How Emotions Influence Color Preference

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This paper examines how an individual's emotional state influences his or her preferences for colors that have either congruent or incongruent emotional tones. Based on the emotion literature, three alternative hypotheses are contrasted: emotion-judgment congruence, emotion-target congruence, and emotion-target incongruence. Evidence of emotion-target congruence is observed—Experiments 1 and 2. This effect, however, is moderated by emotion specificity and the type of colored object. Attitudinal commitment is proposed as the key underlying mechanism. When the negative emotional reaction reflects a committed (not-committed) attitude toward the situation, the emotion-target congruence (incongruence) effect occurs—Experiment 3. Similarly, emotion-target congruence takes place (disappears) when the colored object signals (does not signal) people's attitudes and tastes—Experiment 4. The paper concludes with a discussion on how the proposed mechanism can explain part of the inconsistencies previously observed in the emotion and aesthetics literature.

Judgments about colors are frequent in the market place. Consumers often buy products in the colors that they find most pleasing at the time of purchase and, knowing that, firms often rely on colors to appeal emotionally and aesthetically to consumers. The colorful iPhone cases, the dark green Starbuck's stores, or the red Target logo are common examples of how firms use colors to influence consumer preference, recall, search patterns, inferential processes, and ultimately, decision making (e.g., Gorn et al 1997; Miller and Kahn 2005). Colors are powerful signals, in part, because of their readily accessible emotional tones. Indeed, research has shown that colors are associated with and inducers of specific emotional states (e.g., D'Andrade and Egan 1974; Valdez and Mehrabian 1994). However, in spite of the robust evidence of color's impact on emotion, the literature is surprisingly silent about the inverse relationship—that is, the impact of a viewer's emotion on his/her color preference. The current research, therefore, investigates whether and how emotions influence color preference. Because colors are so spontaneously linked to emotional states, studying the impact of emotions on color preference can also help us tackle another critical question, yet to be systematically explored in the emotion and aesthetics literature: How does an individual's current emotional state interact with the emotional tone of the target object at the time of the evaluative judgment? These two questions are addressed in a series of four experiments. We start with a review of the relevant literature.

COLOR, COLOR FEELING, AND COLOR PREFERENCE

Color signals an emotional tone. More saturated and lighter colors are perceived to be happier, more exciting, and purer (i.e., most often, positive emotions), whereas more muted and darker colors tend to be more strongly associated with sadness, distress or disgust (i.e., most

often, negative emotions). Contrary to the common belief that a color's emotional tone (or *color tone*) is determined primarily by hue (e.g., yellow is happy, blue is sad), the strongest determinants are actually saturation (i.e., the apparent purity of the color) and lightness (i.e., the degree to which the color is similar to white or black) (D'Andrade and Egan 1974; Gorn et al. 1997; Smets 1982; Valdez and Mehrabian 1994).

People's perception of a color's emotional tone is surprisingly consistent across age groups (Boyatzis and Varghese 1994; Meerum Terwogt and Hoeksma 1995; Zentner 2001) and cultures (e.g., D'Andrade and Egan 1974). Developmentally, children as young as three years old have shown to make associations between colors and emotions similar to those made by adults (Zentner 2001). Cross-culturally, people in Chiapas, for example, who were uncontaminated by western cultures, showed color-emotion associations similar to those of American undergraduates (D'Andrade and Egan 1974). The impact of color on emotion is supported not only in verbal measurements (e.g., associations between emotional adjectives and colors) but also in physiological measures of affectively relevant responses, such as GSR and EEG (Jacobs and Hustmyer 1974; Wilson 1966). The universality of color tones suggests that colors can symbolize emotions rather effectively.

Surprisingly, color tone explains little about color preference (Meerum, Terwogt and Hoeksma 1995, Ou 2004). For example, bright yellow is the happiest color, yet among the least preferred, whereas blue is often linked with sadness, yet among the most preferred (Palmer and Schloss, 2010). What, then, is the role of color tone in determining color preference? More specifically, how does one's emotional state interact with color tone to influence color preference?

THE IMPACT OF EMOTIONS ON COLOR PREFERENCE

Previous studies suggest that a viewer's emotions can significantly impact aesthetic preference in general. Based on the literature on emotion and aesthetics, three conflicting hypotheses have been identified: emotion-*judgment* congruence; emotion-*target* congruence; and emotion-target *incongruence*. We discuss each in turn.

Emotion-*Judgment* Congruence

The first hypothesis is based on evidence that, directly or indirectly, emotions bias judgment in a congruent manner. In their seminal work, Schwarz and Clore (1983) proposed the emotion-as-information hypothesis, in which people use their current affective state as information about the to-be-judged target object. That is, they integrate their current affective state with their evaluation of the target object ("how do I feel about it?"). Alternatively, in a memory-based model, Isen and colleagues (1978) propose that a given affective state makes mood-congruent information in memory more salient, which, in turn, makes mood-congruent evaluation more likely. Although these two models differ from one another in their proposed psychological mechanisms, both suggest that the *judgment* of a given target will be congruent with the individuals' current emotional state: that is, people's negative (positive) affect will lead to more negative (positive) evaluation of a given stimulus than they would if they were in emotionally neutral state. Using colors as target objects, the prediction would be that, relative to a neutral control condition, people in a negative (positive) affective state would provide more

negative (positive) evaluations of any color, independent of color tone (i.e., independent of the emotion tone of the color itself).[1]

Emotion-*Target* Congruence

A second hypothesis is that the congruence between the emotional state of the individual and the emotional tone of the target object is the key determinant of the evaluative judgment: That is, the target is judged more positively when its emotional tone is similar to that of the evaluator. There has been some evidence to support this proposition. For instance, people are attracted to emotionally similar others (Gibbons 1986; Locke and Horowitz 1990; Rosenblatt and Greenberg 1991) and are most satisfied with their conversation when they share the partner's moods (Locke and Horowitz 1990). Along the same lines, emotion-target congruence has been identified in advertising, where more favorable attitudes toward the ad were formed when the TV program and the ad shared similar emotional tones (Kamins, Marks, and Skinner 1991; Lajos, Ordabayeva, and Chattopadhyay 2008). Finally, within the aesthetics realm, it has been shown that people who experience dissatisfaction in romantic relationships prefer love-lamenting to love-celebrating music (Gibson, Aust, and Zillmann 2000; Knobloch and Zillmann 2003).

Again, using colors as target objects, the prediction would be that preference for happy colors should be strongest for happy people. Distinctively, the emotion-target congruence hypothesis also predicts that preference for sad colors should be strongest among sad people. As

[1]Color tone may interact with this general main effect if color tone varies the perceived diagnosticity of the affective signal. Note, however, that the perceived diagnosticity in this context will impact the intensity of the effect rather than its direction.

the little prince posited, "when one is so terribly sad, one loves sunsets…" (p. 30, Saint-Exupéry, 1943).

Emotion-Target *Incongruence*

A third hypothesis relies on the motivational assumption that emotions are continuously regulated or managed (Gross 1998; Zillmann 1988) and that people spontaneously want to attain or maintain a *positive* affective state, unless competing goals are at stake (Cohen and Andrade 2004, Tsai 2007). One's evaluation of a target object, therefore, is determined by one's current affective state, one's projected affective state, and the extent to which one believes that the target object or behavioral experience can achieve or maintain the *hedonistically positive* state. As a result, relative to a control condition, negative affect may increase preference for the stimuli that make people feel better (Andrade 2005; Tice, Bratslavsky, and Baumeister 2001), whereas positive affect may decrease preference for stimuli that would make people feel worse (Andrade 2005; Isen and Simmons 1978). In other words, sad people will approach target objects that present an emotion incongruent tone, whereas happy people will avoid target objects that display an emotion incongruent tone. There has been some evidence showing preference for emotionally incongruent aesthetic stimuli. Knoblch and Zillmann (2002) showed that after a negative (vs. positive) performance feedback, participants listened to highly energetic and joyful music for longer periods. Similarly, Ireland, Warren and Herringer (1992) found that highly anxious individuals preferred emotion-incongruent, calm colors (i.e., pastel shades of color) relative to congruent, highly arousing ones (i.e., highly saturated colors).

Assuming that people see happy colors as an opportunity to lift their spirits, the emotion-target incongruence hypothesis predicts that one's feeling of sadness (vs. a control) should increase preference for happy colors. Likewise, assuming that people perceive sad colors as a potential threat to their current positive feelings, one's feelings of happiness (vs. control) should decrease preference sad colors. As Hillary Clinton once pondered, "My hot-pink handbag makes me so happy… How can you be unhappy if you pick up a big pink bag?" (Brown 2011).

