

Investigating how changes in colour information influence food valuation and decision-making

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Introduction

Background:

- Colour provides valuable visual information about foods, influencing preferences and behaviours.
 - It can impact the perception of attributes like taste¹, flavour², health³, and freshness⁴.
- It is now common to digitally manipulate the colour of food images. However, the way these changes in colour information impact liking and decision-making is not well understood.
- This study aims to address this gap by manipulating the colour of food images and assessing how this influences preferences and choices.

Hypotheses:

- H1:** Colour makes foods more visually appealing, with more vivid colours leading to greater liking.
- H2:** Colour amplifies positive and negative food qualities. Preference for colourful food images will depend on the food's liking ratings.

Methods

Population: Undergraduate psychology students.

Studies 1 and 2: Do colour manipulations affect liking?

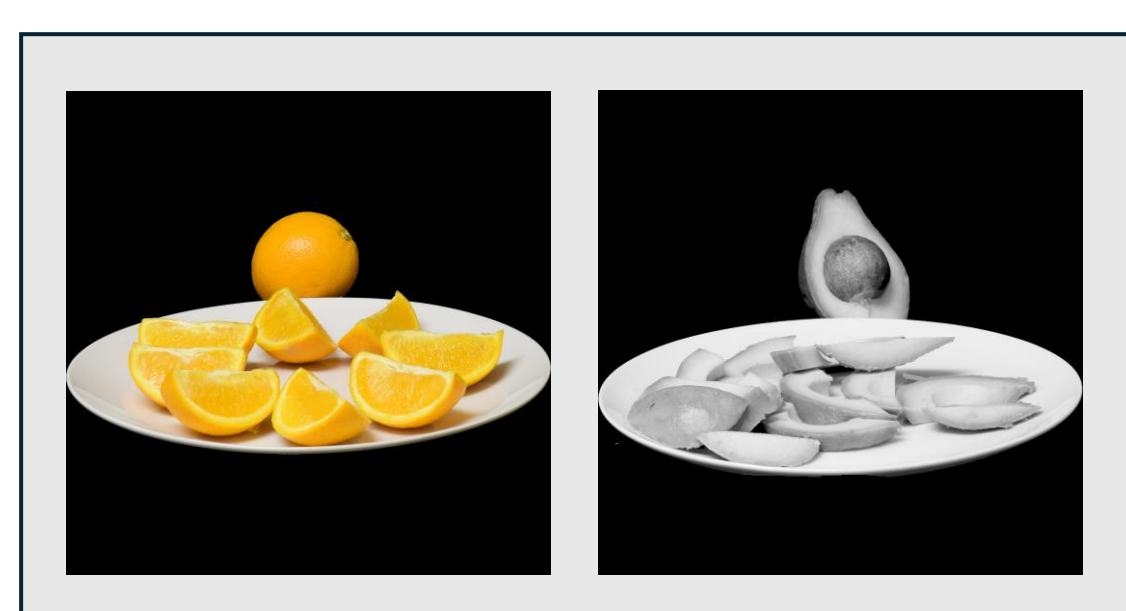
- Liking ratings made on a 6-point Likert scale (1=*highly disliked*, 6=*highly liked*).



Study 1: Participants (N=80) rated colour and greyscale images.

Study 2: Participants (N=78) rated colour and colour-saturated images.

Study 3: Do colour manipulations affect choice?



After making liking ratings for colour images, participants (N=42) chose between equally liked foods, with one appearing in greyscale.

Data Analysis: Mixed effects linear regression models to test the effects of colour on liking ratings (Liking ~ Colour) and liking ratings on choice (Choice ~ Liking).

