Put on that colour, it fits your emotion:
Colour appropriateness as a function of expressed emotion

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Affectively driven colour-matching?

- People readily assign **affective meaning to colours** [1, 2]. **Hue** is considered the most salient descriptor of colour and colour-emotion associations [3]. Yet, **brightness** and **saturation** are other colour properties with strong affective connotations, especially of pleasantness or valence [4].

- **Colour appropriateness** judgment depends not only on the objective or functional features of objects (clothes, cars) but also on their subjectively perceived affective properties [5].

- The **Emotional Mediation Hypothesis** [6] suggests that colours are matched to emotional stimuli (faces, music) based on the congruence of the colour with the stimuli's emotional content.

Given that colour appropriateness is highly sensitive to the **context** in which the colour is evaluated, and emotion can be recognized from **bodily expression** [7] :

Research questions:
- Do nonverbal expressions of emotion influence an observer's judgment of colour appropriateness?
- *How* is expressed emotion related to colour brightness, saturation and hue?

Predictions: Expressions of positive (joy) emotion are associated with brighter and more saturated colours than are expressions of negative (fear) emotion. The heterogenous literature did not allow a clear-cut prediction on the exact hue range appropriate for these emotions.

Colour appropriateness rating

Couleur: H341 S24 B28
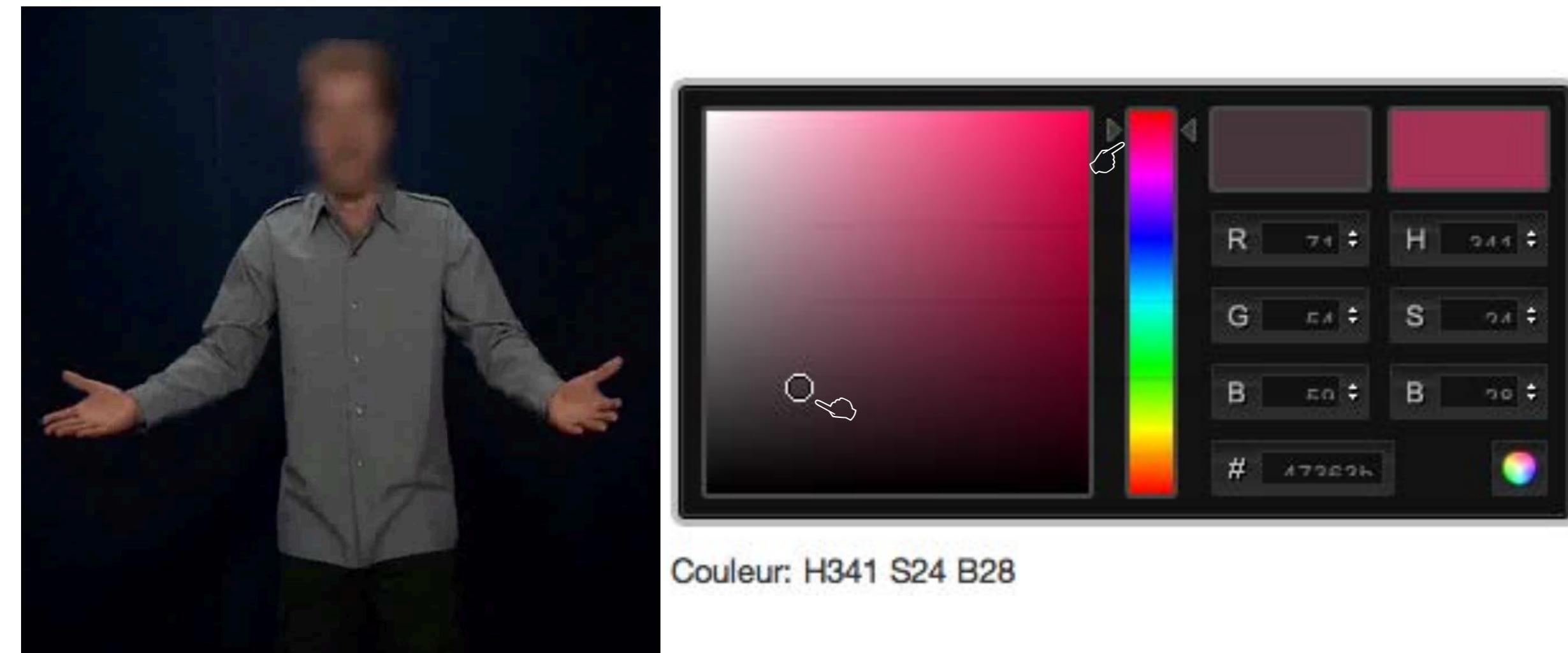
8 Video clips selected from the Geneva Multimodal Emotion Portrayals corpus [8]
2 emotions (elated joy, panic fear) expressed by 4 professional actors (2 male)
Upper body clothing desaturated to a mid level grey (matlab)

