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How does object processing shape the visual appearance of scene context ?

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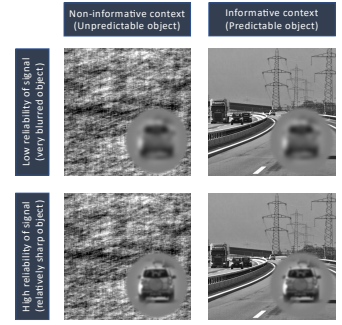
CONTEXT

Visual perception is not only determined by the intrinsic characteristic of **sensory inputs** but also by the **expectations** we have about them^[1].

Previous studies on scene perception have for example shown that **context-based expectations** influence object categorization speed^[2] and accuracy^[3] but also their **subjective perception when visual inputs are noisy**^[4].

Blurred objects that can be expected on their contextual information are perceived as sharper than the exact same blurred object that cannot (i.e., embedded in a meaningless, non-informative context)^[4].

This effect was shown to be **modulated by the quality** (i.e., reliability) of visual signals and was stronger as visual inputs were noisy (i.e., blurred)^[1,4,5].



AIM :

Can object-based expectations reciprocally sharpen the visual perception of scene contextual information ?

METHOD → BLUR PERCEPTUAL MATCHING TASK

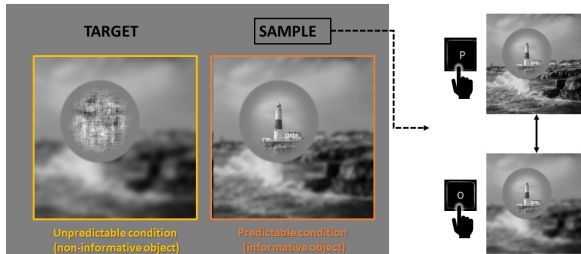
Participants: N = 30 (21.35 ± 3.61 years, 16 F)

Stimuli: 20 real-world scenes (10 indoors/10 outdoors scenes), containing a main object, resized to 350 x 350 pixels and converted to 256-level gray-scale images.

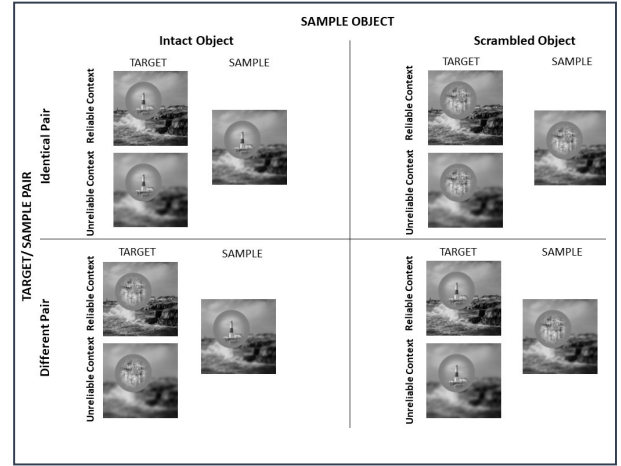
For each scene, contextual information was blurred with 31 blur levels. On each blurred context, we integrated an intact or phase-scrambled object.

Procedure :

- ❖ 2 images (Target and Sample) appear simultaneously on the screen.
- ❖ **Different blur level for each context → Participant had to adjust the blur level of the Sample context to match it with the Target one.**



Experimental conditions:

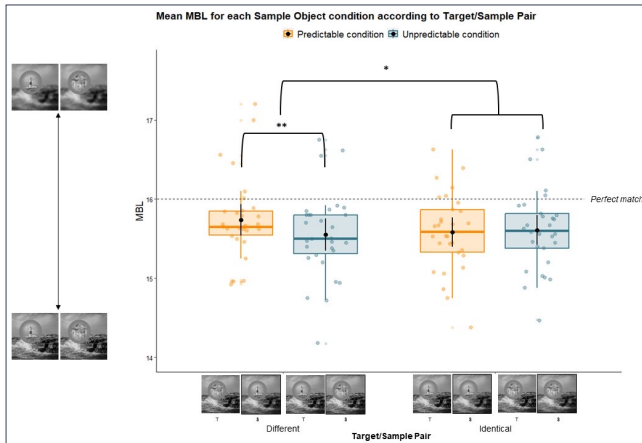


- ❖ **Mesure:** Matched Blur level (MBL) = Blur level attributed to the Sample context when matched to the Target context)

→ In the Different Target/Sample Pair condition:

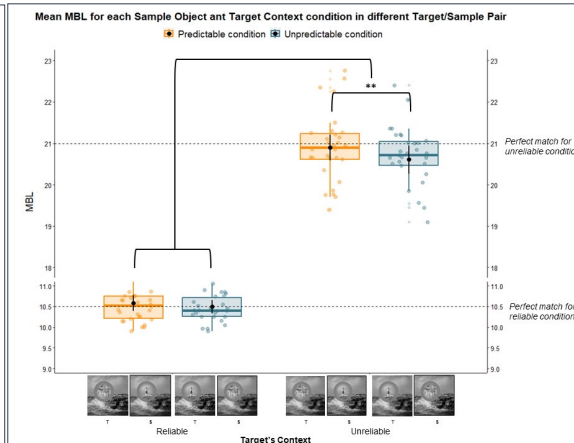
At an objectively equal blur level, scene contexts that can be expected based on object information (containing an intact object) should be subjectively perceived as sharper than context cannot (containing a scrambled object). Participants should compensate this perceived difference between contexts by attributing a higher blur level to Sample context when it contains an intact object than when it contains a scrambled object.

RESULTS



→ **Interaction between Target/Sample Pair type and Predictability of Context :** The MBL attributed to the context of the Sample is significantly higher when the object present in the context is intact (predictable) than when the object is scrambled (unpredictable).

→ **Therefore, in Different Target/Sample pair condition, at an objectively equal level of blur, participants perceive the context containing an intact object as sharper than a context containing a scrambled object.**



→ **This effect is significantly more pronounced when the Target Context is unreliable** (i.e., blurrier than the Sample context)

→ **This perceptual sharpening effect of expectation increase as the signal reliability decrease.**



CONCLUSION

Object-based expectation can also sharpen the perception of scene contextual information, especially when the signal reliability is low. Our findings are in line with recent neuroimaging findings^[6], demonstrating the reciprocal influence between context and object-based expectations in shaping the visual perception of scenes.

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