 

# Investigating the influence of positively valenced decorative visuals on knowledge gain and risk perception

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## Introduction

Decorative pictures in multimedia material are visuals aimed at increasing aesthetic appeal rather than providing additional information and context,[1] and have been shown to influence cognitive processes and emotional affect.[1,2,3] Affect refers to the experience of an emotional state separate from mood, and is a key component of attitude[4]. Affect can be measured along the dimensions of activation and valence.[1] Valence is the force of attraction or aversion to a subject and is often described as a scale from positive to negative,[5] while activation is the degree of intensity of the emotion.

Several studies have found positive affect to be beneficial to human engagement, learning, and behavior. For example, adding a positively valenced decorative picture closely related to the subject material led to decreased irrelevant thinking and improved learning.[1] However, these findings are not consistent, and in another study, adding a decorative visual to a fact list decreased knowledge gain and attitude, and increased perceived risk.[6]

In this study, we ask the question: do positively valenced decorative visuals influence knowledge gain and risk perception?

## Material & Methods

We performed a 3 x 1 between-groups comparative study with picture type as the independent variable and knowledge gain, perceived risk, and positive attitude as dependent variables. Picture types consisted of positive visual (PosV), neutral visual (NeutV), and no visual (NoV).

Participants were shown an information sheet concerning *Myotis* bats and their interaction with humans. PosV and NeutV groups each contained one picture of a bat. Pictures were relevant to the content and questions in the survey, but did not provide any additional information. Positive and neutral visuals were determined from a preliminary ranking study of nine photos by 28 independent volunteers.

A total of 128 participants were recruited during the study; 28 for the preliminary photo ranking, 98 for the main study. Two participant's data were removed after data screening.

In the main study, participants were randomly assigned to one of the picture types, presented with the information sheet, and asked questions to evaluate their understanding of the information, their perceived risk of bats and diseases they may carry, and positive feelings and attitudes after looking at the information sheet and picture. NoV group respondents were not asked about a picture. All surveys were conducted online using Google Forms.

## Results and Discussion

Internal reliability scores of the risk perception and positive attitude questions were acceptable ($\alpha$=0.810 and 0.860, respectively), confirming the validity of the scales used in this study.

The positive visual used in the PosV group was rated as significantly more positive than the neutral visual in the NeutV group ($\bar{x}_{PosV}$=5.483(SD=1.056), $\bar{x}_{NeutV}$=4.806(SD=1.167), U=357.000, $p < 0.05$), confirming the influence of the visual on participant affect. However, this did not translate to a similar effect in knowledge, risk perception, and positive attitude scores ($H_{knowledge}$=3.950 ($p$ =0.139), $H_{risk}$=3.259 ($p$=0.195), $H_{positivity}$=3.575 ($p$=0.167)).

These results suggest that the positive affect elicited from a positively valenced visual did not influence knowledge gain and perceived risk towards the subject depicted in the visual. This contrasts with previous studies suggesting positive affect from a visual improves knowledge gain and decreases perceived risk. It should also be noted that although participants demonstrated a difference in positive affect when asked only about the visual, the difference in affect did not extend to their attitude towards bats.

It is important to note, however, that effect sizes were low (around f=0.12 for all tests), and achieved statistical power was approximately 0.19, well below the minimum acceptable 0.8. Therefore, there is an unacceptably high risk that these results constitute a false negative. To reduce the possibility of a Type II error and confirm the lack of significant difference between PosV, NeutV, and NoV groups, a greater sample size of upwards of 750 participants in total is required according to *a priori* estimates.

Additionally, this study could be further improved by the addition of more difficult questions evaluating participants' knowledge gain. In the current study, the majority of participants across all groups were able to correctly answer all knowledge questions, resulting in an inability to conclusively determine a difference between groups.

## References

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