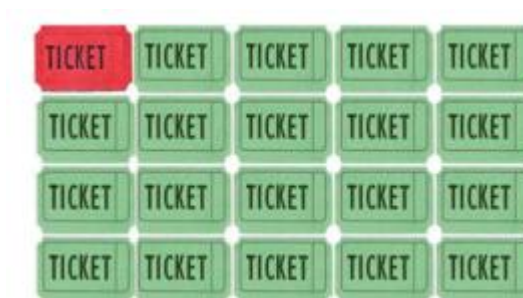
[STUDY 1] B: Play a lottery with a 1 in 20 chance [5 in 100 chances] to lose your endowment.

[STUDY 2] B: Play a lottery where a ticket will be randomly drawn from a bowl containing 20 [100] tickets. In this lottery, 1 in 20 [5 in 100] tickets cause/s you to lose your endowment.

[STUDY 3] B: Play a lottery where a ticket will be randomly drawn from a bowl containing 20 [100] tickets. In this lottery, 1 in 20 [5 in 100] tickets cause/s you to lose your endowment.

This is the set of tickets contained in the bowl:

(1 in 20 condition)



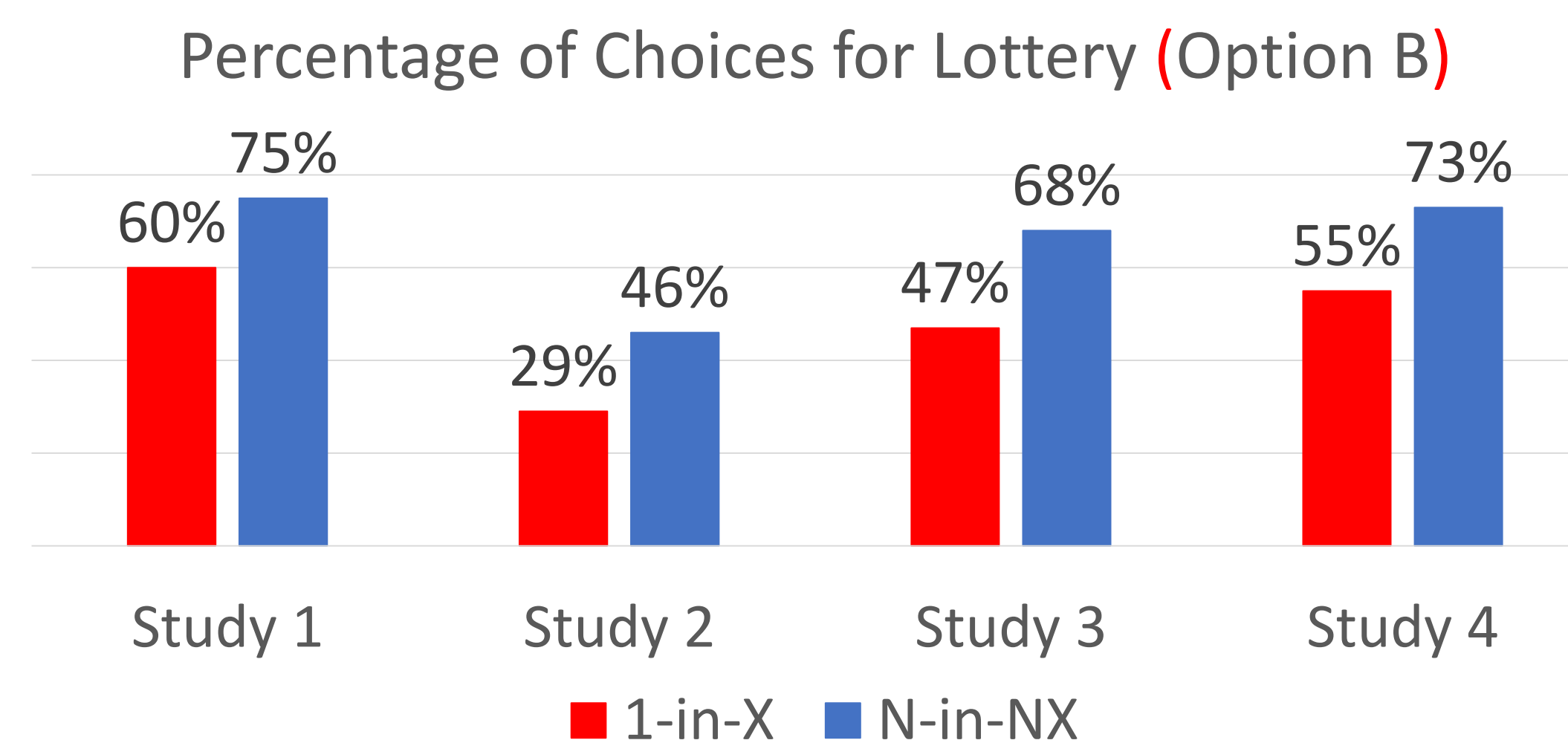
(5 in 100 condition)



[STUDY 4] A: lose 6 pence of your endowment for sure

B: Play a lottery with a 1 in 20 chance [5 in 100 chances] to lose your endowment.

Results



Discussion

The results suggest that the 1-in-X format can have a significant influence on decision-making: Overall, the use of the 1-in-X format in describing the chances of losing in a lottery option leads to a decreased likelihood of choosing that option compared with the N-in-NX format. Such a 1-in-X effect is clearly in line with the tendency to perceive a probability as higher when this is presented using the 1-in-X format, as compared with the N-in-NX format.

The 1-in-X effect on choice did not disappear when the lottery was made more concrete (Study 2 and Study 3), although it did on subjective probability (in studies not shown here).

The 1-in-X effect on choice was also found when the lottery was more convenient (in terms of expected value) than the sure loss but disappeared when the lottery became very convenient (in studies not shown here).

Concluding, the 1-in-X effect extends beyond judgments and can influence behaviors.

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