

# Does the Color Red Reduce Snack Food Consumption?

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## Introduction

The color red has been hypothesized to induce a state of avoidance motivation because of its association with danger and mistakes. This state is predicted to influence behavior reliably (Elliot & Maier, 2012; Mehta & Zhu, 2009).

Mehta and Zhu (2009) reported that avoidance-themed anagrams were solved more quickly when they appeared on red backgrounds. However, Steele (2013) was unable to reproduce this result even when a direct replication of their procedure was used. This failure suggests a need for replication of other results in the color-priming literature.

Genschow, Reutner, & Wänke (2012) hypothesized that the presence of red should elicit avoidance behavior towards snack food. Study 1 reported reduced soft drink consumption from cups with red stickers. Study 2 reported reduced pretzel consumption when the food appeared on red plates.

The purpose of this study was to replicate the results of Study 2. The Genschow et al. study took place at a public information fair where participants were provided pretzels while responding to surveys. One problem with their procedure was that 16% of their participants were excluded for sharing pretzels.

Our study took place in a lab under the guise of a taste evaluation task. Participants could be isolated from each other and thus all data could be used.

## References

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- Mehta, R., & Zhu, R. J. (2009). Blue or red? Exploring the effect of color on cognitive performances. *Science*, 323, 1226-1229.
- Steele, K. M. (2013). Failure to replicate the Mehta and Zhu (2009) color-priming effect on anagram solution times. *Psychonomic Bulletin and Review*. Advance online publication. doi:10.3758/s13423-013-0548-3

## Method

### Participants

269 ASU undergraduate students (175 females, 94 males) participated in the study for course credit.

### Apparatus

Frito Lay <sup>TM</sup> Rold Gold Tiny Twist and Rold Gold Stick pretzels were used. The 23-cm diameter plates were obtained from a grocery store, in red, white, and blue. A 150-ml clear cup provided water.

### Procedure

Participants were told they would be evaluating two types of pretzels along several dimensions. They were provided with two covered plates of the same color (red, white, or blue) which contained either 10 pretzel twists or 10 pretzel sticks (counterbalanced for position). A cup of water was provided.

Two measures of current hunger were obtained (time since last meal and subjective rating on a 9-point scale). Participants were instructed to uncover the plates and sample the pretzels until they had a stable impression of the taste of each pretzel type. They were to cover the plates when done and not to sample again. A filler task produced a short time gap. The participants evaluated the pretzels on 5 dimensions (saltiness, crunchiness, flavor, color, attractiveness) on an 11-point bipolar scale. The final questions asked about general preference for pretzels and how often pretzels were eaten.

The experimenter counted the pretzels that remained after the participant left the room. Partially-consumed pretzels were counted as eaten if less than half remained.

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## Results

### Red Plates Increased Pretzel Consumption

The Figure shows the *M* and *SE* for the number of pretzels consumed per person as a function of plate color.

An ANOVA showed a main effect of color,  $F(2, 266) = 6.28$ ,  $p = .002$ ,  $\eta^2 = 0.044$ .

Post-hoc comparisons showed that more pretzels were consumed on red plates vs. white plates,  $t(178) = 2.78$ ,  $p = .006$ ,  $d = 0.42$ , and red vs. blue plates  $t(177) = 2.98$ ,  $p = .003$ ,  $d = 0.45$ .

The number of pretzels eaten on blue and white plates were not significantly different,  $t(177) = 0.15$ ,  $p = .88$ ,  $d = 0.02$ .

