

Research Report

# When red means go: Non-normative effects of red under sensation seeking

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## Abstract

Although previous research has identified red as the color of compliance, the current work proposes that this effect of red may not hold under high sensation-seeking propensity conditions. It is argued that the color red has the capability to induce arousal, which in turn has been shown to enhance a person's default tendencies. Further, because high sensation seekers have a higher tendency to react, the exposure to the color red for these individuals will increase reactance and thereby non-compliant behavior. One field study and two lab experiments provide support for this theorizing. The first experiment, a field study, examines prank-chatting incidences at a child helpline and shows a positive effect of red on such non-compliant behavior. Experiment 2 confirms this finding in a controlled lab setting and shows that when one has a high sensation-seeking propensity, the color red positively affects one's attitude towards non-compliance. The final study illuminates the underlying process and explicates the role of arousal and reactance in the color–non-compliance relationship. Both theoretical and practical implications are discussed.

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## Introduction

Color plays a pervasive role in people's lives and their interactions with the external environment. Consumers are continuously exposed to a variety of colors that affect their perception and behavior. For example, the color red is associated with dangers and mistakes and has been shown to influence consumption behavior, such as inducing preference for prevention-oriented products (Mehta & Zhu, 2009), or avoidance of unhealthy foods (Rohr, Kamm, Koenigstorfer, Groeppel-Klein, & Wentura, 2015). More importantly, and relevant to the current research, it has been shown that the color red, as compared to other colors, also leads to the highest level of compliance and induces conformity not only with instructions and warnings (Braun & Silver, 1995; Williams & Noyes, 2007), but also with social norms (Elliot, Maier, Moller, Friedman, &

Meinhardt, 2007; Mehta & Zhu, 2009). In this paper, we propose that this widely accepted link between the color red and compliance might not be as universally applicable as suggested by previous research. Specifically, we argue and demonstrate that exposure to the color red may in fact lead to higher non-compliant behavior under high sensation-seeking propensity conditions.

## Theoretical development

Ample evidence suggests that the color red is associated with dangers and mistakes (Braun & Silver, 1995) and evokes a motivational tendency to avoid negative outcomes (Elliot et al., 2007; Mehta & Zhu, 2009). Such activation of avoidance motivation makes people more vigilant and risk-averse (Friedman & Förster, 2002; Koch, Holland, & van Knippenberg, 2008) and enhances the likelihood of compliance with, for example, requests (Nikitin & Freund, 2008). Color research has also shown that because red is associated with dangers and mistakes (Chapanis, 1994; Griffith & Leonard, 1997; Rodriguez, 1991), it enhances

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compliance with warnings, signals (Braun & Silver, 1995; Williams & Noyes, 2007), and normative standards (Mehta & Zhu, 2009). Interestingly, besides having its association with dangers and mistakes, the color red also has the capability to induce arousal (Bagchi & Cheema, 2013; Bellizzi, Crowley, & Hasty, 1983; Schaie & Heiss, 1964). Exposure to the color red has been shown to increase blood pressure, respiratory rate, and eye blink frequency (Gerard, 1957). Research using skin conductance (Wilson, 1966) and electrical responses as a measure of brain function (Clynes & Kohn, 1968) has also shown positive relationship between red and arousal.

Recent research has also demonstrated the implications of such arousal arising from the color red, such as increased willingness to pay for auction (versus negotiation) purchases (Bagchi & Cheema, 2013) and enhanced human performance in contests (Hill & Barton, 2005). More relevant to the current work, it has also been argued that arousal amplifies people's default behavioral tendencies (Baumeister & Bushman, 2013; Gilovich, Keltner, & Nisbett, 2010). The seminal work in social facilitation theory (Zajonc, 1965) suggests that arousal increases people's tendencies to do what they are already predisposed to do. Findings from other work also support this argument (Cottrell & Wack, 1967; Criddle, 1971; Markovsky & Berger, 1983). For example, Platania and Moran (2001) found that during a stimulus identification task, participants reported significantly more preferred response numbers (i.e., the responses with greatest habit strength) under high versus low arousal conditions. Similar effects of arousal have been found even when the habitual strength is externally manipulated. Cottrell and Wack (1967) demonstrate that under high-arousal conditions participants' responses to ambiguous stimuli, in a pseudorecognition task, are governed by stronger habits established during the training trials.

