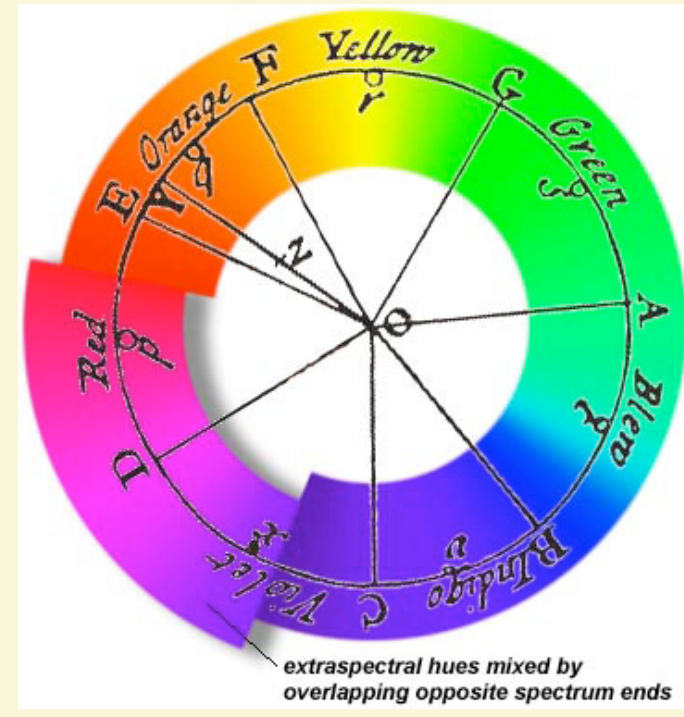


Isaac Newton's Hue Circle (1704)

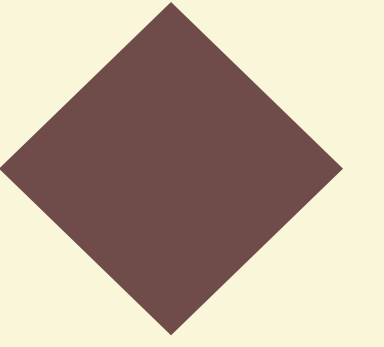


COLOR HARMONY

Increases the Capacity of Visual Short Term Memory

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PURPOSE

Harmonious colors are subjectively pleasurable. Does color harmony also have objective effects, on the efficiency of the mind?

We varied color harmony (hue similarity), and measured its influence on an objective visuocognitive property of mind, the capacity of visual short term memory (VSTM for colors).

COLOR HARMONY – BACKGROUND

Color harmony has been examined for centuries, including theorizing by Newton (1704), who viewed it as analogous to musical harmony, and Chevreul (1839) who did systematic empirical studies. Psychological research has continued, and modern studies converge on hue similarity as the strongest determinant of subjective harmony (e.g., Polzella & Montgomery, 1993, Ou & Luo, 2006).