Results

Study 1

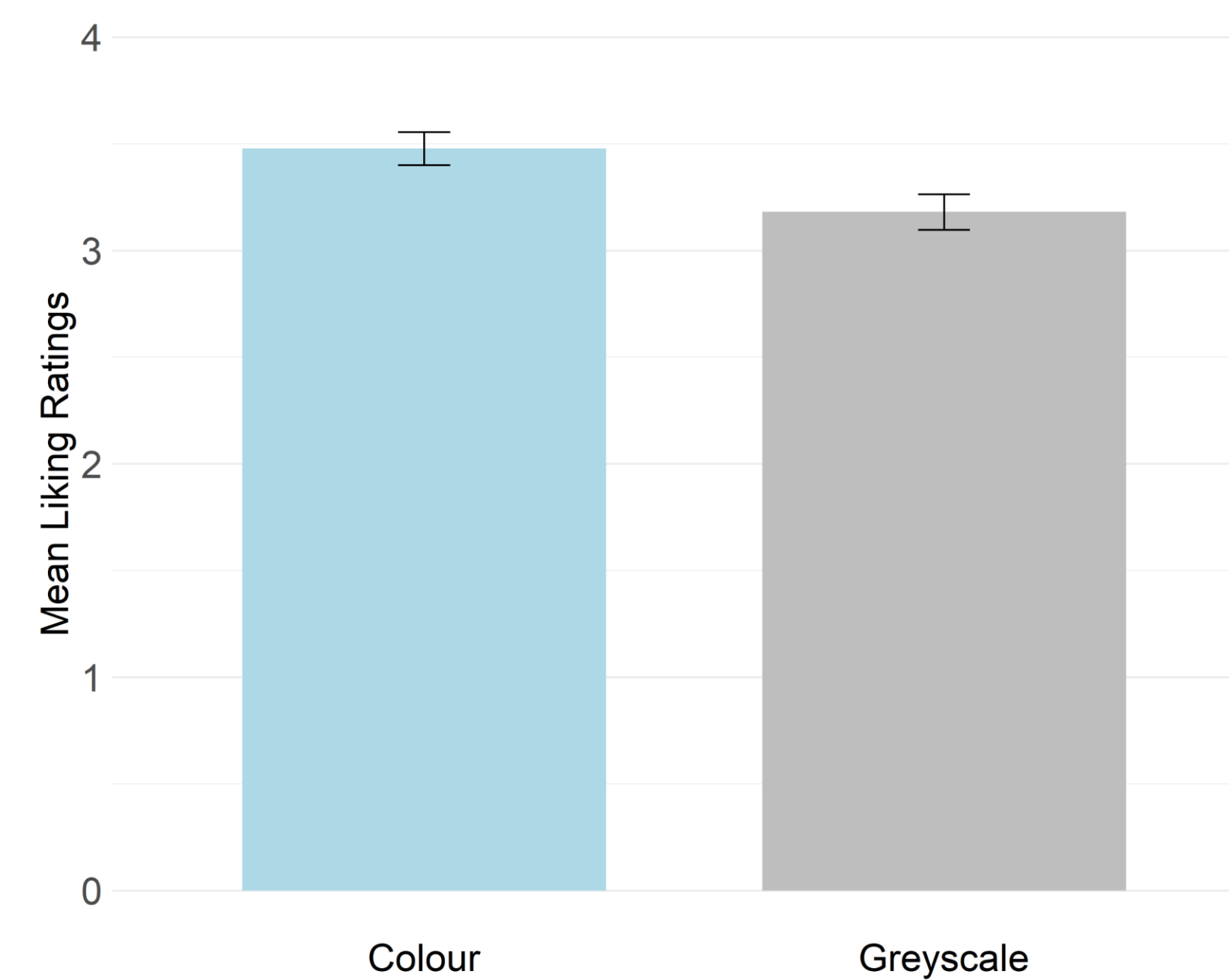


Fig 1: Colour images had higher liking ratings than greyscale images ($p < .001$).