Building on the above argument, we propose that because the color red induces arousal, it would lead to higher non-compliant behavior for people who have high sensation-seeking propensity. Sensation seeking has been defined as "the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman, 1994). Importantly, it has been argued that high sensation seekers have a higher tendency of exhibiting reactance to the presented cautionary stimuli (Burgooon, Alvaro, Grandpre, & Voulodakis, 2002; Quick & Stephenson, 2008; Stephenson et al., 1999). For example, Quick and Stephenson (2008) show that high sensation seekers when presented with dogmatic persuasive messages (e.g., ones advocating an exercise routine or encouraging sunscreen use) display higher reactance which in turn leads to higher non-compliant behavior. Thus, we argue that arousal induced on exposure to the color red should activate reactance for high sensation seekers and in turn lead to higher non-compliant behavior. Indeed, prior research has argued that sensation-seeking propensity interacts with the presented stimuli's arousal inducing capability (Zuckerman, 1988) to activate reactance, which in turn may enhance non-compliance with the presented stimuli. Findings in the neuroscience literature also support this argument. Joseph, Liu, Jiang, Lynam, and Kelly (2009) demonstrate that when exposed to high-arousal stimuli, low sensation seekers exhibit neural

responses that are consistent with a stronger inhibitory system. By contrast, high sensation seekers exhibit neural responses that are consistent with an overactive approach system, indicating higher propensity to react when exposed to high-arousal stimuli.

Summarizing the above arguments, we hypothesize that exposure to the color red will induce arousal, which in turn will activate high sensation seekers' default tendency to react, thereby leading to higher non-compliance with the presented stimuli. We test our hypothesis through a set of three studies as detailed next.

## Experiment 1

The first experiment examined our basic proposition through a field study conducted in collaboration with a Dutch child helpline that offers free online counseling for children (ages 8 to 18 years) through a chat service. Although the helpline explicitly promotes the use of its online counseling services for genuine purposes only, around 20% of all chat conversations are non-genuine or prank chats. Such prank chats are an indication of non-compliant behavior and are a common problem for helplines worldwide (De Ruyter, Wetzels, & Feinberg, 2001; Emmison & Danby, 2007). Note that it is suggested that children engage in such behavior for thrill-seeking purposes (Emmison & Danby, 2007; Fukkink & Hermanns, 2009; Seilhamer, 2011).

As discussed earlier, previous research examining the effects of the color red on compliant behavior would suggest that using red as the background color on a chat request screen should reduce prank chats. However, if red increases non-compliance under high sensation-seeking conditions, then service abuse, which is driven by the thrill-seeking motivation, should increase if the chat request screen is red, as compared to when it is neutral (e.g., white) or another chromatic color (e.g., blue).

## Method

For this experiment, we manipulated the color of the waiting screen on the childline's website (red vs. white vs. blue; see methodological detail (MD) Appendix A). This screen appears only if there is a time lag between a child's request for a chat and his/her being connected with the counselor. As the helpline's system records this waiting time in minutes, we only analyze the chats with a waiting time of more than one minute. That is because a recorded waiting time of more than one minute indicates that participants were indeed exposed to the focal color manipulation for at least one minute. After the chat is finished, the counselor codes the conversation as to whether it was a prank or not. The counselors were blind to the hypotheses, and the color of the waiting screen that might have appeared before the chat began.

## Data

The waiting screen color was changed on an hourly basis for 30 days during which a total of 10,086 records of chat conversations were captured. Of these, 5387 visitors had a

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