THE PHENOMENON

In the first two experiments, we attempt to test these 3 alternative predictions. Once the phenomenon has been clearly determined, the subsequent studies will attempt to detail the underlying processes and potential boundary conditions.

H1a (emotion-judgment congruence): Sad (vs. control/happy) people will show decreased preference for colors in general, independent of the emotional tone of the color.

H1b (emotion-target congruence): Sad (vs. control/happy) people will show increased preference for sad colors. Happy (vs. control/sad) people will show increased preference for happy colors.

H1c (emotion-target incongruence): Sad (vs. control/happy) people will show increased preference for happy colors. Happy (vs. control/sad) people will show decreased preference for sad colors.

To test these hypotheses, the experiments used a similar paradigm. First, participants' preferences for colored stimuli were measured on a subjective rating scale. Then, their emotional states were incidentally manipulated through viewing emotionally charged video clips and

sometimes listening to emotionally charged music. Color preferences were then measured again for each participant on the same rating scale. That is, color preferences were measured once before and again after the emotion inducing experience to control for massive individual differences characteristic of color preference (Jacobson and Bender 1996; Palmer and Schloss 2010). Thus, *preference change* due to emotion induction served as the main dependent variable. We asked participants to evaluate multiple colors (20 ~ 24 colors), which allowed us to focus on general emotional tones across colors, independent of specific color characteristics. Finally, whereas the emotional state was manipulated across subjects, the emotional tone of the stimuli (e.g., happy vs. sad colors) was manipulated as a within-subjects variable across all the experiments.

EXPERIMENT 1

Color Tone

A pretest was conducted to identify the colors that participants identify as happy or sad. Eighty-eight participants were presented with 24 colors from the Hue-Saturation-Brightness (HSB) color space (4 hues (red, yellow, green, blue) x 2 saturations (50% vs. 100%) x 3 brightness (17%, 50%, or 83%), see appendix 1 for coordinates).

After each color exposure they were asked to indicate on a seven-point scale (1=not at all to 7=very much) how strongly the color was associated with each of the following emotional adjectives: happy, sad, cheerful, exciting, arousing, depressing, boring, and relaxing. Seven of the eight adjectives loaded onto two factors: cheerful, happy, exciting, and arousing onto an active-positive factor ($\alpha = .92$) and sad, depressing, and boring onto a passive-negative factor (α

= .84). Relaxing was not loaded onto either factor. Since the two factors were strongly and negatively correlated (r = -.47, p < .0001), we combined them into a color tone index by taking the difference between the positive-active and the negative-passive factor score for each of the 24 colors. Using hierarchical clustering analysis, each color tone index was then used to categorize the 24 colors. Half of the colors formed the happy category, and the other half formed the sad category (appendix 2). The index confirmed that the happy colors were on average more positive than the sad ones (M_{happy} = 2.49 vs. M_{sad} = -1.24, t(83) = 23.53, p < .0001). Consistent with previous findings (Boyatzis and Varghese 1994; Valdez and Mehrabian 1994), happy colors tended to be more saturated and brighter, whereas sad colors tended to be more muted and darker.

Method

Participants and Design. One hundred ninety-seven students participated in this experiment for course credit. The experiment adopted a 2 (emotional tone of the color: sad vs. happy; within) by 3 (participant's emotion: sad vs. neutral vs. happy; between) mixed design.

Procedure. Upon arrival at the lab, participants were randomly assigned to one of the computers. The instructions indicated that they would be participating in two tasks: a color preference task and a black-and-white video evaluation task. In the former task, they would be presented with a series of colors to be sequentially evaluated. The latter, they were told, would also serve as a filler task. Because the number of colors to be assessed in the color evaluation task was quite large, a color-free break would be needed in the middle of the task to avoid eye fatigue. Hence, after the alleged first half of the task, participants watched about 15 minutes of black and white video clips that were happy, neutral, or sad. Questions about the videos, including a manipulation check, followed the videos. Participants were then guided to the

second half of the color evaluation task, which was composed of the same 24 colors used in the first half.

Emotion Elicitation. Similar to previous research, emotion was induced through emotionally laden movie clips: two video clips of similar emotional tone per condition. The clips were converted to black-and-white to eliminate color exposure as well as to match the cover story (i.e., to reduce eye fatigue). To induce happiness, funny scenes from "When Harry Met Sally" (Gross and Levenson 1995) and the sitcom, "Friends", were used (Andrade and Ariely 2009). For the control group, two documentary clips about Africa were shown (Andrade 2005). The sad group watched scenes from "The Champ" (Gross and Levenson 1995; Lerner, Small, and Loewenstein 2004) and "The Lorenzo's Oil." Six measures of emotional state were used: "The first [second] video clip made me feel happy [sad]", "Right now I feel good [bad]," disagree completely = -200/ agree completely = +200. These measures were embedded in a list of 12 irrelevant items used to disguise the manipulation check. After reliability checks ($\alpha = .94$), the items were collapsed to create an emotion index. The oppositely valence items were recoded. Higher numbers on the emotion index indicated higher levels of happiness.

Dependent Variable. Each of the 24 colors was displayed one-by-one in random order as a 7 x 7 cm square at the center of the computer screen on a neutral grey background. The computer screen was calibrated with X-Rite Eye-One Display. For each half of the color preference task, participants indicated how much they liked each of the 24 colors on the bar anchored "Not at all" = -200; "Very much" = +200. Due to the high variance in preference for colors across individuals (Jacobson and Bender 1996; Palmer and Schloss, 2010), *preference change*—i.e., post-video minus pre-video color preference ratings—represented the main dependent variable.

Results

Manipulation Check. Emotions were induced as intended ($F(2, 194) = 313.43$, $p < .0001$). People in the happy condition felt significantly happier than people in the neutral condition ($M_{happy} = 145.8$, $M_{neutral} = 26.6$, $F(1,127) = 190.47$, $p < .0001$), who, in turn, felt significantly happier than those in the sad condition ($M_{sad} = -99.7$, $F(1,129) = 136.93$, $p < .0001$).

Color Preference. An ANOVA with repeated measures was conducted to assess the impact of participants' current emotion (sad vs. neutral vs. happy) and color tone (sad vs. happy) on color preferences. The two factors produced a significant interaction ($F(2, 194) = 4.59$, $p = .01$; see figure 1). Pairwise comparisons indicated that happiness increased participants' preference for happy colors ($M = 6.82$, $SD = 38.38$) relative to sad colors ($M = -1.70$, $SD = 27.90$; $F(1, 194) = 3.95$, $p < .05$), whereas sadness increased preference for sad colors ($M = 3.99$, $SD = 31.16$) relative to happy colors ($M = -5.67$, $SD = 29.98$, $F(1, 194) = 5.24$, $p < .05$). Also, relative to participants in a more neutral emotional state ($M_{neutral\ group\_sad\ colors} = - 6.57$, $SD = 30.87$; $M_{neutral\ group\_happy\ colors} = - 6.13$, $SD = 31.01$), sadness increased their preference for sad colors ($F(1, 129) = 3.79$, $p = .054$), but not for happy colors ($F(1, 129) = .01$, $p > .10$), whereas happiness increased preference for happy colors ($F(1, 127) = 4.42$, $p < .05$) but not for sad colors ($F(1, 127) = .88$, $p > .10$).

-- Insert figure 1 around here --

Discussion

The obtained pattern of results are inconsistent with the H1a (emotion-judgment congruence), which predicts that happy people will like the colors in general more than sad people will. The data are also inconsistent with H1c (emotion-target incongruence), because sadness did not increase the liking of happy colors, nor did happiness reduce preference for sad colors relative to the neutral condition. The results provide initial evidence consistent with H1b (emotion-target congruence), however, because people preferred colors whose emotional tone fitted with their current emotional state. Happy people increased their preference for happy colors relative to sad colors and relative to participants in a neutral condition. Similarly, sad participants increased their preference for sad colors relative to happy colors and relative to participants experiencing a more neutral emotional state.

EXPERIMENT 2

Given the uniqueness of the effect, experiment 2 attempted to replicate the findings of experiment 1 with a different set of colors and a different, more consumer related, context. The new set of colors was contextualized to represent the single distinguishing attribute of a product: t-shirts. This procedural change allowed us to test whether changes in color preference could translate into changes in product preference. Also, instead of obtaining an aggregate measure of color tone in a pre-test with a different population, experiment 2 obtained each participant's perception of the emotional tone for each of the colors they had previously assessed in the preference task. Third, the emotion manipulation check was made after participants completed the second measure of color preference to be sure that this measure did not influence the second set of color preference ratings. Since the findings of experiment 1 displayed emotion-target

congruence across colors and emotional states, no neutral emotion condition was included in this experiment.