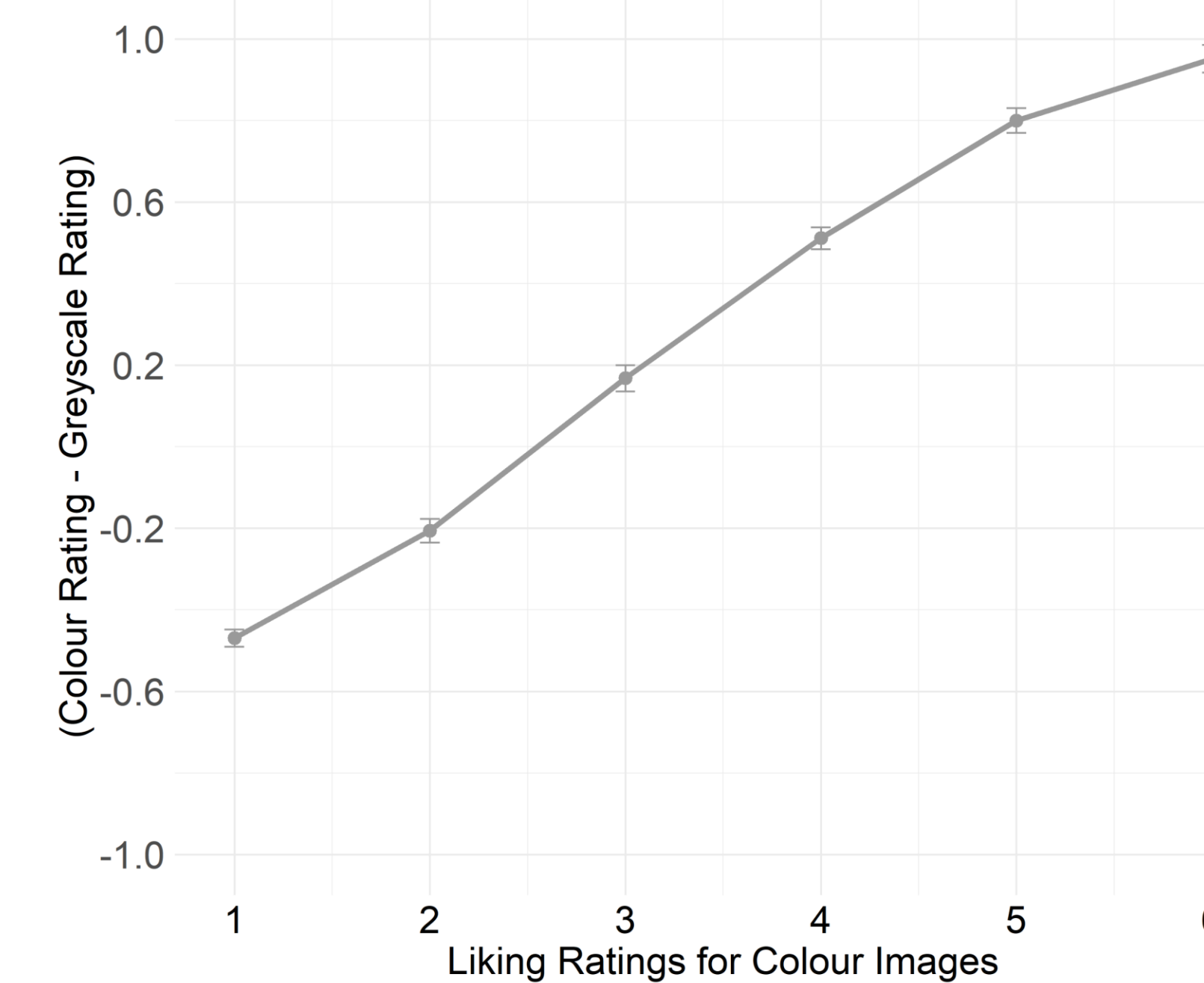


Fig 2: Liked foods were preferred in their original, colour version, while disliked foods were preferred in greyscale ($p < .001$).

