Amodal completion in passively viewed displays: A priming study
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Introduction
Until recently, investigations of perceptual grouping based on pre- and post-constancy information, respectively, employed direct report paradigms (e.g., Palmer, Neff, & Beck, 1996; Schulz & Sanocki, in press). Follow up studies using indirect measures instead (e.g., Schulz, 2002) showed that direct measures of grouping may not be entirely appropriate because the unlimited exposure of the display, and the conscious decision demanded of the participant, most likely convert the participants’ task from a perceptual grouping task into a cognitive categorization task. Here, we employ an indirect measure of grouping (a masked priming paradigm) to investigate the time course of grouping based on pre- or post-amodal completion information. Our displays are based on Palmer et al. (1996), but, unlike the latter, we do not require participants to make any explicit decisions about the direction of grouping.

Adantages of the paradigm
• Priming paradigm provides an indirect measure of the perception of the prime, rather than relying on introspection.
• SOA manipulation allows us to look at time course of amodal completion in ‘real time’.
• Target display was unrelated to amodal completion; hence does not induce participants to perform amodal completion on the prime.
• Responses to the targets reflect priming by grouping rather than priming by shape similarity.

Experiment 1: Methods
• Methods as described in General Method section.
• ‘Thick’ occluder, sufficiently wide to accommodate the completed portion of the partially ‘occluded’ disks.

Experiment 1: Results
• Whether grouping occurs or not depends on the location of the central column relative to the occluder, which appears to function as a scene divider, interfering with post-completion grouping when it separates the central column from the two columns of complete disks.
• Grouping by amodal completion appears to occur between 48 and 112 ms (showing up as a slowing of responses to pre-completion targets). (See panel A above.)

Discussion
• Expt. 2 indicates that amodal completion occurs even under conditions in which the completed contour is not consciously perceived.
• Inferred contours seem to be subject to context effects.

Experiment 2: Methods
In order to test whether the visual system will complete partially ‘occluded’ surfaces under ecologically impossible conditions, we constructed the stimulus on the right. The only change from Expt. 1 was a reduction of the occluder to a bar 1/4 its original width.

Discussion
We again obtained evidence of completion between 48 and 112 ms, again surfacing as an inhibition of the pre-completion response. In Expt. 2, however, this inhibition occurred when the divider separated the central column from the two columns of complete disks.

Conclusions
• Direct report paradigms of perceptual grouping with unlimited exposure should perhaps be considered categorization tasks.
• Grouping based on amodal completion occurs between 48 and 112 ms, and, at least as measured in this priming paradigm, appears to be transient.
• Inferred contours seem to be subject to context effects.