METHOD

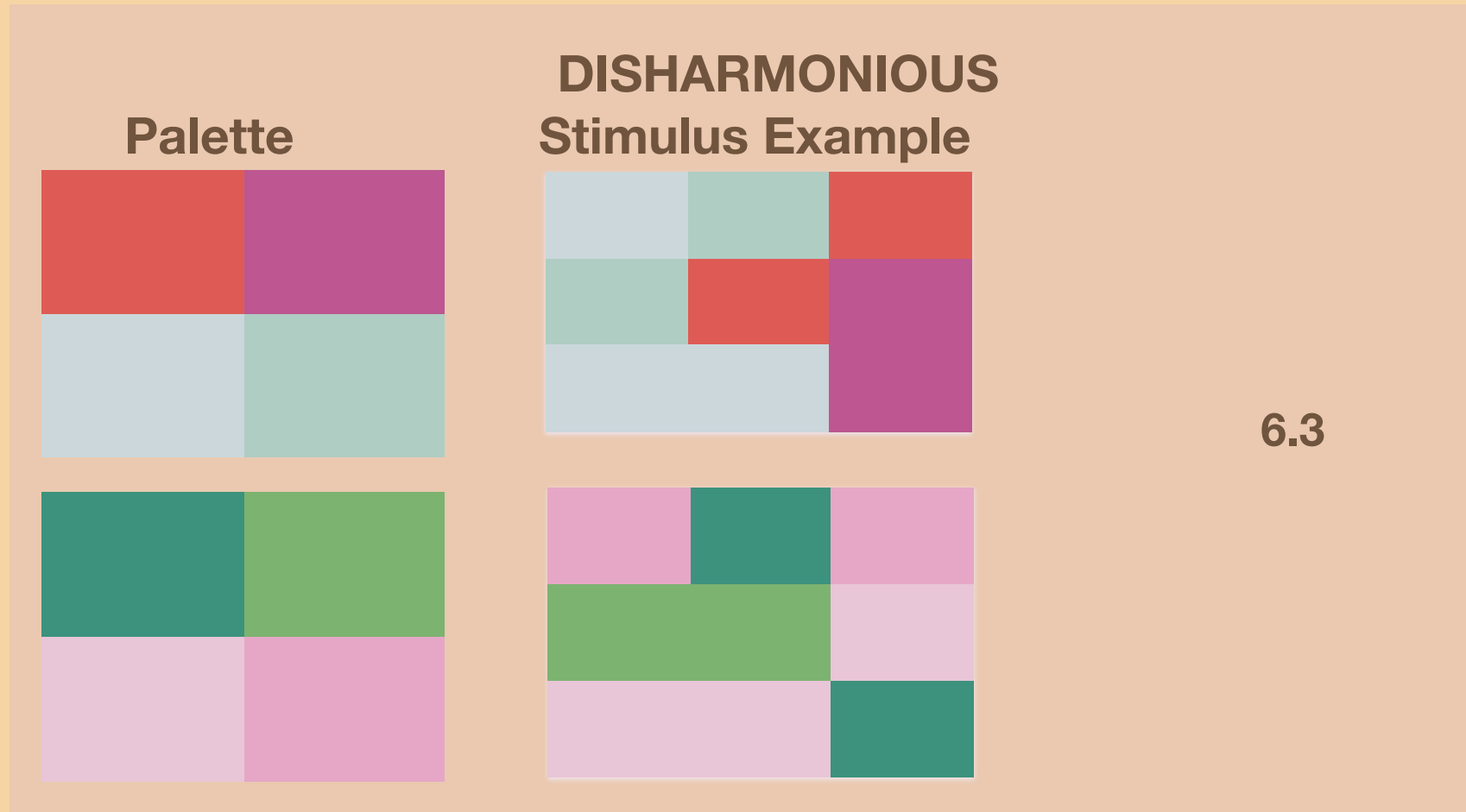
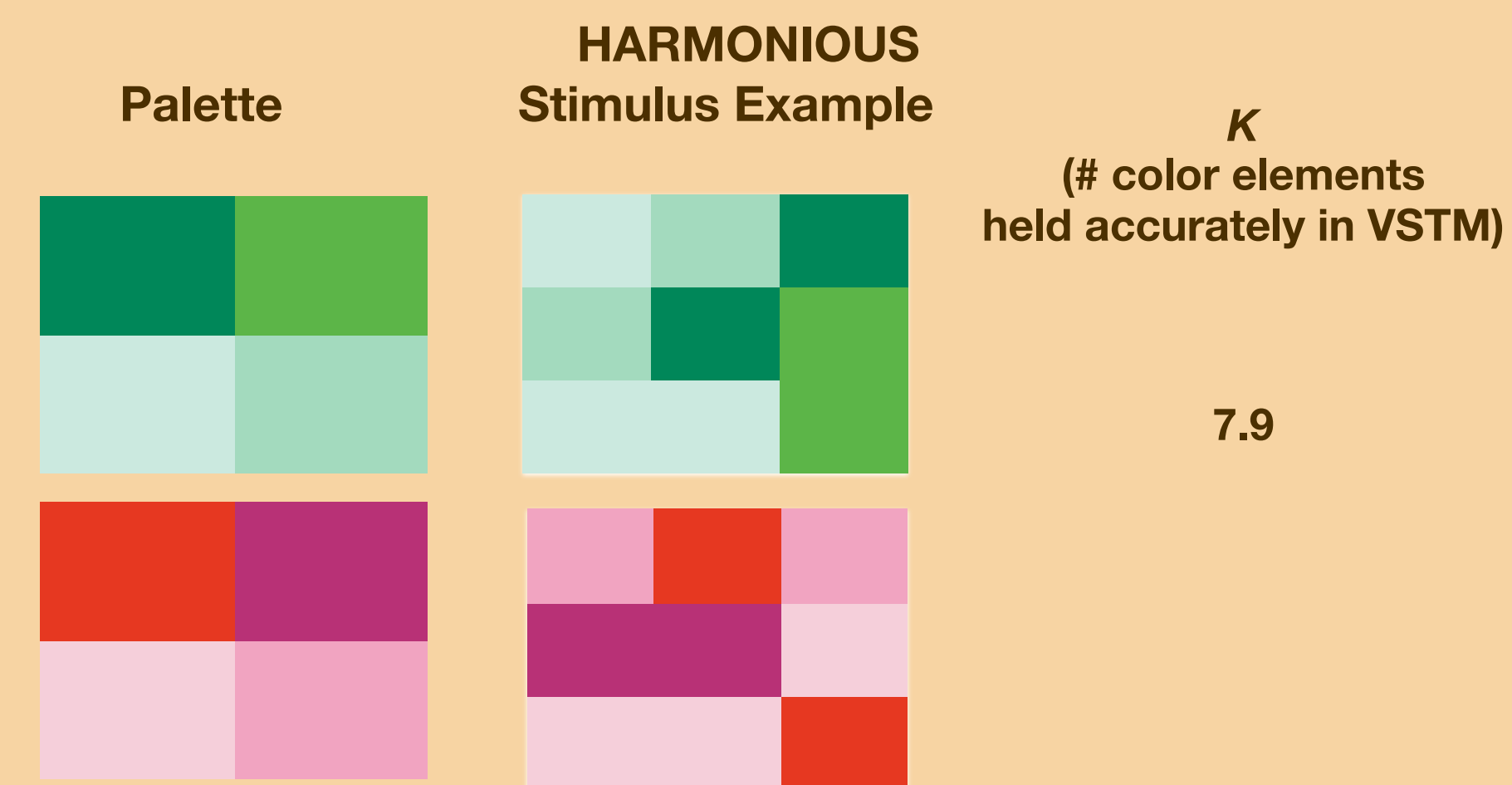
Patterns of 9, 12, or 15 colored squares were presented briefly, to be held in STM for 1 sec and then compared against a test pattern that was same (identical) or different in the color one square. Color changes were equated across conditions.