Study 2

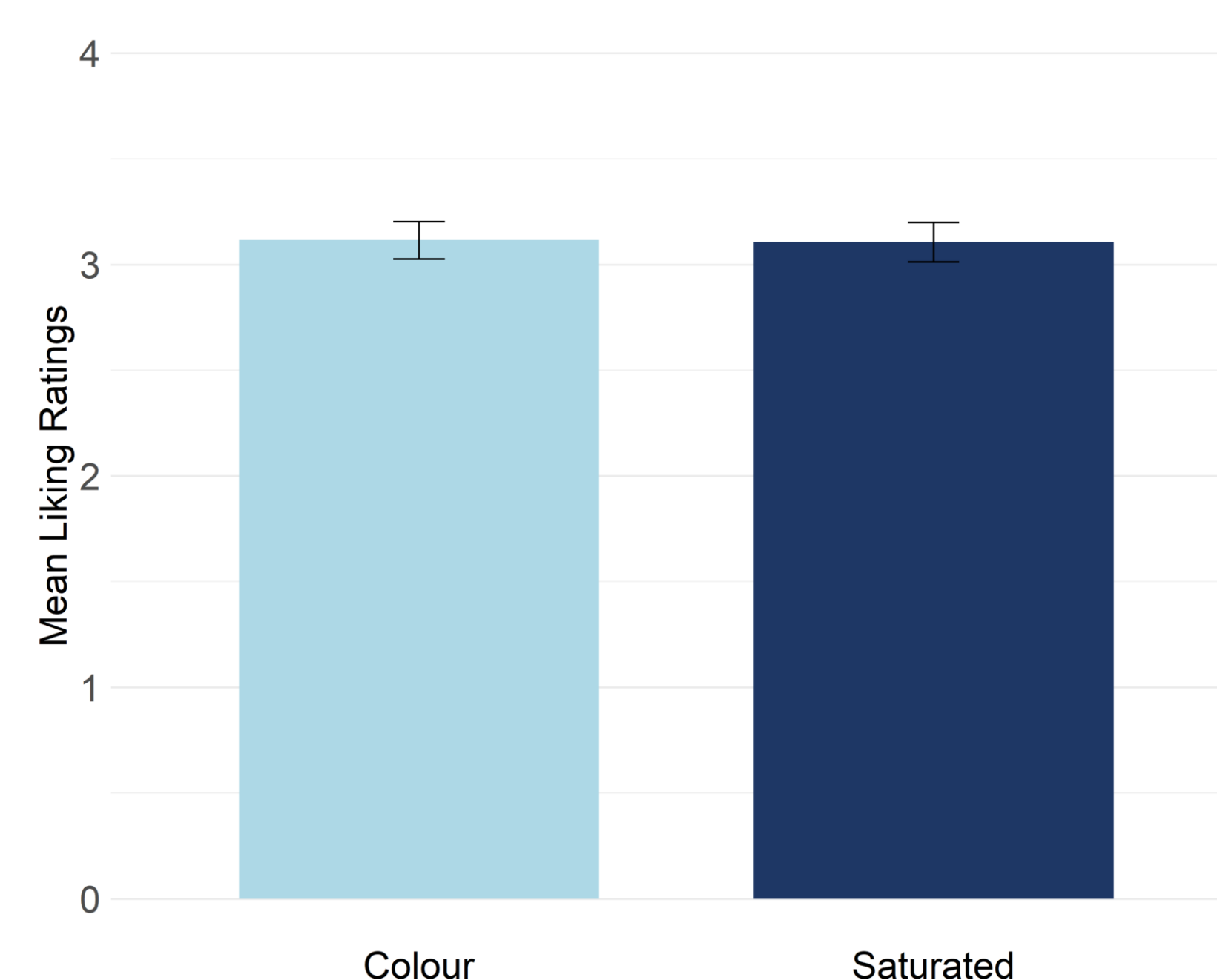


Fig 3: Liking ratings for colour and colour-saturated images did not differ ($p = .693$).

