**Motivation**

Interior-design experts’ suggestions
- Luminance: Perceived height is said to increase both with increasing ceiling luminance and increasing luminance contrast of ceiling and walls (e.g., Neufert & Kister, 2009).
- Saturation / Hue: Several specific assumptions like, for example, that colorful ceiling colors such as pure red, green, or blue, have an “oppressive” effect on perceived height (e.g., Meerwein, Rodéck, & Mahnke, 2007).

Studies on interior space perception
- Luminance: Perceived height of greyscale three-dimensional room simulations increases with increasing ceiling luminance (e.g., von Castell, Hecht, & Oberfeld, 2016).
- Additive effect of wall luminance: maximum perceived height, when both ceiling and walls have maximum luminance (e.g., Oberfeld, Hecht, & Gamer, 2010).

Do luminance, saturation, and/or hue of chromatic ceiling colors influence the perceived height of interior spaces?

**Method**

Subjects
- N = 22 (10 women, 12 men)
- Age 19 to 34 years (M_age = 23.95, SD_age = 3.57)

Apparatus
- Oculus Rift DK2
  - FOV: horizontal ≈ vertical ≈ 100°
- Virtual eye height: 1.30 m
- Rear wall luminance: 4.75 cd m⁻²
- Maximum effect of hue on perceived height for medium-high (3.00 m) high-luminance (Y+) ceilings (not illustrated)

Stimuli
- 3D room simulations
  - Independent variation of ceiling luminance, saturation, and hue
  - Constant luminance of rear and side walls (M, = 25.46 cd m⁻²)
  - Variation of ceiling height
  - Constant room width (4.50 m) and depth (5.80 m)

**Design and Procedure**

Independent variables (IVs)
- Luminance Y (Y, Y')
- Saturation S (S, S')
- Hue H (Red, Green, Blue)
- Luminance-matched achromatic ceilings (Grey)
- Ceiling height (2.90, 3.00, 3.10 m)

Dependent variable (DV)
- Centimeter ratings of perceived height

**Results**

**Luminance**
- Perceived height increased with increasing ceiling height, both for chromatic (η²_p = .81) and achromatic (η²_p = .76) ceiling colors

**Saturation**
- Maximum effect of hue on perceived height for medium-high (3.00 m) high-luminance (Y+) ceilings (not illustrated)

**Hue**
- First indications that ceiling hue influences the perceived height of interior spaces: subjects judged green ceilings slightly lower than red, blue, and grey ceilings
- Virtually no effect of saturation
- No evidence for an “oppressive” effect of colorful ceilings on perceived height

**Conclusion**

- The previously reported achromatic luminance effect can be generalized to chromatic ceiling colors: subjects judged lighter ceilings higher than darker ceilings, independent of saturation and hue.
- Absence of luminance effect in the achromatic condition probably due to a smaller luminance difference than in previous studies (e.g., Δ_L = 16-46 cd m⁻² in von Castell et al., 2016).

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**References**