Method

Participants and design. Eighty-four students participated in this experiment for course credit. The experiment adopted a 2 (color tone: sad vs. happy; within) by 2 (participant's emotion: sad vs. happy; between) mixed design.

Procedure. We used a procedure similar to that used in experiment 1, except for the following changes. First, pictures of 20 colored t-shirts were used as the target objects. Participants evaluated them sequentially (one t-shirt per screen). All the t-shirts had the same gender-neutral design (round neck and short sleeves) so that color represented the only distinguishing attribute. The t-shirt colors were selected from several online t-shirt stores (e.g., polo.com, llbean.com). The colors ranged from saturated yellow and orange, to muted purples, dark green and dark brown (see appendix 3).

Second, to reinforce the emotion manipulation, background music was added after exposure to the same video clips as in Experiment 1. The music was played throughout the second t-shirt preference measure as well as the color-emotion association task. The emotional tone of the music was always consistent with the emotional tone of the videos. In the happy condition, participants listened to karaoke versions of "Papa loves mambo" and "Don't worry, be happy," which did not include lyrics. In the sad conditions, they listened to "Adagio for Strings Op. 11" by Samuel Barber. The music was pre-tested in a separate task with 77 participants from the same population as those of the main experiment. After listening to the music participants indicated their current feelings in a 4 item 9 point scale (1= disagree completely; 9=agree

completely). A Music Index was created (["The music made me feel good" + "I feel good"]/2 – ["The music made me feel bad" + "I feel bad"]/2). The results confirmed the prediction (Happy Music = 8.71 vs. Sad Music = 2.49; $F(1, 76) = 38.66$, $p < .0001$).

After completing the second t-shirt preference measure, an unexpected color association task was administered. Participants were asked to indicate on a seven point scale how strongly each color was associated with 2 emotion adjectives (happy, somber; 1 = not at all/ 7 = very much). Then, the emotion manipulation check was administered. This later manipulation check assessed whether participants were still feeling happier/sadder during the second t-shirt preference measurement. Four items were used ("Right now I feel good [bad, happy, sad]"; 1 = disagree completely, 9 = agree completely).

Results

Manipulation check. The four emotion-related items were averaged to form an emotion index (α =.91). As expected, participants who were exposed to the sad video and music (M_{sad}= -.33) felt significantly worse than those exposed to the happy video and music (M_{happy} = 1.68, $F(1, 83) = 33.44$, $p < .0001$).

Color tone. The 20 colors were divided into happy and sad colors based on each participant's associations. Specifically, color tone index (happy - somber) for each participant was computed and categorized as happy or sad (mean split per individual). Median splits were also analyzed and produced similar results. The emotion manipulation did not influence color tone perception ($F(1, 81) = .014$, $p >.10$).

T-shirt preference. An ANOVA with repeated measures showed a significant interaction between one's current emotional state (happy vs. sad; between) and the emotional tone of the

colored t-shirts (sad vs. happy; within) on the preference change ($F(1, 82) = 9.51$, $p < .003$, figure 2). Sad participants increased their preference for sad colored t-shirts ($M = 14.92$, $SD = 40.88$) relative to happy colored t-shirts ($M = 3.65$, $SD = 45.02$; $F(1, 82) = 3.79$, $p = .05$), whereas happy participants increased their preference for happy colored t-shirts ($M = 11.08$, $SD = 25.61$) relative to sad colored t-shirts ($M = -2.89$, $SD = 23.28$; $F(1, 82) = 5.83$, $p < .05$). Also, preference for sad colored t-shirts significantly increased for sad (vs. happy) participants ($F(1, 82) = 6.02$, $p < .05$). Preference for happy colored t-shirts did not significantly differ between sad and happy participants ($F(1, 82) = .86$, $p > .10$).

– Insert figure 2 around here –

The impact of emotion and color tone on colored t-shirt preference was further investigated through a regression analysis in which color preference change was predicted from (a) each participant's emotion index (i.e., the manipulation check for the emotion inducing stimuli), (b) the color tone index for each color (i.e., the manipulation check for the emotion-color association task), and (c) the interaction between (a) and (b). Only the interaction term was significant ($ß = .24$, $t(1676) = 3.01$, $p < .003$).

Discussion and Aggregate Analysis

Experiment 2 provides further evidence consistent with H1b (emotion-target congruence). Sad participants increased their preference for T-shirts in sad colors whereas happy participants increased their preference for T-shirts in happy colors. The effect emerged when color

associations were individually measured and in a context in which the colors represented the sole differential attribute of the products.

Because the experimental procedures were similar, an aggregated analysis of experiments 1 and 2 was conducted (N=218). Color preference was standardized per experiment and the z-score of the preference changes for happy and sad colors within experiments 1 and 2 was used as the main dependent variable. A 2 (emotional state: happy vs. sad; between) by 2 (emotional tone of the color: happy vs. sad; within) by 2 (experiment: 1 vs. 2; between) ANOVA with repeated measures indicated no interaction between the experiment itself and the other two factors (three-way interaction: $F(1, 214) = .318$, $p > .10$), but a strong two-way interaction between the emotional state and color tone emerged ($F(1, 216) = 17.42$, $p < .0001$, see figure 3). Again, sad participants increased their preference for sad colors ($M = 0.16$ z-units, $SD = 1.11$) relative to happy colors ($M = -0.15$ z-units, $SD = 1.01$; $F(1,216) = 8.63$, $p < .005$), whereas happy participants increased preference for happy ($M = 0.15$ z-units, $SD = 0.96$) relative to sad colors ($M = - 0.16$ z-units, $SD = 0.85$; $F(1, 216) = 8.79$, $p < .005$). Also, preference for sad colors increased more among sad than among happy participants ($F(1, 216) = 5.67$, $p < .05$), whereas preference for happy colors increased more among happy than among sad participants ($F(1, 216) = 4.98$, $p < .05$).

– Insert figure 3 around here –

Therefore, despite the use of different color stimuli (24 colors from HSL vs. 20 colors from retailers), emotion induction methods (video only vs. video and music), timing of emotion manipulation check (before vs. after the second color preference measure), target object (colored

squares vs. colored t-shirts), and color tone measurements (predefined color tone judgments made by other participants vs. each participant's own color tone perception after the task), the combined results show robust evidence that the congruence between one's emotional state and that of the target object increases preference for the target object. It is worth noting that the effect occurs in both experiments even though the initial preferences were positive in experiment 1 (i.e., people initially liked the color squares in general: $M_{\text{sad colors}} = 6.36$, $SD = 42.94$, $M_{\text{happy colors}} = 10.07$, $SD = 50.22$) and negative in experiment 2 (i.e., people initially disliked the colored t-shirts in general: $M_{\text{sad colors}} = -18.76$, $SD = 56.95$, $M_{\text{happy colors}} = -35.51$, $SD = 56.29$). In other words, the effect holds regardless of the evaluator's initial impression.

HOW EMOTION-TARGET CONGRUENCE OPERATES

The increase in preference for sad colors among sad participants represents an empirically unique and theoretically challenging phenomenon. Therefore, in the rest of the paper, we will focus on this particular emotion-target congruence effect. Although the phenomenon cannot be readily explained by either emotion regulation or affect-as-information, we have identified three distinct potential accounts.

One potential explanation is *fluency* (Bornstein and D'Agostino 1992; Reber, Schwartz, and Winkielman 2004). According to this theory, the ease of processing of a stimulus is positively experienced. This positive affect is then misattributed to liking for the stimulus. Two types of fluency and their antecedents have been identified. Perceptual fluency indicates how easily one can perceive and identify the physical characteristics of the stimuli and it is affected by simple repetition, symmetry, prototypicality, contrast, or duration. Conceptual fluency

indicates how readily one can grasp the meaning of the stimuli and it is influenced by semantic priming, predictability, or context congruity (Reber, Schwartz, and Winkielman 2004, Winkielman et al 2003). There is little empirical evidence that emotion facilitates processing of emotion congruent stimuli (Niedenthal and Setterlund 1994). That being said, fluency is a possible account: sad (happy) individuals may have liked sad (happy) colors more because the congruent emotional tone of the color is more easily processed.