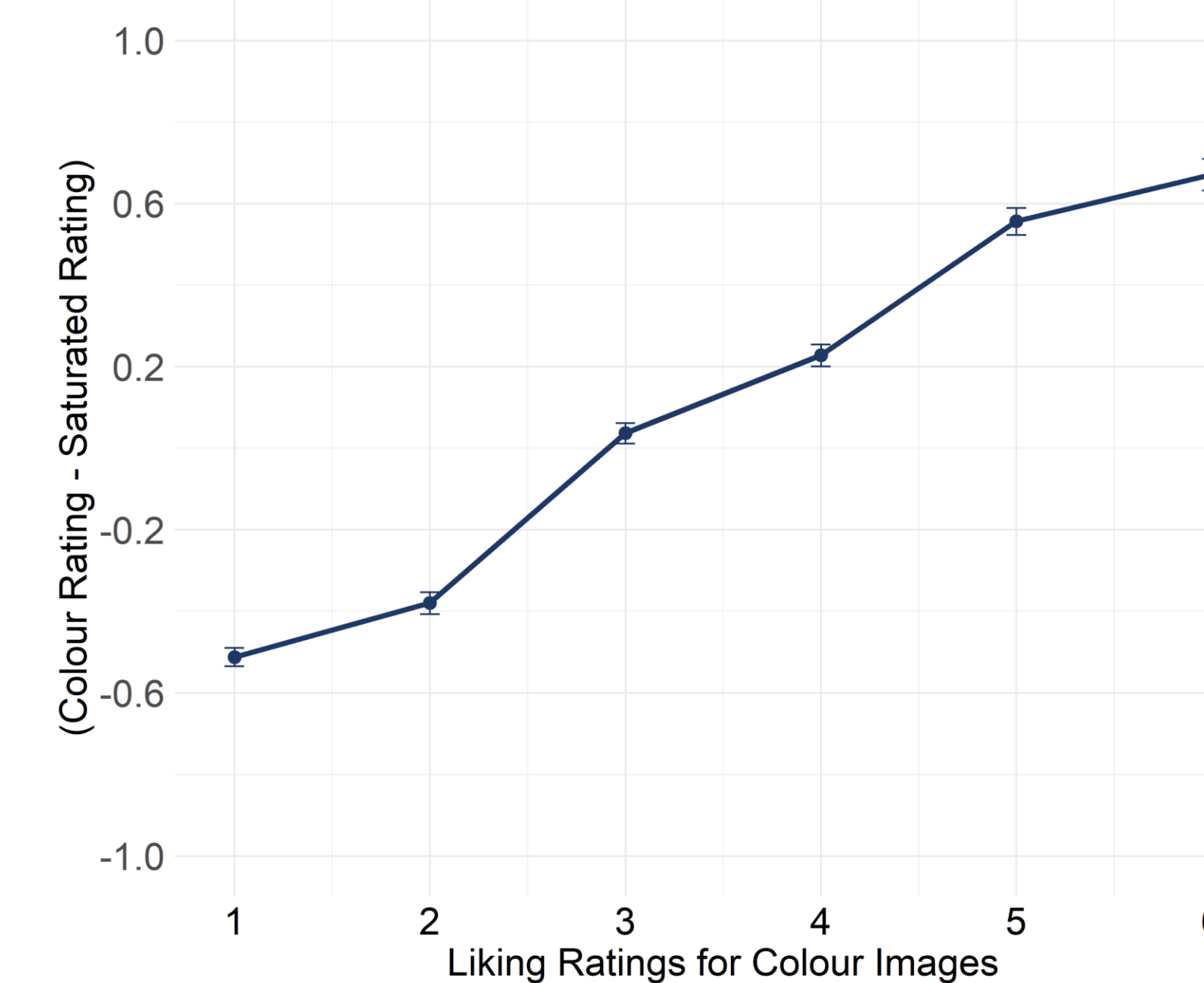


Fig 4: Liked foods were preferred in their original, colour version, while disliked foods were preferred in their colour-saturated version ($p < .001$).