Colour choices

Panic fear   Elated joy
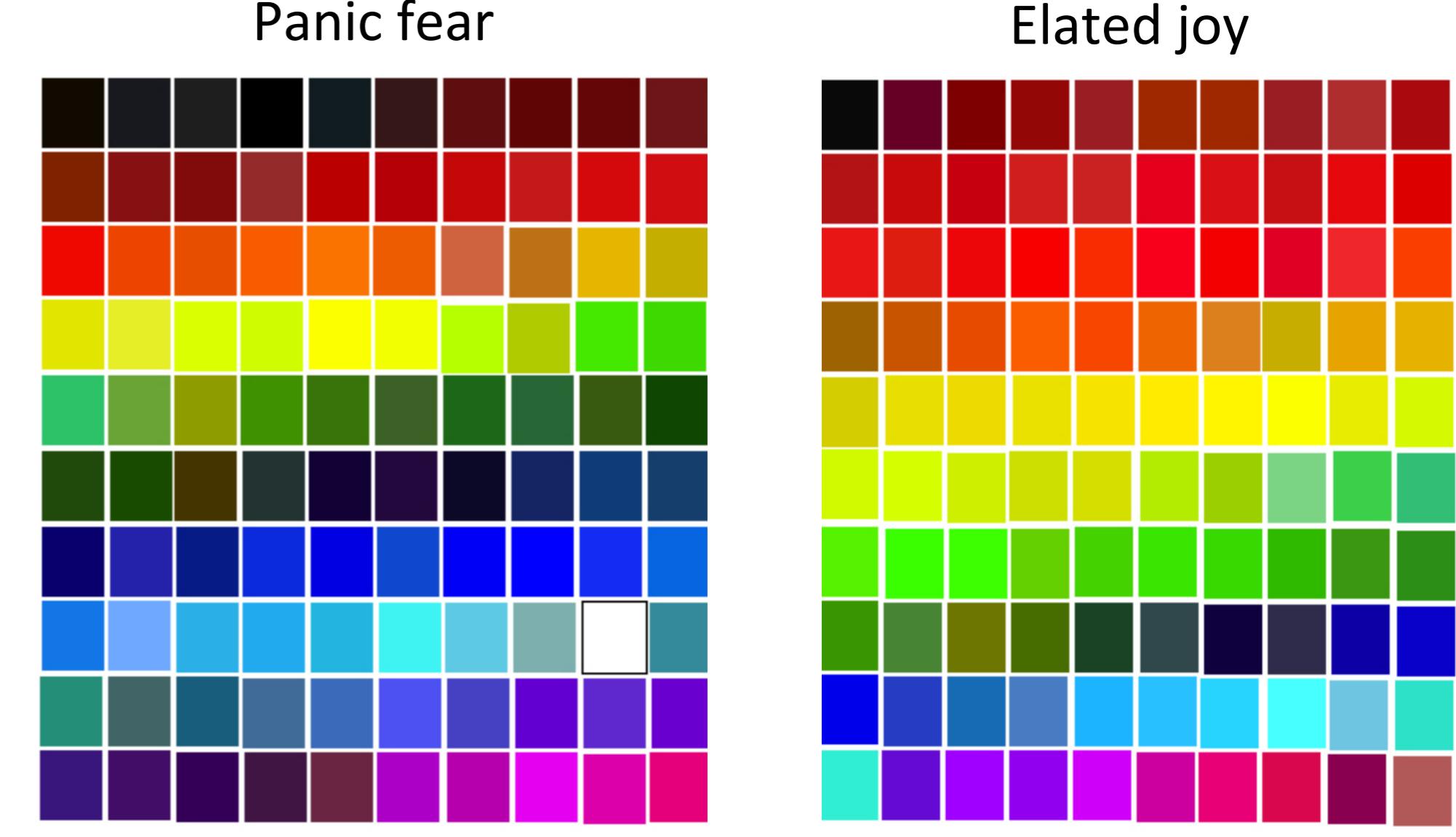
25 non-colour blind students (13 females) selected for each expression shown (N = 8) the most appropriate values of hue, brightness, and saturation using HSB colour sliders