<< Try (find the change) !!

Colors came from 4-color palettes that were either harmonious (similar hues) or disharmonious combinations of the same colors. Palettes were rated for subjective pleasure separately from VSTM study.

EXPERIMENT 1

VSTM accuracy was measured and converted to capacity (Pashler's K) for 2 harmonious (similar hue) and 2 disharmonious (diss) palettes.



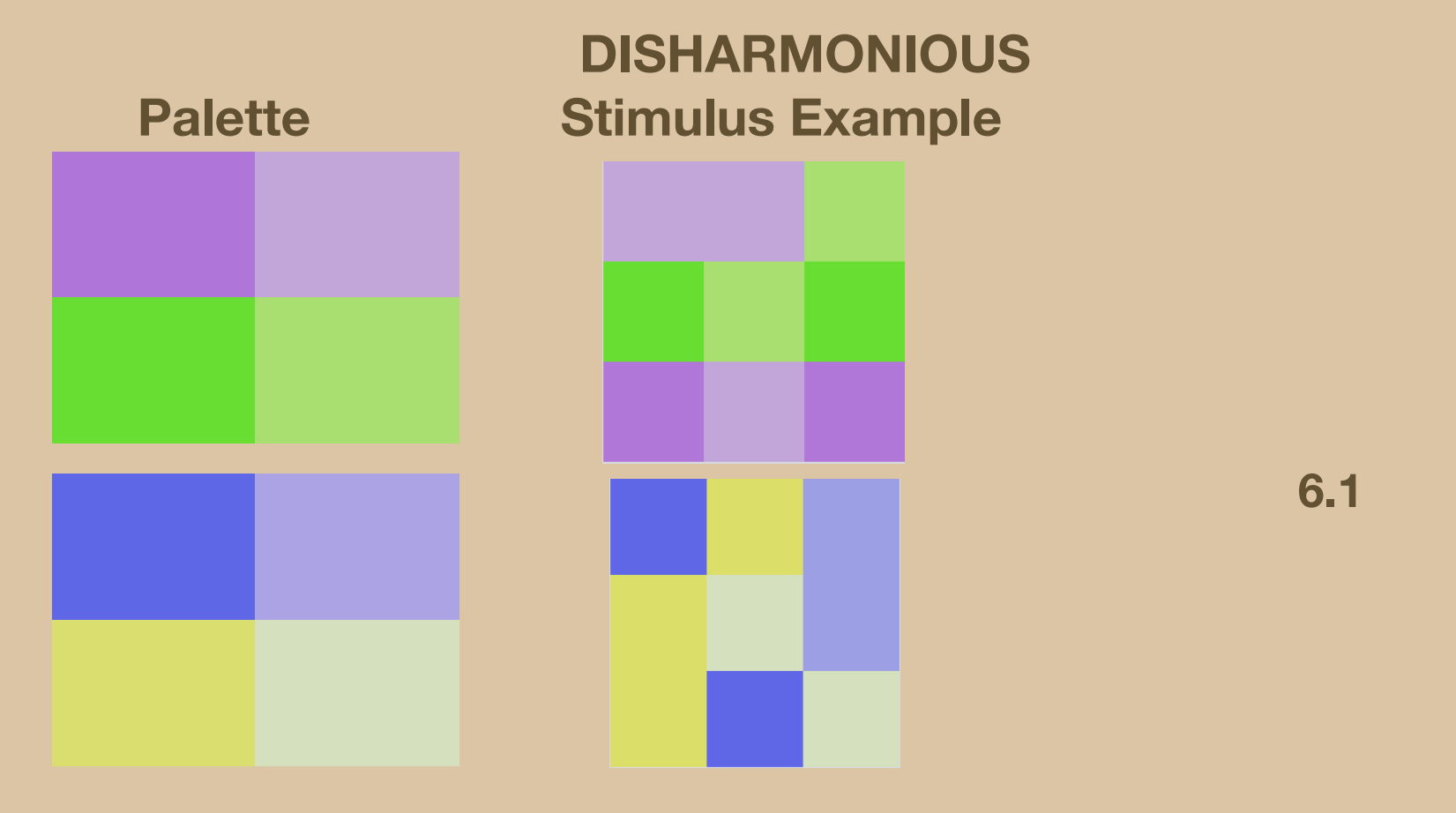
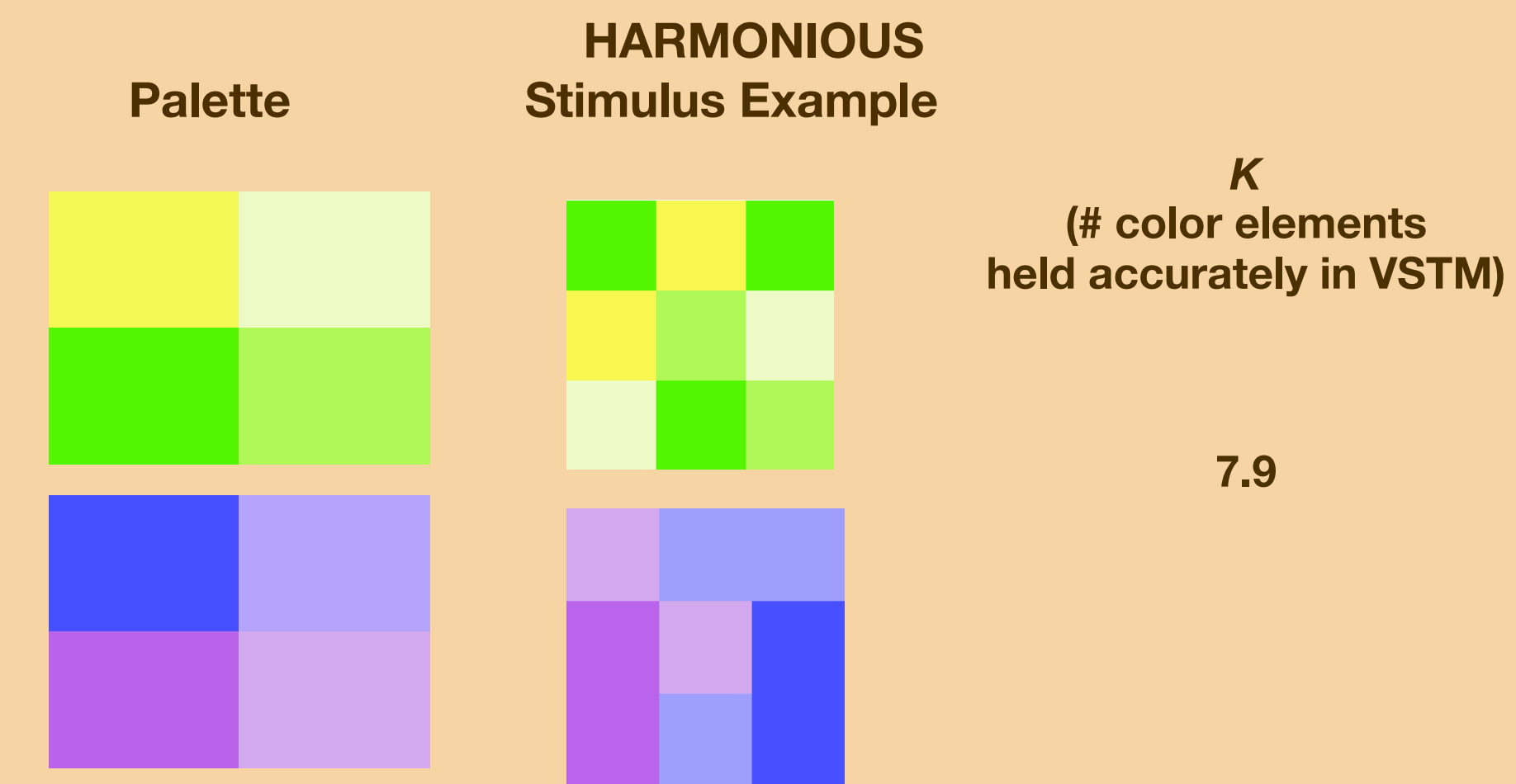
DISCUSSION