A second potential account is *role fulfillment* (Martin et al. 1997). According to this hypothesis, if the target object satisfies or exceeds the observer's expectations about the object's intent, the evaluation becomes more positive. For instance, people would enjoy a fearful ad more if the ad makes people feel more afraid—that is, if the ad better fulfills its "role". Incidental emotions that match the emotional tone of the target might lead people to perceive the target object as more effective at fulfilling its role (as a result of misattribution). Consequently, a previously scared participant, for instance, will like a fearful ad more relative to a funny ad and relative to happy participant. There is indeed evidence consistent with this hypothesis in the literature (Lajos, Ordabayeva, and Chattopadhyay 2008). In the realm of colors, however, it is not clear that people have any strong expectations about the "intentions" behind a color tone. That being said, role fulfillment theory is a possible account: sad (happy) individuals may have liked sad (happy) colors more because the emotional tone of the color fulfilled more effectively people's "expectations" of what a sad (happy) color should look or feel like.

A third potential account is *attitudinal commitment*. Attitudinal commitment refers to an attitude, belief, or value that an individual is personally attached to, identified with, and finds meaning in. It is well established that people are motivated to defend their highly committed attitude, belief, or values, because holding conflicting views on an important issue produces

greater discomfort (Hart et al. 2009). Moreover, people seek to interact with objects and events that confirm their internally justified beliefs and meanings (Swann 1983, Belk 1988, Heine, Proulx, and Vohs 2006). For example, people like to interact with signs and symbols that signal who they are and what they value and stand for to themselves and others (Swann 1983). In a similar vein, people may like emotional stimuli that are congruent with their internally justified meaning of a situation. More precisely, sad people might increase their preference for sad colors, because the meaning of sad colors (serious, somber, etc.) is coherent with their internally justified meaning and committed attitude toward the situation at that moment. Also, sad people might decrease preference for happy colors because the signals from these colors (fun, exciting, good) would be perceived as quite inappropriate to the situation's perceived significance, value, or meaning.

Contrary to fluency (a pure perceptual process) or the role fulfillment hypothesis (an expectation-confirmation process), the attitudinal commitment account implies that the strength of one's attitudinal commitment and the strength of a stimulus's attitudinal signal should impact emotion-target congruence effects. Specifically, emotional experiences that reflect personal beliefs, attitudes, and meaning to which one is highly committed (i.e., experiences that are high in attitudinal commitment—e.g., sadness) are more likely to produce emotion-target congruence effects than emotional reactions which inherit little personal view or value to which an individual could be attached (i.e., experiences that are low in attitudinal commitment—e.g., visceral disgust). Likewise, colored objects that provide stronger signals of one's own attitude, taste, and values (e.g., t-shirt) are more likely to produce the emotion-target congruence effects than colored objects that are unrelated to one's values and attitudes and are often chosen based on instrumental reasons (e.g., post-its). Experiments 3 and 4 address these possibilities.

EXPERIMENT 3

In this experiment we examine the impact of sadness and visceral disgust on color preference. These negative emotions are chosen for two reasons. First, sad colors and disgusting colors tend to be highly correlated (both are dark and muted) and very different from happy and clean colors (both are bright and saturated). This high correlation allowed us to test the impact of the emotion manipulation on the very same set of (sad and disgusting) colors. Second, sadness and visceral disgust have different levels of attitudinal commitment. People experience sadness when they lose or observe someone losing something/someone valuable and meaningful. Sad people are committed to their emotion and attitude toward the situation, because they do not want to undermine the meaning or the value of a loss (e.g., parent's death) by trying to feel happy. In contrast, visceral disgust represents a physical and often automatic response to a dirty object or situation. By itself, visceral disgust rarely reflects a deeper meaning, value, or belief one is committed to. Thus, disgusted people would generally want to eliminate such a negative feeling.

Even though both sadness and visceral disgust represent negative feelings and the same set of colors (dark and muted ones) can be easily associated with both sorts of emotions, as well as be dissociated from the other, opposite emotions (happy & clean), we predict that due to its attitudinal commitment only sadness will produce the emotion-target congruence effect. That is, sad people will prefer sad colors to happy colors, whereas disgusted people will *not* prefer disgusting colors to clean colors.

Method

Participants and Design. One hundred and thirty seven students participated in this experiment for course credit. The experiment adopted a 2 (color tone: dark-muted vs. bright-saturated; within) by 2 (participant's emotion: sad vs. disgusted; between) mixed design.

Procedure. The procedure was similar to that used in the previous experiments, except for the following changes. First, 22 new colors (11 dark-muted colors and 11 bright-saturated colors) were selected. Participants were told to think of it as interior paint colors and each color was presented on the entire computer screen. We contextualized colors as interior colors to examine if the emotion-target congruence effect can be generalized to a different aesthetic judgment context (i.e., interior design) and differently sized color stimuli. Second, color tone was measured through a color categorization task after the second measure of color preference. After each color presentation, participants were asked to categorize—through key pressing— the color tone as fast as possible. Each color was categorized twice, one for each emotion dimension (sad vs. happy, disgusting vs. clean). This procedure allowed us to categorize the colors as well as to see if any fluency effects could be observed.

Third, a new emotion manipulation was introduced. Participants watched 5-6 minutes of either a disgusting or a sad video clip. To induce visceral disgust, a dirty toilet scene from "Trainspotting" was used (Lerner, Small and Loewenstein 2004). For sadness, participants watched a depressing scene from the movie "I am Sam," in which a father with mental challenges was forced to separate from his young daughter. As in the previous studies, both clips were edited to black and white. The emotion manipulation check followed the clips. Four items asked participants to indicate on a 9 point scale (9=agree completely), the extent to which they were feeling disgusted, sad, bad, and good.

Finally, to assess the extent to which people are committed to the meaning of their emotion across the two emotion conditions, we asked participants to indicate the extent to which they felt personally connected to the meaning of the emotional scene they watched. More precisely, three items were included ("I find myself related to the meaning of the movie," "I am personally connected to the message of the movie," "I personally feel that the meaning of the movie is relevant to me"; (1= disagree completely; 9=agree completely). We expected participants in the sadness (vs. disgust) condition to show significantly higher means in these items. Further, we assessed whether this collapsed construct (attitudinal commitment index) could at least partially mediate the impact of emotion type on color preferences. To examine whether answering attitudinal commitment items could alter color preferences at time 2, we asked these three items to only half of the participants.

Results

Color tone. The perceive tone of each color was measured through the color categorization task. A hierarchical clustering analysis with happy versus sad categorization data showed that the eleven dark-muted were grouped together as one group (i.e., sad colors) and the other eleven bright-saturated colors as another group (i.e., happy colors; see appendix 4). The same hierarchical analysis with clean vs. disgusting categorization data showed that the same eleven dark-muted colors were grouped together (i.e., disgusting colors) and the other, same eleven bright-saturated colors were grouped together (i.e., clean colors). Combined, these results showed, as expected, that the dark-muted colors were more strongly associated with sadness and disgust. Similarly, the bright-saturated colors were happy as well as clean colors.

Emotion manipulation. Participants in the sad (vs. disgust) condition reported higher levels of sadness ($M_{sad\ cond}$ = 4.52 vs. $M_{disgust\ cond}$ = 3.00, F(1, 135) = 17.65, p =.0001) and lower levels of disgust ($M_{sad\ cond}$ = 3.03 vs. $M_{disgust\ cond}$ = 4.28, F(1, 135) =10.57, p =.001). The two groups did not differ on the general feeling state items (feeling bad: $M_{sad\ cond}$ = 3.85 vs. $M_{disgust\ cond}$ = 3.43, F(1, 135) =1.65, p > .20, feeling good: $M_{sad\ cond}$ = 5.72 vs. $M_{disgust\ cond}$ = 5.90, F(1, 135) =.362, p > .50). Participants' emotional state did not impact their reporting of color tone on the color categorization task. Nor did it influence their categorization speed (all Fs < 1).

Interior Color Preference. A 2 (emotional state: sad vs. disgust; between) by 2 (emotional tone of the color: dark-muted vs. bright-saturated; within) by 2 (attitudinal commitment items: present vs. absent; between) ANOVA with repeated measures did not show any significant effects of the last factor (Fs < 1). This factor was then collapsed for the subsequent analysis. A 2-way ANOVA showed a significant interaction between one's own emotional state and the emotional tone of the interior colors on color preference (F(1, 135) =13.62, p = .0001; see figure 4). Sad participants tended to increase their preference for dark-muted colors (M = 1.71) relative to bright-saturated colors (-12.63, F (1, 135) = 2.90, p < .10). Moreover, dark-muted colors were liked significantly more by sad relative to disgusted participants (F(1, 135) = 7.26, p=.008). These findings replicate the emotion-target congruence effect observed in experiments 1 and 2. However, the pattern of results not only disappeared, but it actually reversed for participants in the visceral disgust condition. Disgusted people's preference for bright-saturated colors increased significantly (M= 9.99) relative to dark-muted colors (M = -18.54, F(1, 135) = 12.72, p < .001). Also, bright-saturated colors were liked significantly more by disgusted relative to sad participants (F(1, 135) = 9.43, p < .003). These findings show an emotion-target *in*congruence effect.