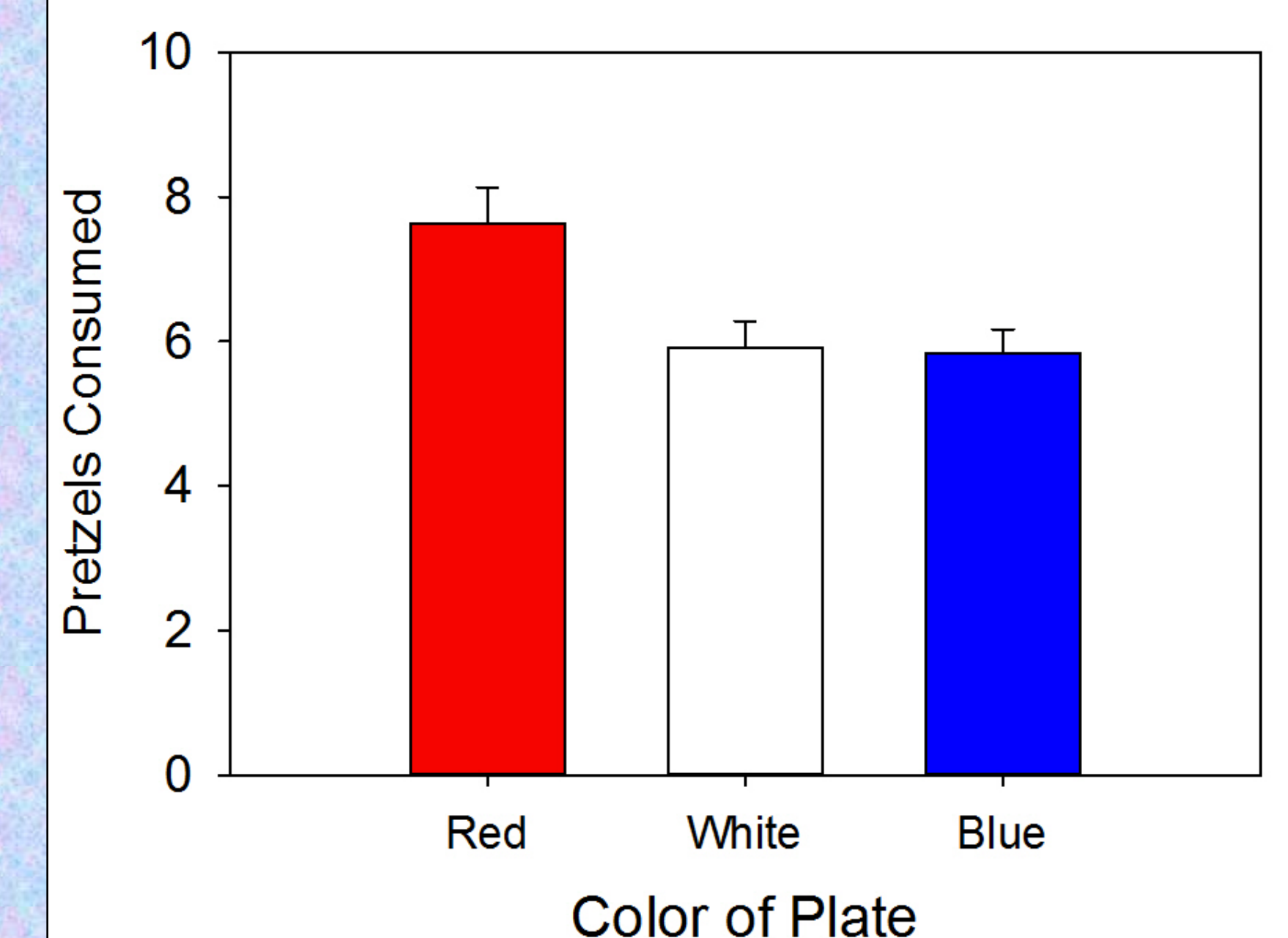
One alternative explanation is that by chance people in the red plate condition were more hungry. This possibility was examined by repeating the analysis with an ANCOVA, using the objective measure (time since eaten) or the subjective measure as the covariate. The main effect of color remained when the objective measure was the covariate,  $F(2, 265) = 6.37$ ,  $p = .002$ , and when the subjective measure was the covariate,  $F(2, 265) = 5.95$ ,  $p = .003$ . Post-hoc comparisons indicated that significantly more pretzels were consumed on red plates.

A final test was to examine whether the groups differed in hunger at the beginning of the experiment. ANOVAs were performed using both the objective and subjective measures of hunger as the dependent measure. There was not a main effect of color for the objective measure,  $F(2, 266) = 0.63$ ,  $p = .53$ , or the subjective measure of hunger,  $F(2, 266) = 0.94$ ,  $p = .39$ .

Reprint of Steele et al. (2014)



Pretzels Eaten on Different Plate Colors



## Conclusions

Genschow, Reutner, & Wänke (2012) hypothesized that the presence of red should elicit avoidance behavior towards snack food and reported reduced pretzel consumption when the food appeared on red plates.

Our study attempted to verify their report but found the opposite effect, red plates produced an increase in the number of pretzels eaten.

An alternative explanation, that somehow the groups were different in amount of hunger, was not able to account for the results. The lack of success with the alternative explanation suggests that the color effect is genuine.

An informal survey of students indicated that they were holding red cups when asked to imagine being at a party. This result suggests an experiential basis to our findings.

However, it is important to replicate and verify this result before proceeding with theoretical accounts.