Observers held 26% more stimulus information in VSTM when the colors were harmonious.

Alternative explanations are discussed below; the design was replicated with new palettes in Experiment 2.

EXPERIMENT 2

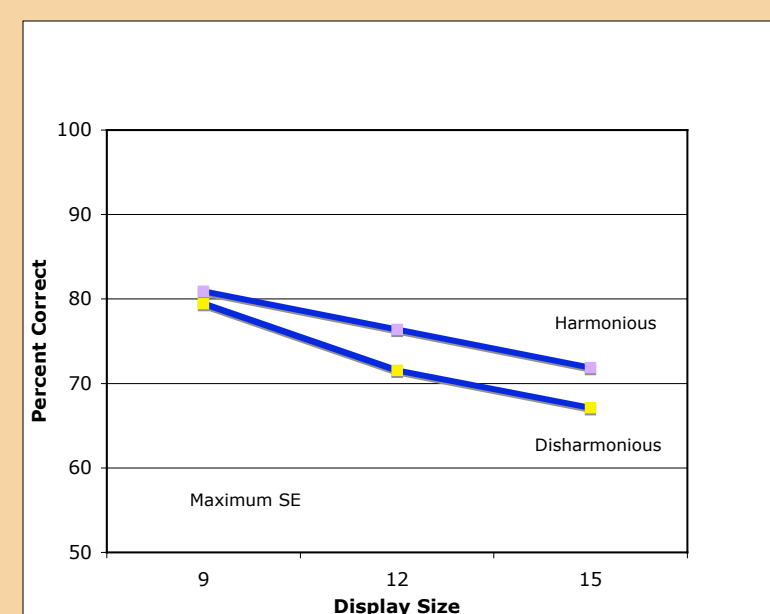
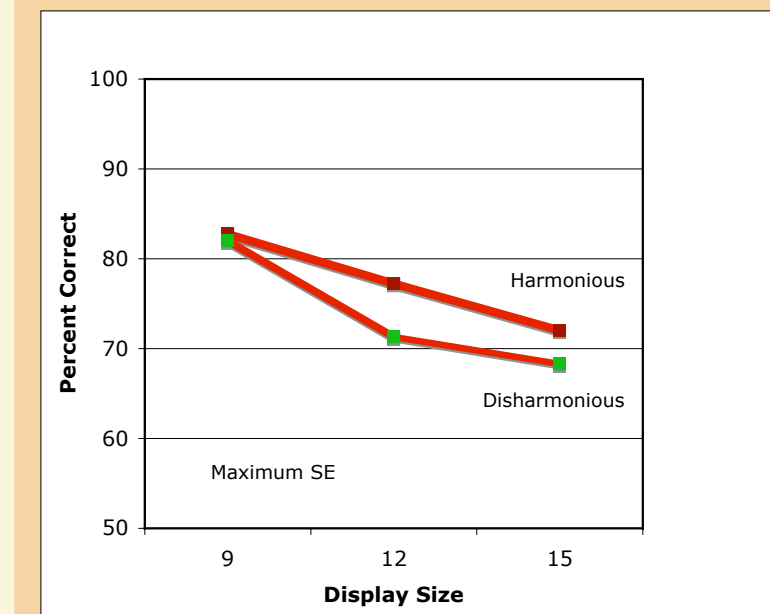
Four new palettes were used. In each palette, there were 2 color categories (unlike Experiment 1).



DISCUSSION

Observers held 29% more stimulus information in VSTM when the colors were harmonious. This result occurred with 2 color categories in each palette.

EFFECTS OF DISPLAY SIZE (slopes) indicate that load is decreased with harmony, i.e., harmonious colors are especially helpful when there are more color elements to remember.



GENERAL DISCUSSION

Color relations influence how easily colors are combined and maintained in mind. Harmonious schemes lead to a 28% increase in efficiency of VSTM. The subjective pleasure of color harmony is accompanied by an increase in the objective efficiency of mind.

The present results do not tell us if color harmony is distinct from similarity of hue. Artists, who work with color every day, have been sure that harmony is a distinct and broader concept for centuries.

Discussion of mechanisms follows >>