--insert figure 4 around here--

Attitudinal Commitment. The attitudinal commitment index ($\alpha = .93$) showed, as hypothesized, that participants in the sadness condition found greater meaning and personal relevance in their current emotional experience than those in the disgust condition ($M_{sad\ group} = 4.61$ vs. $M_{disgust\ group} = 2.82$, $F(1, 76) = 16.29$, $p=.0001$). Further, two mediation analyses (one for dark-muted colors and one for bright-saturated colors) were conducted to test whether the attitudinal commitment index could at least partially account for observed results. To do so, we followed Baron and Kenny (1986) standard procedure (see figure 5). Within the dark-muted colors condition, first, the mediator, attitudinal commitment index, was regressed on the independent variable, the emotion condition ($\beta = .42$, $t(77) = 4.11$, $p=.0001$). Then, the dependent variable, preference for dark-muted colors, was regressed on the emotion condition ($\beta = .20$, $t(77) = 2.76$, $p=.082$). Finally, color preference was regressed on both the emotion condition variable and the attitudinal commitment index. The emotion condition coefficient decreased to non-significant levels (β -.08, $t(76)=.63$, $p=.53$), whereas the mediator remained significant ($\beta = .29$, $t(76) = 2.38$, $p=.020$). The Sobel test confirmed that the mediation was significant (Sobel $z = 2.39$, $p=.017$).

The same mediation analysis was conducted for bright-saturated color preference. First, attitudinal commitment was regressed on the emotion condition ($\beta = .42$, $t(77) = 4.04$, $p=.0001$). Then, preference for bright-saturated colors was regressed on the emotion condition ($\beta = -.25$, $t(76) = -2.27$, $p=.026$). Finally, color preference was regressed on both the emotion condition variable and the attitudinal commitment index. The emotion condition coefficient decreased to

nonsignificant levels (β = -.16, t(76)=-1.29, p=.20), whereas the mediator remained significant (β =-.23, *t*(76) = -1.88, *p*=.06). Again, the Sobel test confirmed the mediation (Sobel *z* = 2.24, *p*=.025).

--insert figure 5 around here--

Discussion

Experiment 3 provides important new insights. Once again, it replicates the emotion-target congruence effect within the sadness condition. Sad individuals showed increased preference for sad-disgusting colors relative to happy-clean colors and relative to disgusted individuals. As important, experiment 3 shows that among disgusted participants, the effect not only disappeared, but it actually reversed, such that emotion-target incongruence was observed for the very same colors in which congruence effects were observed in the sad condition. That is, viscerally disgusted individuals increased preference for happy-clean colors relative sad-disgusting colors and relative to sad individuals. In addition, the mediational analysis corroborates the notion that the attitudinal commitment represents an important ingredient in the observed effects. Experiment 3, therefore, provides initial evidence that emotion-target congruence is not due to fluency or role fulfillment. Instead, it represents people's preference for stimuli that signal attitudinally meaning that is coherent with their own. When a negative emotion itself does not make salient the values and meanings an individual is committed to, the emotion-target congruence disappears and a pattern of preference change more consistent with affect regulation becomes evident.

EXPERIMENT 4

The attitudinal commitment rationale implies that mismatched attitudes between an individual and a stimulus should mitigate the emotion-target congruence effect. Whereas, in experiment 3, an individual's commitment to an attitude was manipulated by changing individuals' emotion experience, in this final experiment, we manipulate the strength of the attitudinal signal from the color source. Colored objects which provide stronger signals of one's own attitude, taste, and values (t-shirts) are expected to produce stronger emotion-target congruence effect than colored objects whose choices are based on instrumental reasons rather on one's own attitude, taste, and values (post-its).

Method

Participants and Design. One hundred twenty-six students participated in this experiment for course credit. The experiment adopted a 2 (color tone: sad vs. happy; within) by 2 (colored object: t-shirts vs. post-its; between) mixed design.

Procedure. The procedure was similar to the one used in the previous experiment, except for the following changes. We induced sadness with two new videos. All participants watched the same two *new* sad videos for about 8 minutes ("I've loved you so long" and "My sister's keeper"). Both clips depicted sad situations where families say a final goodbye and share the last moment with a loved, dying member. Half of participants evaluated colored t-shirts (as in Experiment 2), while the other half evaluated the very same colors on post-it images (2 x 1.5 inch rectangles). Twenty colored objects were rated. Color tone was measured at the end of the experiment.

Results

Color tone. Based on the group level of color happiness index [happy – sad], colors were categorized as either happy colors or sad colors. We ran a hierarchical analysis to categorize colors into happy vs. sad colors. Both groups' color feeling judgments were the same for the 17 colors, but there were 3 ambivalent colors, which the post-it group judged to be slightly sad but the t-shirt group judged to be slightly happy. We included these three ambivalent colors in the happy colors in the following analysis. However, even when we included these three colors into the sad colors or excluded them from analysis, the same results hold.

Color Preference. The t-shirt group and the post-it group did not differ in their emotional state (I feel happy [sad, good, bad], all Fs < 1). However, the impact of sadness on their color preferences varied significantly. An analysis of variance with repeated measures revealed that the color tone (happy vs. sad color) and the colored object (t-shirt vs. post-it) interacted on reported preference ($F(1, 125) = 6.25$, $p=.01$, see figure 6). Replicating the previous results, sadness increased preference for sad color t-shirts to happy colors ($M_{\text{sad shirts}} = 10.52$ vs. $M_{\text{happy shirts}} = -5.28$, $F(1, 125) = 8.85$, $p=.004$). However, there was no impact of sadness in the post-it condition ($M_{\text{sad post-it}} = -4.36$ vs. $M_{\text{happy post-it}} = -.85$, $F(1, 125) = .39$, $p > .5$). Also, preference for sad colored t-shirts increased significantly more than preference for sad colored post-it after sadness induction ($F(1, 125) = 5.75$, $p=.018$). Preference for happy colored t-shirt and happy colored post-its did not differ ($M_{\text{happy shirt}} = -5.28$ vs. $M_{\text{happy post-it}} = -.85$, $F(1, 125) = .74$, $p > .10$).

--Insert figure 6 around here--

Discussion

Experiment 4 provides further evidence consistent with the attitude commitment hypothesis and presents a clear boundary condition for the phenomenon. When the colored object conveys one's attitudinal commitment, what one cares and stands for—i.e., high attitude signaling—emotion-target congruence is likely to operate. However, when preference for a colored object is based mostly on utilitarian reasons and hence provides little signals about the individuals' attitudes, values and beliefs, the emotion-target congruence effect disappears.

GENERAL DISCUSSION

In this paper we systematically examine how an individual's preference for colors and various colored objects varies depending on his/her emotional state and the extent to which it interacts with the color's emotional tone. In a series of four experiments, we find increased preference for colors for which a fit exists between one's emotional experience at the time of the evaluation and the emotional tone of the color. More precisely, happy people increase their preference for happy colors relative to sad colors and relative to sad participants, whereas sad people increase preference for sad colors relative to happy colors and relative to happy participants. This preference toward emotion-target congruence appears regardless of one's initial preference for the color. Attitudinal commitment is proposed as a key underlying mechanism—that is, people like the emotional associations of stimuli to be consistent with their own emotion if they are committed to the attitude that is reflected in their emotion. Analogously, sad people increase their preference for sad (vs. happy) colors, because the emotional

associations of sad colors (sober and somber) are consistent with their own committed emotional attitude toward the situation and its meaning, whereas happy colors signal the opposite meaning (fun, exciting, good), which is then perceived as quite inappropriate. Consistent with this account, people like emotion-congruent colors when they find their emotion reflects a committed (vs. not-committed) attitude toward the situation (experiment 3) and when the colored object signals (vs. not does signal) one's committed attitude (experiment 4).