Hue effects

- The most appropriate hue level differs between expressed emotions, $\chi^2(2) = 9.45$, $p_{(two-tailed)} = .01$
- Multilevel logistic regressions per hue range of 90° in progressive steps of 30°. Emotion (not actor or the interaction) affects the most appropriate hue ranges:
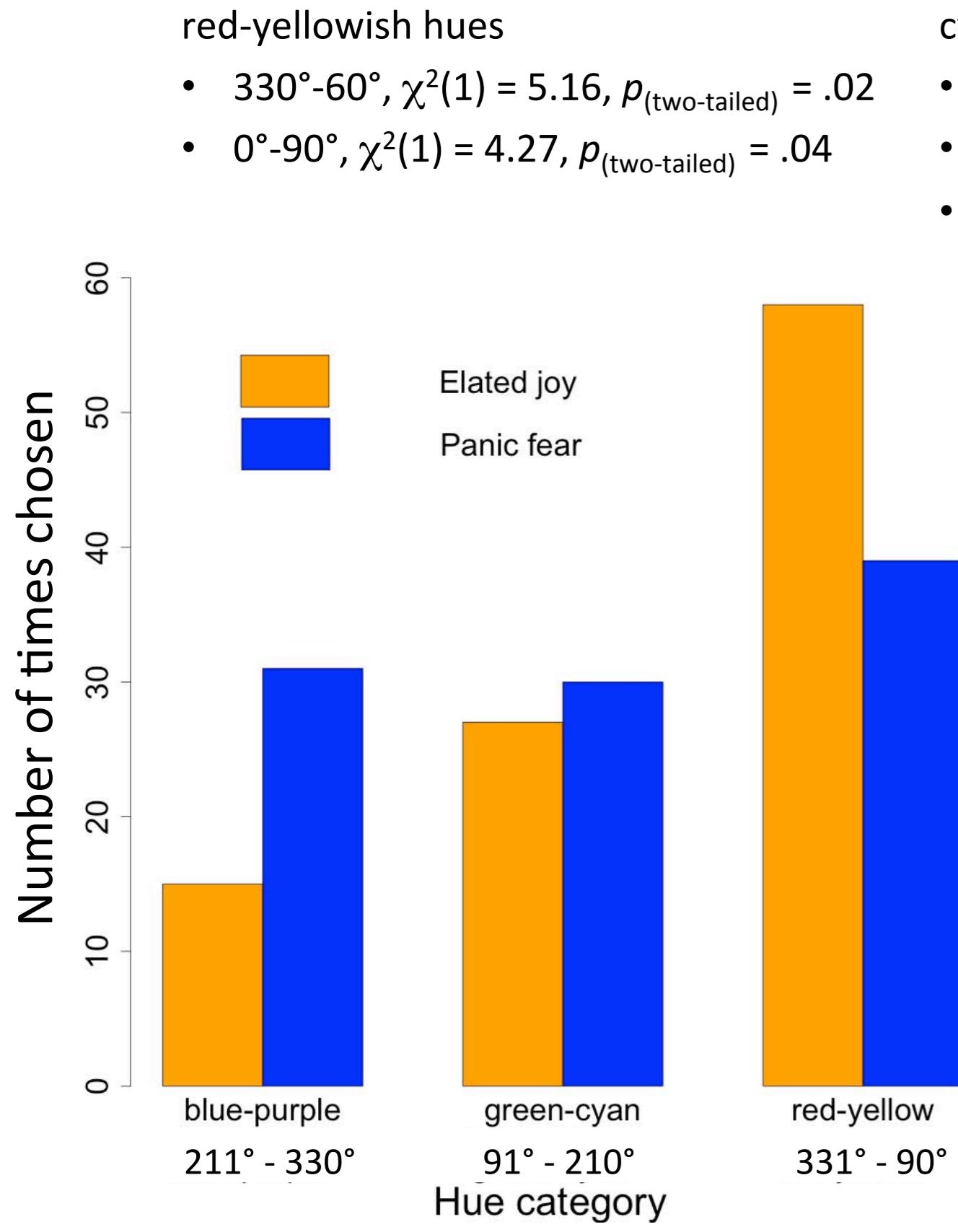
red-yellowish hues
- 330°-60°, $\chi^2(1) = 5.16$, $p_{(two-tailed)} = .02$
- 0°-90°, $\chi^2(1) = 4.27$, $p_{(two-tailed)} = .04$