Study 3

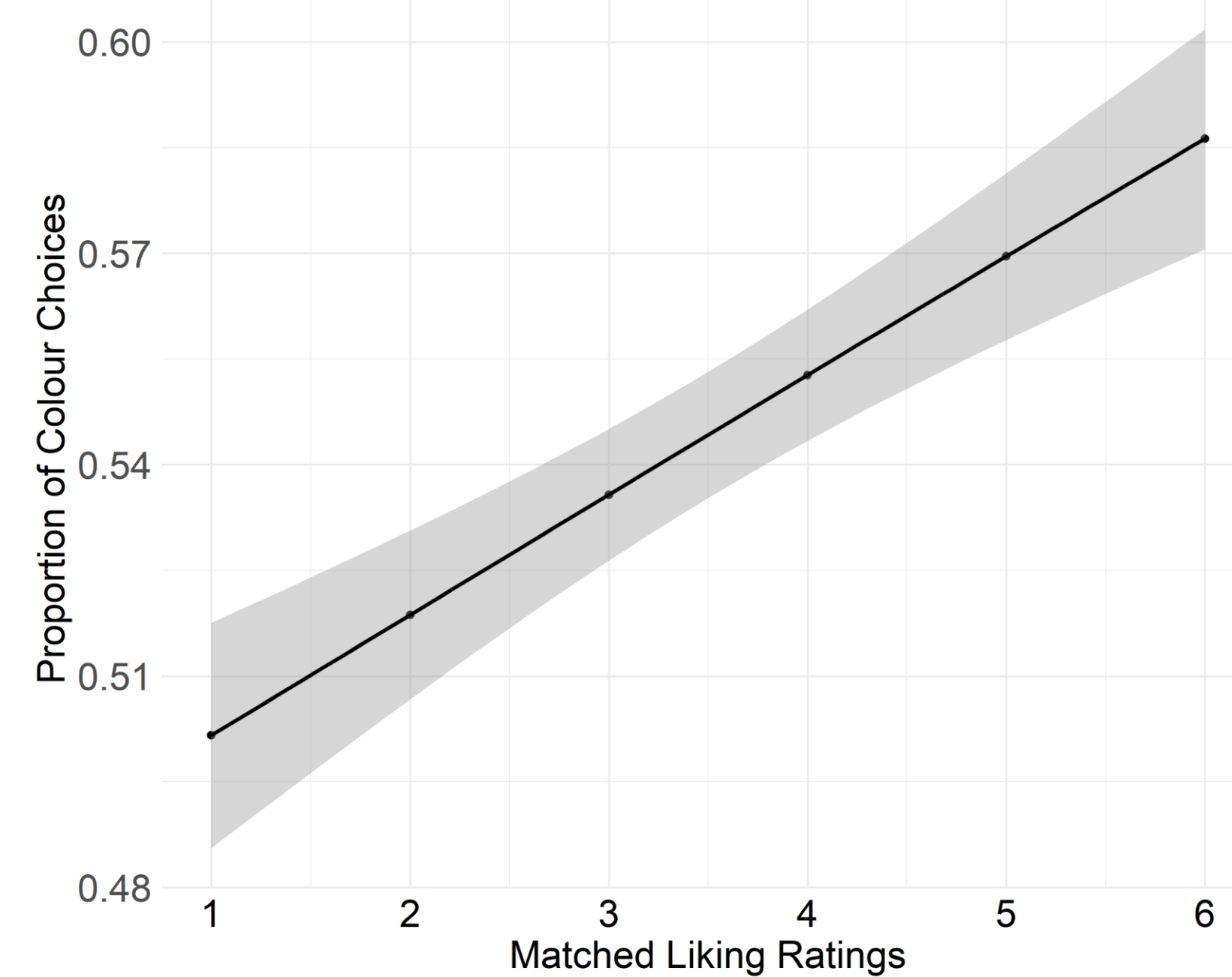


Fig 5: Participants were more likely to choose the colour option when both foods were liked, but this preference disappeared when both foods were disliked ($p < .001$).