Conflicting findings – A potential resolution

Our findings shed light into some conflicting findings in the emotion and aesthetics literature. Whereas there has been evidence showing that people in negative moods like emotion-incongruent aesthetic stimuli to lift their spirits (e.g., comedy, cheerful songs, game show), there has also been evidence that people in negative emotions increase preference for mood-congruent aesthetic stimuli (for a review, see Carpentier et al 2008). Our theorizing predicts that when the negative emotion contains a committed attitude and meaning toward a situation (e.g., loss of loved one, break-up, or exposure to some else's suffering), the emotion-target congruence effect is likely to emerge. Consistent with the prediction, preference for emotion-target congruence tends to be observed for people experiencing negative emotions of loneliness, sadness, or regret (e.g., Gibson, Aust, and Zillmann 2000; Knobloch and Zillmann 2003; Kamins, Marks, and Skinner 1991; Lajos, Ordabayeva, and Chattopadhyay 2008, Martin et al. 1997; Mills 1993; Nabi et al 2006; Strizhakova and Krcmar 2007). Such experiences often feature serious and deep issues, which not only evoke a negative emotion but also highlight serious and somber attitude and beliefs (e.g., life is difficult but precious). In such situations, stimuli which signal the same

attitudinal meaning (e.g., drama, sad music, sad colors) should be more appreciated than those with opposite meaning (e.g., comedy, cheerful songs, and happy colors), which may be perceived as quite inappropriate or threatening to one's view.

On the other hand, when negative emotion has less committed values and meaning, emotion-target *in*congruence effects would be more likely to emerge. Consistent with this prediction, preference for emotion-incongruent aesthetic stimuli tends to be observed when the emotion was induced through bogus lab-induced performance feedback (Biswas, Riffe & Zillmann 1994; Knobloch and Zillmann 2002; Zillmann, Hezel and Medoff 1980) or physical annoyance (Helregel & Weaver 1989; Meadowcroft & Zillmann, 1987). In such situations, only negative emotion but not committed attitude or belief is likely to be evoked. As a result, affect regulation motives might operate, which would make people prefer positive/mood-lifting stimuli. Thus, emotion-target incongruence is likely to be preferred under not-committed negative emotion.

Conclusion

What is the source of aesthetic pleasure? In spite of the importance of aesthetic pleasure in people's daily life and psychological well-being, it mostly remains mysterious for scientists due to its complexity and subjectivity. In particular, the popularity of dramas, tear-jerker stories, and gloomy music challenge attempts to theorize about aesthetic pleasure based on hedonistic principles. Researchers have built alternative theories such as role-fulfillment theory (Martin et al 1997), downward social comparison (Gibbons 1986), or information gathering from people in a similar situation (Mares, Oliver, and Cantor 2008) to explain preference for mood-congruent

company, videos, or music. However, our experimental results with simple colors suggest that signaling the same attitudinal tone is enough to change people's liking for aesthetic stimuli when they are experiencing an emotion to which they are committed.

Aesthetic judgment is not only a matter of context and inherent taste, but also a function of the relationship between the emotional tone the stimulus conveys and the feeling one has at the time of the evaluation. This article presents an additional facet to our understanding of aesthetic pleasure. Future studies are needed to explore the important relationships among emotion, emotional tone of aesthetic stimuli, and aesthetic pleasure.

REFERENCES

Andrade, Eduardo (2005), "Behavioral Consequences of Affect: Combining Evaluative and Regulatory Mechanisms," *Journal or Consumer Research*, 32 (December), 355-62.

_____ and Dan Ariely (2009), "The Enduring Impact of Transient Emotions on Decision Making," *Organizational Behavior and Human Decision Processes*, 109 (1), 1-8.

Belk, Russell W. (1988), "Possessions and the Extended Self," Journal of Consumer Research, 15(2), 139-168.

Biswas, Rahul, Daniel Riffe & Dolf Zillman (1994) "Mood Influence on the appeal of bad news," *Journalism Quarterly*, 71, 689-696.

Bornstein, Robert F. and Paul R. D'Agostino (1992), "Stimulus Recognition and the Mere Exposure Effect," *Journal of Personality and Social Psychology*, 63(4), 545-52.

Boyatzis, Chris J. and Reenu Varghese (1994), "Children's Emotional Associations with Colors," *Journal of Genetic Psychology*, 155 (1), 77-85.

Brown, Laura (2011, February 14), Hillary Clinton: Myth and Reality Cont, *Harper's Bazaar* from http://www.harpersbazaar.com/magazine/feature-articles/hillary-clinton-interview-2

Cohen, Joel B. and Eduardo B. Andrade (2004), "Affective Intuition and Task-Contingent Affect Regulation," *Journal of Consumer Research*, 31(September), 358-367.

D'Andrade, Roy and Michael Egan (1974), "The Colors of Emotion," *American Ethnologist*, 1, 49-63.

Gibbons, Frederick X. (1986), "Social Comparison and Depression: Company's Effect on Misery," *Journal of Personality and Social Psychology*, 51 (1), 140-48.

Gibson, Rhonda, Charles F. Aust, and Dolf Zillmann (2000), "Loneliness of Adolescents and Their Choice and Enjoyment of Love-Celebrating Versus Love-Lamenting Popular Music," *Empirical Studies of the Arts*, 18 (1), 43-48.

Gorn, Gerald J., Amitava Chattopadhyay, Tracey Yi, and Darren W. Dahl (1997), "Effects of Color as an Executional Cue in Advertising: They're in the Shade," *Management Science*, 43 (10), 1387-400.

Gross, James J. (1998), "Antecedent-and Response-Focused Emotion Regulation: Divergent Consequences for Experience, Expression, and Physiology," *Journal of Personality and Social Psychology*, 74 (1), 224-37.

_____ and Robert W. Levenson (1995), "Emotion Elicitation Using Films," *Cognition & Emotion*, 9 (1), 87-108.

Guilford, Joy P. (1934), "The Affective Value of Color as a Function of Hue, Tint, and Chroma," *Journal of Experimental Psychology*, 17 (3), 342-70.

Hart, William, Dolores Albarracin, Alice H. Eagly, Inge Brechan, Matthew J. Lindberg, and Lisa Merrill (2009), "Feeling Validated Versus Being Correct: A Meta-Analysis of Selective Exposure to Information," *Psychological Bulletin*, 135 (4) 555-88.

Heine, Steven J., Travis Proulx, and Kathleen D. Vohs (2006), "The Meaning Maintenance Model: On the Coherence of Social Motivations," Personality and Social Psychology Review, 10(2), 88-110.

Helregel, Brenda K. and James B. Weaver (1989) "*Mood-Management During Pregnancy through Selective Exposure to Television*," Journal of Broadcasting & Electronic Media, 33 (1), 15-33.

Ireland, Susan R., Yvonne. M. Warren, and Lawrence G. Herringer (1992), "Anxiety and Color Saturation Preference," *Perceptual and motor skills*, 75 (2), 545-46.

Isen, Alice, & Simmons, Stanley (1978). "The Effect of Feeling Good on a Helping Task that is incompatible with Good Mood," *Social Psychology*, 41 (4) 346-49.

_____, Thomas.E. Shalker, Margaret Clark, and Lynn. Karp (1978), "Affect Accessibility of Material in Memory and Behavior: a Cognitive Loop?," *Journal of Personality and Social Psychology*, 36 (1), 1-12.

Jacobs, Keith W. and James F. Suess (1975), "Effects of Four Psychological Primary Colors on Anxiety State," *Perceptual and motor skills*, 41 (1), 207-10.

Jacobson, Nathaniel and Walter Bender (1996), "Color as a Determined Communication," *IBM Systems journal*, 35 (3), 526-38.

Kamins, Michael A., Lawrence J. Marks, and Deborah Skinner (1991), "Television Commercial Evaluation in the Context of Program Induced Mood: Congruency Versus Consistency Effects," *Journal of Advertising*, 20 (2), 1-14.

Knobloch, Silvia and Dolf Zillmann (2002), "Mood Management via the Digital Jukebox," *Journal of Communication*, 52 (2), 351-366.

Knobloch, Silvia and Dolf Zillmann (2003), "Appeal of Love Themes in Popular Music," *Psychological reports*, 93 (3), 653-58.

Lajos, Joseph, Nailya Ordabayeva, and Amitava Chattopadhyay (2008), "Mood Matching: The Importance of Fit between Moods Elicited by TV Programs and Commercials" 2009/06/MKT/ISSRC, INSEAD Knowledge, Retrieved from http://docentes.fe.unl.pt/~satpeg/ano20072008/docs/LAJOS_paper.pdf

Lerner, Jennifer S., Deborah A. Small, and George Loewenstein (2004), "Heart Strings and Purse Strings," *Psychological Science*, 15 (5), 337-41.