cyan-bluish hues
- 150°-240°, $\chi^2(1) = 6.75$, $p_{(two-tailed)} = .01$
- 180°-270°, $\chi^2(1) = 7.97$, $p_{(two-tailed)} < .01$
- 210°-300°, $\chi^2(1) = 7.01$, $p_{(two-tailed)} = .01$

Brightness & Saturation effects
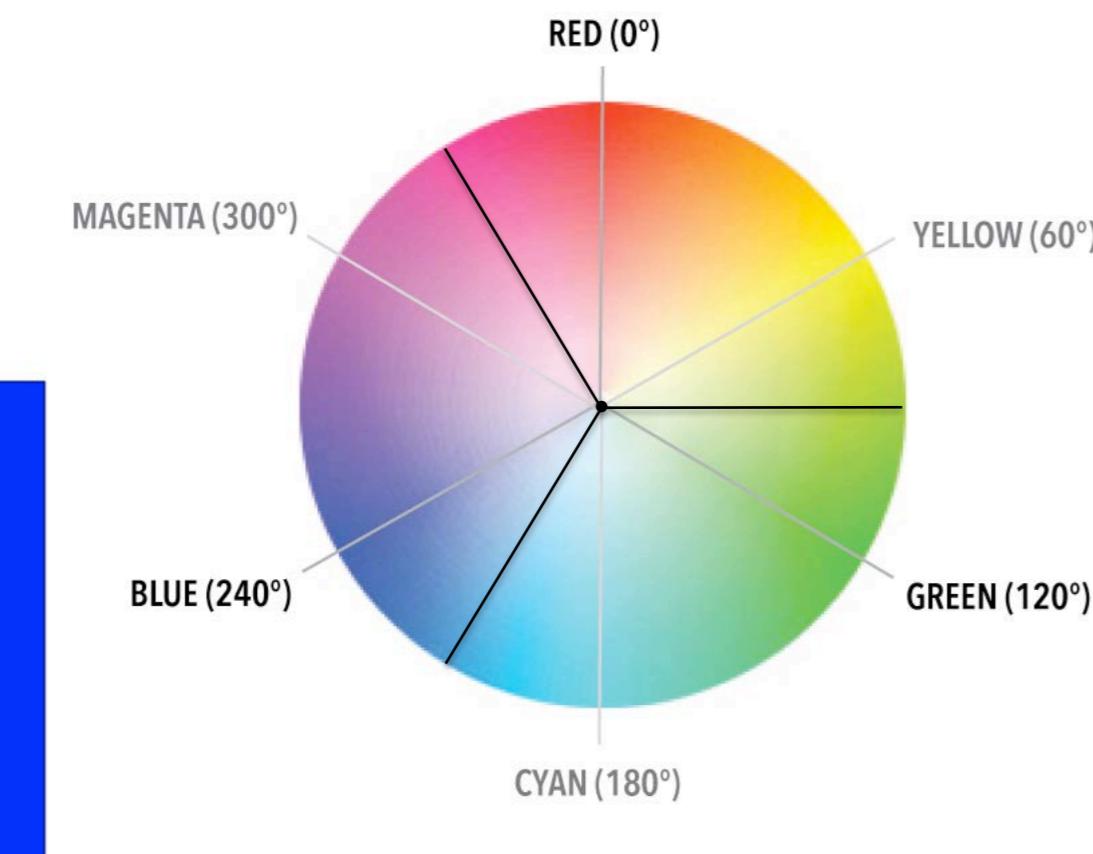
- Interrater reliability: Participants use the brightness scale (Cronbach $\alpha = .78$) but not the saturation scale ($\alpha = .54$) consistently to judge its appropriateness
- Brightness and saturation are moderately correlated (Pearson's): $r_{bri\,sat} = .52$, $p_{(two-tailed)} < .001$
- Repeated measures ANOVA of Emotion (2) x Actor (4):