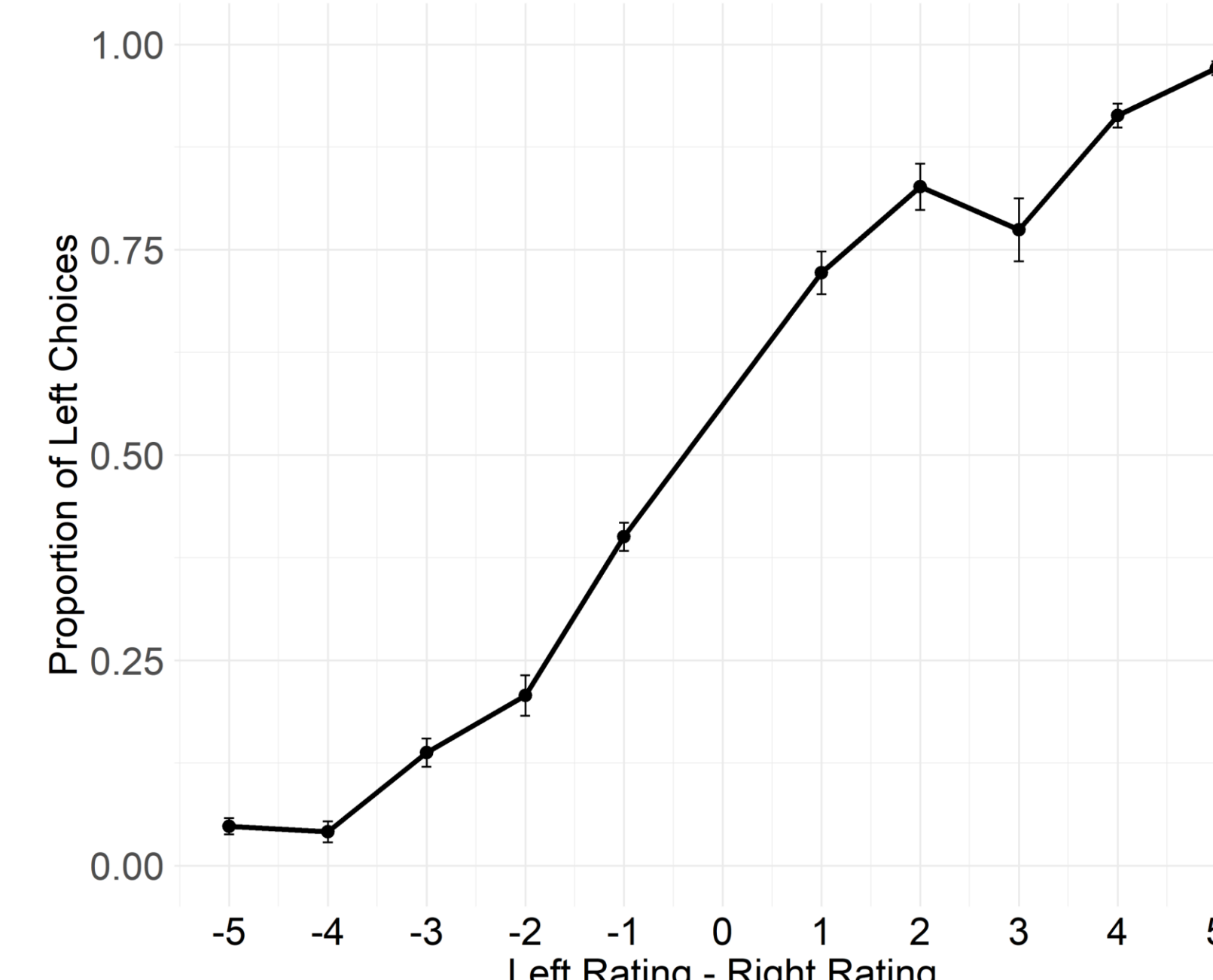


Fig 6: When liking ratings were not matched, the food with the higher liking rating was more likely to be chosen ($p < .001$).

Secondary Analyses

Does colour change the perception of food attributes?

- Liking may be a weighted average of food attributes like taste and health.
- Colour images were rated as tastier ($p < .001$) but not healthier ($p = .10$) than greyscale images. Taste ratings predicted higher liking ratings for colour images ($p < .001$).
 - Colour can change the perception of food attributes that contribute to overall liking.
- Colour and colour-saturated images did not differ in taste ($p = .90$) or health ratings ($p = .70$).
 - Increasing colour does not alter the perception of food attributes.

Does colour change image processing speed?

- Participants took longer to rate greyscale images than original images ($p < .001$).
 - Greyscale food images are harder to process.
- Rating times for colour and colour-saturated images did not differ ($p = .36$).
 - More colour information does not make food images easier to process.

Discussion

Discussion:

- Study 1 supports the hypothesis that more colour is inherently preferred, but study 2 does not.
- Study 2 shows that after a certain amount of colour is present, enhancing it does not impact liking.
- All 3 studies support the theory that colour amplifies both the appealing and off-putting qualities of foods.
 - Removing colour information may increase liking by minimizing off-putting features.
 - Colour saturation can increase liking by enhancing any positive features alongside the negative ones.
- These findings can be used to influence food attitudes by altering image colour.
 - Presenting healthy foods in colour and unhealthy foods in greyscale may encourage healthier choices.

Conclusion:

Colour plays an important role in food valuation and decision-making processes. While it is inherently preferred in some cases, it can also attenuate liking and choices.

References

- Spence, C. (2015). On the psychological impact of food colour. *Flavour*, 4, 1-16
- Zampini, M., Sanabria, D., Phillips, N., & Spence, C. (2007). The multisensory perception of flavor: Assessing the influence of color cues on flavor discrimination responses. *Food quality and preference*, 18(7), 975-984.
- Schuldt, J. P. (2013). Does green mean healthy? Nutrition label color affects perceptions of healthfulness. *Health communication*, 28(8), 814-821.
- Schifferstein, H. N., Wehrle, T., & Carbon, C. C. (2019). Consumer expectations for vegetables with typical and atypical colors: The case of carrots. *Food Quality and Preference*, 72, 98-108.

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