Locke, Kenneth D. and Leonard M. Horowitz (1990), "Satisfaction in Interpersonal Interactions as a Function of Similarity in Level of Dysphoria," *Journal of Personality and Social Psychology*, 58 (5), 823-31.

Mares, Marie-Louise, Mary Beth Oliver, and Joanne Cantor (2008), "Age Difference in Adults' Emotional Motivations for Exposure to Films," Media Psychology, 11, 488-511.

Martin, Leonard L., Teresa Abend, Constantine Sedikides, and Jeffrey D. Green (1997), "How Would I Feel If…? Mood as Input to a Role Fulfillment Evaluation Process," *Journal of Personality and Social Psychology*, 73 (2), 242-53.

Meadowcroft, Jeanne M. and Dolf Zillmann (1987), "Women's Comedy Preferences During the Mensutrual Cycle," *Communication Research*, 14 (2) 204-218.

Meerum Terwogt, Mark and Jan B. Hoeksma (1995), "Colors and Emotions: Preferences and Combinations," *Journal of General Psychology*, 122 (1), 5-17.

Miller, Elizabeth G. and Barbara E. Kahn (2005), "Shades of Meaning: The Effect of Color and Flavor Names on Consumer Choice," *Journal of Consumer Research*, 32 (1), 86-92.

Mills, Judson (1993), "The Appeal of Tragedy: An Attitude Interpretation," *Basic and Applied Social Psychology*, 14 (3), 255-71.

Nabi, Robin L., Keli Finnerty, Tricia Domschke, and Shawnika Hull (2006), "Does Misery Love Company? Exploring the Therapeutic Effects of TV Viewing on Regretted Experiences," Journal of Communication, 56, 689-706.

Niedenthal, Paula M. and Marc B. Setterlund (1994), "Emotion Congruence in Perception," *Personality and Social Psychology Bulletin*, 20 (4), 401-11.

Ou, Li-Chen, M. Ronnier Luo, Andrée Woodcock, and Angela Wright (2004), "A Study of Colour Emotion and Colour Preference. Part III: Colour Preference Modeling," *Color Research & Application*, 29 (5), 381-89.

Palmer, Stephen E. and Karen B. Schloss (2010), "An Ecological Valence Theory of Human Color Preference," *Proceedings of the National Academy of Sciences*, 107 (19), 8877-82.

Pham, Michel Tuan (1998), "Representativeness, Relevance, and the Use of Feelings in Decision Making," *Journal of Consumer Research*, 25 (2), 144-59.

Reber, Rolf, Norbert Schwartz, and Piotr Winkielman (2004), "Processing Fluency and Aesthetic Pleasure: Is Beauty in the Perceiver's Processing Experience?" *Personality and Social Psychology Review*, 8 (4), 364-82.

Rosenblatt, Abram and Jeff Greenberg (1991), "Examining the World of the Depressed: Do Depressed People Prefer Others Who Are Depressed?" *Journal of Personality and Social Psychology*, 60 (4), 620-29.

Saint-Exupery, Antoine de (1943), *The Little Prince*, Ware: Hertfordshire, Wordsworth Editions, 1995.

Schwarz, Norbert and Gerald L. Clore (1983), "Mood, Misattribution, and Judgments of Well-Being: Informative and Directive Functions of Affective States," *Journal of Personality and Social Psychology*, 45 (September), 513-523.

Smets, Gerda (1982), "A Tool for Measuring Relative Effects of Hue, Brightness and Saturation on Color Pleasantness," *Perceptual and Motor skills*, 55, 1159-1164.

Strizhakova, Yuliya and Marina Krcmar (2007), "Mood Management and Video Rental Choices," *Media Psychology*, 10 (1), 91-112.

Swann, Jr. William B. (1983), “Self-Verification: Bringing Social Reality into Harmony with the Self,” In J. Suls & A.G. Greenwald (Eds.), *Psychological perspectives on the self* (Vol. 2, pp33-66). Hillsdale, NJ: Erlbaum.

Tice, Dianne M., Ellen Bratslavsky, and Roy F. Baumeister (2001), "Emotional Distress Regulation Takes Precedence over Impulse Control: If You Feel Bad, Do It!," *Journal of Personality and Social Psychology*, 80 (1), 53-67.

Tsai, Jeanne L. (2007), "Ideal Affect: Cultural Causes and Behavioral Consequences," *Perspectives on Psychological Science*, 2 (3), 242.

Valdez, Patricia and Albert Mehrabian (1994), "Effects of Color on Emotions," *Journal of Experimental Psychology: General*, 123 (4), 394-409.

Wilson, Glenn D. (1966), "Arousal Properties of Red Versus Green," *Perceptual and motor skills*, 23 (3), 947-49.

Winkielman, Piotr, Norbert Schwarz, Tedra A. Fazendeiro, and Rolf Reber (2003). The hedonic marking of processing fluency: Implications for evaluative judgment. In J. Musch & K. C. Klauer (Eds.), The psychology of evaluation: Affective processes in cognition and emotion (pp. 189–217). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Zentner, Marcel R. (2001), "Preferences for Colours and Colour--Emotion Combinations in Early Childhood," *Developmental Science*, 4 (4), 389-98.

Zillmann, Dolf (1988), "Mood Management: Using Entertainment to Full Advantage," *Communication, social cognition, and affect*, 147-71.

Zillman, Dolf, Richard T. Hezel, and Norman J. Medoff (1980), “The Effect of Affective States on Selective Exposure to Televised Entertainment Fare,” Journal of Applied Social Psychology, 10(4), 323-39.

FIGURE 1: PREFERENCE CHANGE FOR COLORS (EXPERIMENT 1)

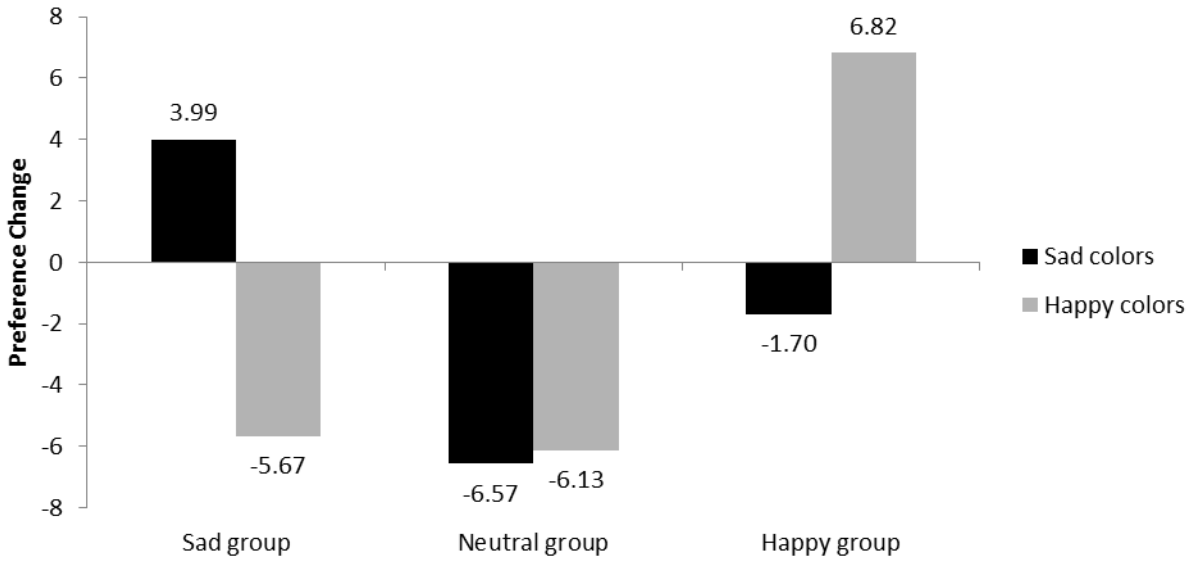


FIGURE 2: PREFERENCE CHANGE FOR COLORED T-SHIRTS (EXPERIMENT 2)

