CAN SEGMENTATION INFLUENCE RAPID SCENE CATEGORIZATION?

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CATEGORIZATION

is **fast** (Thorpe et al., 1997; Oliva & Torralba, 2001)
can be accounted for by **feedforward** processing (Serre et al., 2007; Krizhevsky et al., 2012)
requires **no segmentation**

HOWEVER, segmentation into

object surfaces (Nakayama et al., 1995)
or **proto-objects** (Rensink, 2000; Pylyshyn, 2001)
has been proposed as a basis for categorization

QUESTIONS

How fast is segmentation computed?
Can it occur **prior to categorization** (at least to some extent)?

DESIGN

IDEA Manipulate segmentation cues available to participants who are completing a categorization task

IF segmentation influences categorization

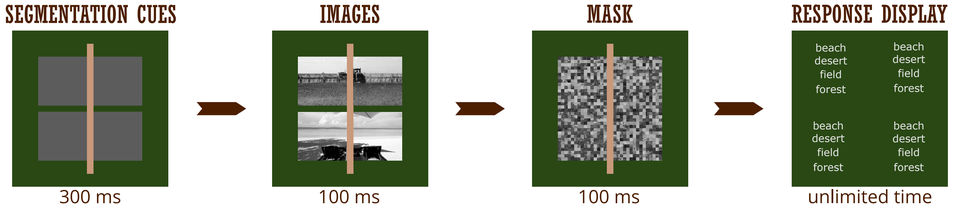
THEN segmentation is as fast as categorization, i.e., feedforward

SETUP

Participants presented with two images of scenes (oriented either vertically or horizontally). The images were divided in half by an orange occluding bar.

Participants were informed that there were only two different images and were asked to report their categories.

Thus, the task required to disregard any grouping cues.



MANIPULATION

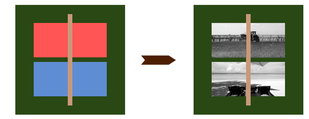
Pre-segmentation cues and an occluding bar either support the correct grouping of the image halves or not.

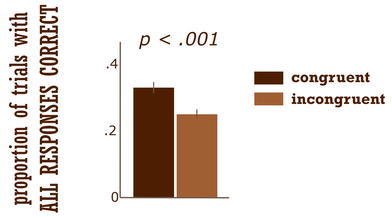
Do these cues influence participants?

RESULTS (n = 10)

Experiment 1

Red/blue pre-segmentation cues



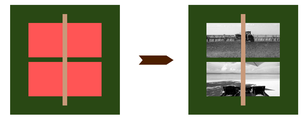


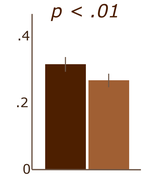
When observers categorize all four images correctly, that means they correctly parsed the display into two vertical or horizontal patches irrespective of segmentation cues.

These plots show the proportion of trials they could do so. It is harder to ignore segmentation when it is acting against categorization (i.e., incongruent trials).

Experiment 2

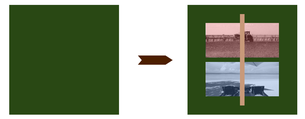
Identical pre-segmentation cues

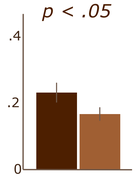




Experiment 3

No pre-segmentation cues but stimuli sightly tinted





The effect remains robust even when no cues are present beforehand.

CONCLUSIONS

1. Grouping cues can influence scene categorization
2. Some grouping is performed as fast as categorization
3. Compatible with feedforward processes of segmentation

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