



Conceptual Masking: Is it really all about the concept or does layout matter?

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Purpose

What is it about the onset of a new scene that draws attention?

- 1) A scene's *gist*
 - Gist is characterized as the general theme of a scene, such as "baby reaching for a butterfly" (Potter, 1976) or a "kitchen scene" (Biederman, 1972, 1974).
 - Observers cannot ignore a new, meaningful scene. Gist acquisition automatically draws attention, thus disrupting processing of previously view scenes; conceptual masking (Potter, 1976).
 - Supporting this idea, observers are able to ignore new, meaningless pictures (changing contours and colors) and also repeating, meaningful pictures (Intraub, 1984).
- 2) What about layout?
 - In prior research, new conceptual masks were completely new pictures and therefore contained both a *new gist* and a *new layout*...but gist got all the "credit" for disrupting memory.
 - We sought to determine if observers could ignore changes in layout (independent of changes in gist). If they could not, we ask, "is conceptual masking truly conceptual?"

Hypotheses

- 1) A scene conveying a new gist cannot be ignored and will cause conceptual masking during sequential presentation, whereas changes in layout that do not affect gist can be ignored.
- 2) Layout acquisition is as fundamental to scene perception as gist acquisition. All things being equal, changes in layout (irrespective of gist) will also automatically draw the observer's attention causing "conceptual masking".

Two Conditions - defined by object layout in conceptual masks

Condition 1: New Objects Same Layout



Condition 2: New Objects New Layout



Thus to-be-ignored pictures ALWAYS changed in terms of gist



Memory for the target pictures was tested using a Two Alternative Forced Choice (2AFC) test, which presented the same gist, but a different scene.

Experiment 2

Same as Experiment 1 but new, more complex masks, 20 target pictures (100 ms) and 4 conceptual mask conditions (N = 40 in each).

Condition 1: Same Objects Same Layout



Condition 2: Same Objects New Layout



Condition 3: New Objects Same Layout



Condition 4: New Objects New Layout



Summary

1. It is known that a new gist (i.e. new theme) draws attention to a scene even when people try to ignore it (conceptual masking).
2. In Experiment 1, when gist changed, similarity of layout mattered: when layout stayed the same, to-be-ignored scenes drew less attention than when both gist and layout changed.
3. In Experiment 2, when the same gist was always repeated, again layout mattered: when layout stayed the same to-be-ignored scenes drew less attention than when layout changed.
4. The results of Experiments 1 & 2 both suggest that the specific layout of objects in a scene captures attention.

Conclusions

Conceptual masking is not limited to the onset of a novel gist. It is also caused by the onset of a limited layout in a meaningful scene.

How is layout represented?

Sanoeki (2003) argued that layout and objects are bound together in scene representations. We show that changing layout causes conceptual masking above and beyond changing gist. Thus, layout might be represented at an abstract level, separate from object identity, as has been argued in the contextual cueing literature (Jiang & Song, 2005). Repetition of the same abstract representation might make the scene easier to ignore, independent of gist.

Is conceptual masking truly conceptual?

If layout is conceptualized as being independent from gist, then our findings might cause one to question if conceptual masking is really *conceptual* in nature. On the other hand, the meaning of a scene is certainly more than its abstract gist. The specific layout of objects may contribute to its meaning. For example, given the same gist (e.g. bottles on a table), bottles that are evenly spaced vs. askew in a haphazard way, would likely convey a different meaning (the beginning vs. the end of a party). In support of this possibility, camera viewpoint affects both the interpretation and recall of visually presented narratives (Kraft, 1987).

It is known that in the absence of meaningful objects, the overall spatial structure of a scene can convey its gist (Schyns & Oliva, 1994; Biederman, 1981). Our results suggest that it is time to revisit our concept of "gist" to explore more subtle nuances of scene comprehension.

References

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Experiment 1

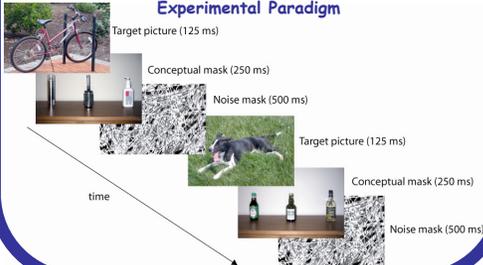
In Experiment 1 the conceptual masks presented a new gist each time, but in one condition the layout remained the same (N = 32) and in the other it changed each time (N = 32).

Method

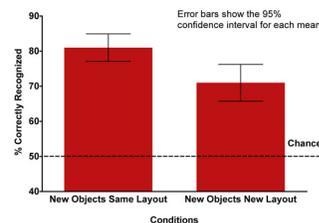
16 to-be-remembered pictures (target pictures), were interspersed with 16 to-be-ignored conceptual masks and noise masks.

Counterbalancing: across participants each target was masked by each individual conceptual mask.

Experimental Paradigm



Results & Discussion



When the conceptual mask contained a new gist each time but layout was maintained, target recognition benefited ($t(62) = 3.10, p < .01$).

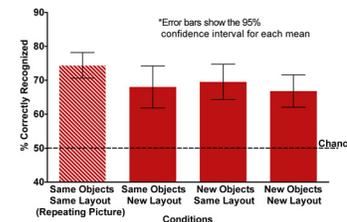
"Conceptual masking" involved more than a new "gist". Conserving layout lead to better recognition even in the presence of new objects.

One possibility is that an abstract representation of layout (Jiang & Song, 2005) made masks easier to ignore. This representation would be independent of object identity.

Bottom Line

When layout repeated target recognition was superior - this suggests that gist is not the only aspect of a scene that draws attention.

Experiment 2 Results & Discussion



Orthogonal planned contrasts, comparing the repeating picture condition with each of the other three conditions showed that when either the objects ($t(156) = 2.0, p < .05$), layout ($t(156) = 2.7, p < .01$) or both changed ($t(156) = 3.2, p < .01$), memory was significantly impaired.

Bottom Line

Whether gist, layout or both changed, recognition of target pictures suffered - this again suggests that "gist" is not the only aspect of a scene that draws attention.