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GRIP STRENGTH AS A FUNCTION OF EXPOSURE TO RED OR GREEN VISUAL STIMULATION

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Summary.—40 male college students exhibited greater grip strength in the presence of red visual stimulation than they did when exposed to green. Several confounding factors present in previous tests of the color-strength hypothesis were carefully controlled.

Although there is a great deal of popular and professional speculation about the effects of vivid colors on an individual's feelings and performance (Birren, 1965), relatively few empirical data are available on this topic. One line of research growing out of this general question involves testing the hypothesis that physical strength can be affected by the color that an individual sees while undergoing testing. For example, Pellegrini and his associates (Pellegrini & Schauss, 1980; Pellegrini, Schauss, & Birk, 1980) found that subjects could exert more strength with their hands and legs while staring at blue than at pink cardboard plates. There are, however, several problems with these studies. No clear theoretical explanation is proposed for the observed differences, and the colors used as stimuli (pink and blue) have very strong sex associations and also differ in pleasantness and how strongly they are preferred (Child, Hansen, & Hornbeck, 1968). The present study tested the color-strength hypothesis using colors that lacked these confounding features.

Red and green were chosen as stimulus colors because they have been shown to be strongly preferred by both males and females (Helson & Lansford, 1970; Optical Society of America, 1953; Stimpson & Stimpson, 1979) and because they differ significantly on how arousing they are. Red consistently induces higher levels of arousal in experimental subjects than does green (Mehrabian & Russell, 1974; Wilson, 1966), and Nakshian (1964) has already shown that subjects who engaged in a tracing task showed more hand tremor and speed of movement when exposed to red than when exposed to gray and that gray evoked faster tracing than green. A reasonable explanation of how color might affect performance is based on the performance-arousal curve (Hebb, 1955), with increases in arousal being related to increased performance up to an optimal level of arousal. The use of colors differing in arousal properties would be necessary to test this hypothesis.

Forty male undergraduate volunteers participated individually under standardized laboratory conditions. Each subject stared at a brightly colored

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wall (luminance was not specifically measured) for exactly 60 sec. and then was told to squeeze a hand dynamometer with his preferred hand (as assessed by verbal report) as hard as he could while continuing to stare at the wall. Each subject did this twice. The mean of the readings from the two squeezes was recorded for each subject. After a 60-sec. rest outside of the room, the procedure was repeated with the wall a different color. To control for order effects, 20 subjects were randomly assigned to a red followed by green condition, and 20 experienced green, then red. Analysis showed that subjects had significantly greater grip strength scores when exposed to the red wall than when looking at the green wall [$t_{39} = 17.44$, $p < .01$; $Ms = 48.09$ kg ($SD = 7.41$) vs 47.20 ($SD = 8.39$)]. The order of the experiences for each individual subject and the ranges of the individual scores are no longer available. Of 40 subjects 26 scored higher when looking at the red wall, while only 14 scored higher in response to the green one. These findings are consistent with the hypothesis that the arousing quality of the color rather than its pleasantness or gender associations is primarily responsible for the difference in the performance of the subjects in the two conditions.

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