  - Expressed emotion affects the most appropriate brightness ($F(1, 24) = 14.59$, $p_{(two-tailed)} = .001$, $\eta_p^2 = .38$)
  - No effect of actor (main or interaction)
  - Expressed emotion affects the most appropriate saturation ($F(1, 24) = 7.01$, $p_{(two-tailed)} = .014$, $\eta_p^2 = .23$)
  - No effect of actor (main or interaction)
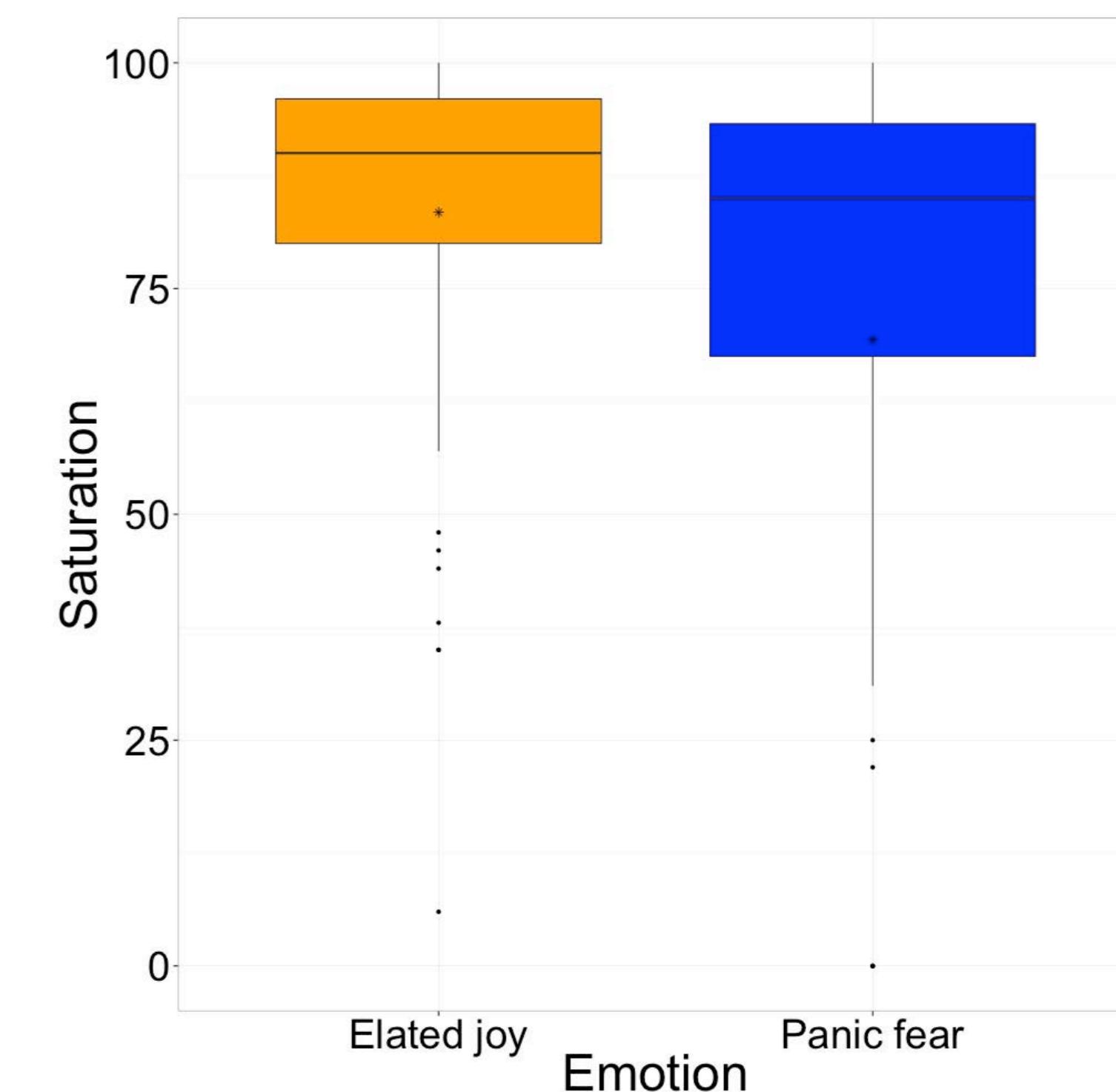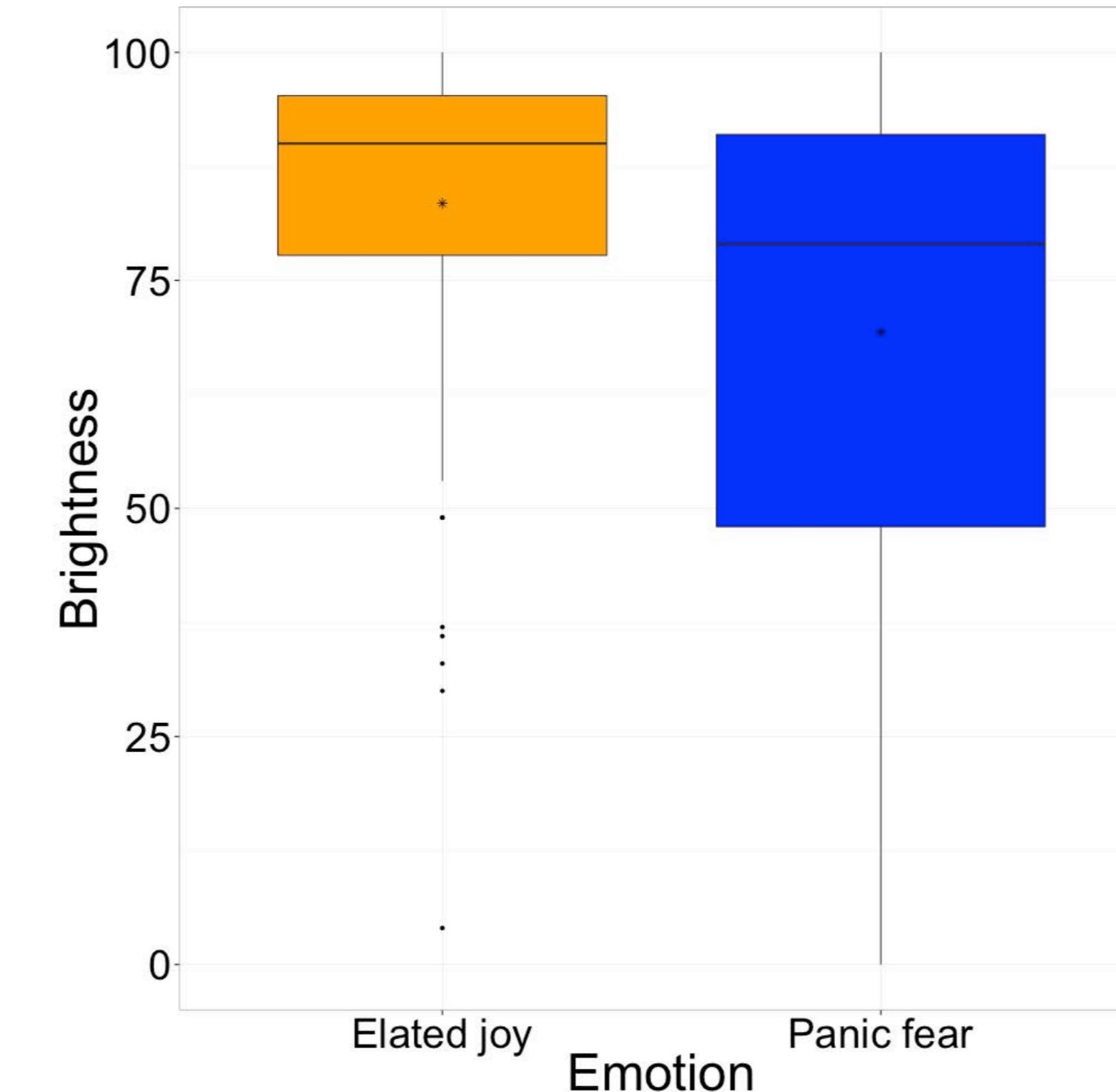
Conclusions

- The choice of colour brightness for non-verbal emotion expressions was stable across participants, this was was less prominent for the choice of color saturation

- As predicted, colours chosen for the joy expressions were brighter and (to a lesser extend) more saturated than those for the fear expressions

- Colours along the red-yellow hue spectrum were deemed more appropriate for joy expressions and cyan-bluish hues for fear expressions.

- **Expressed emotion influences judged colour appropriateness, congruent with the depicted emotional content**

- **Conjecturally, colour in clothing can be a general contextual cue to convey and infer emotional intensions**

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