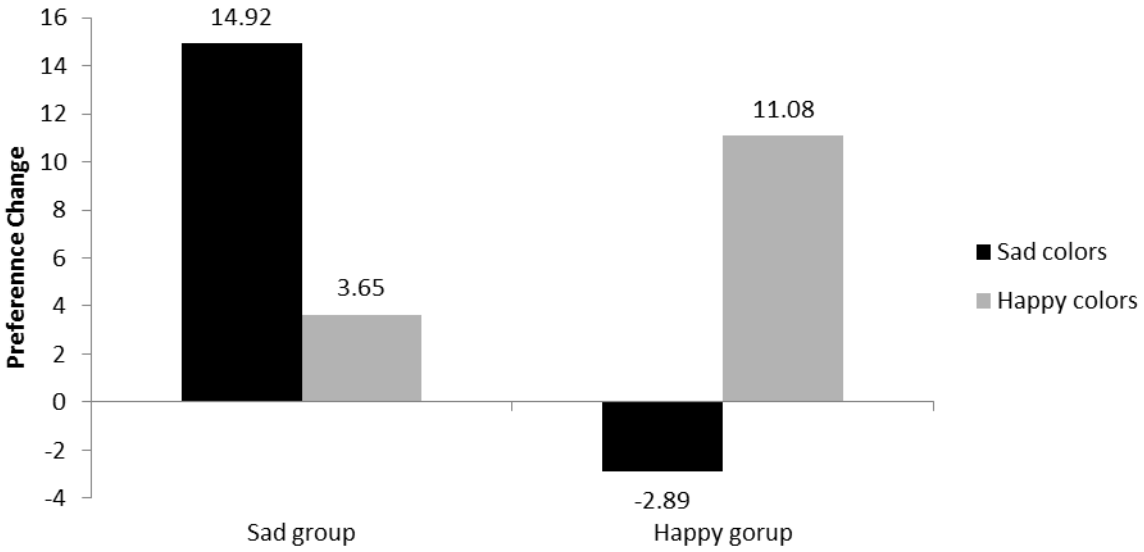


FIGURE 3: PREFERENCE CHANGE (EXPERIMENTS 1 AND 2 COMBINED)

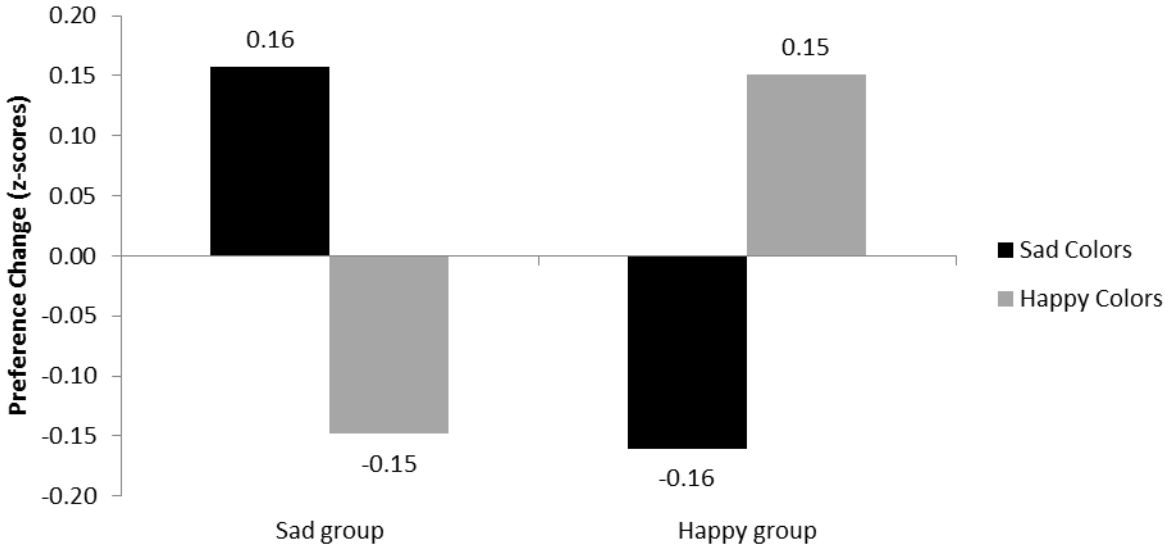


FIGURE 4: PREFERENCE CHANGE (EXPERIMENT 3)

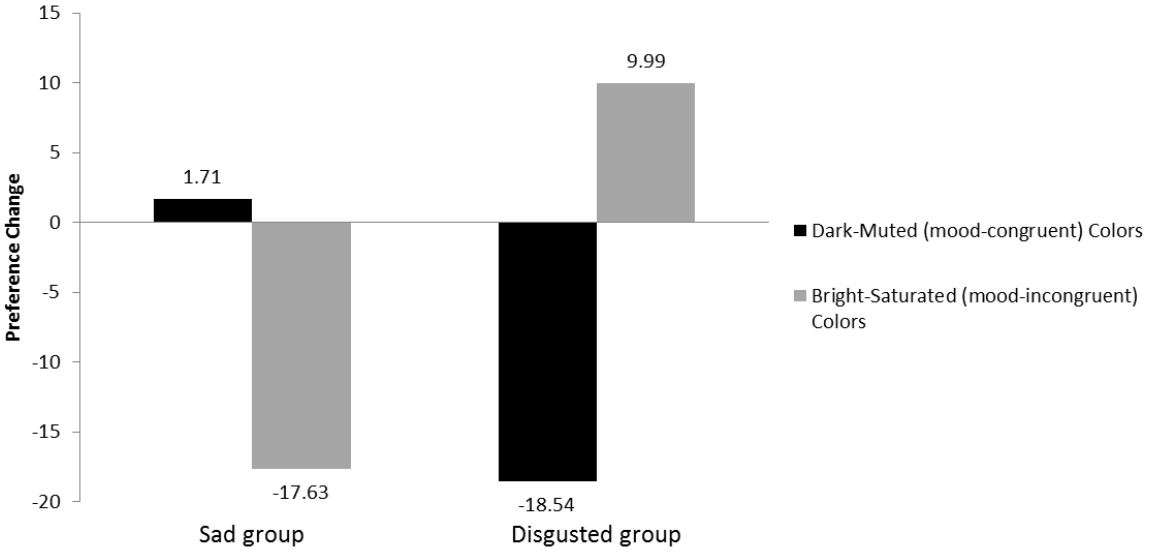
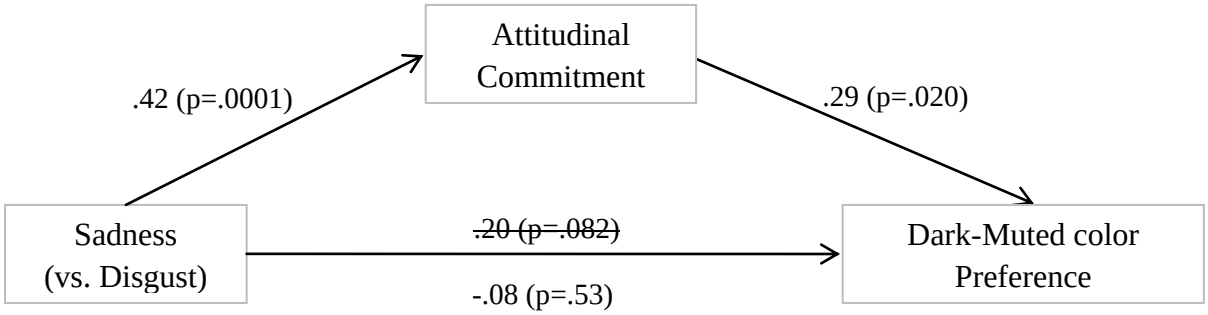


FIGURE 5: MEDIATION ANALYSES

A. Dark-muted color preference change



B. Bright-saturated color preference change

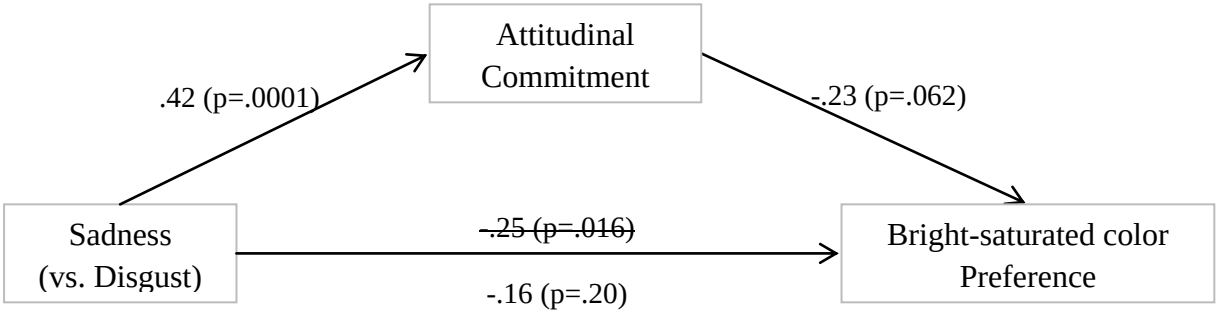
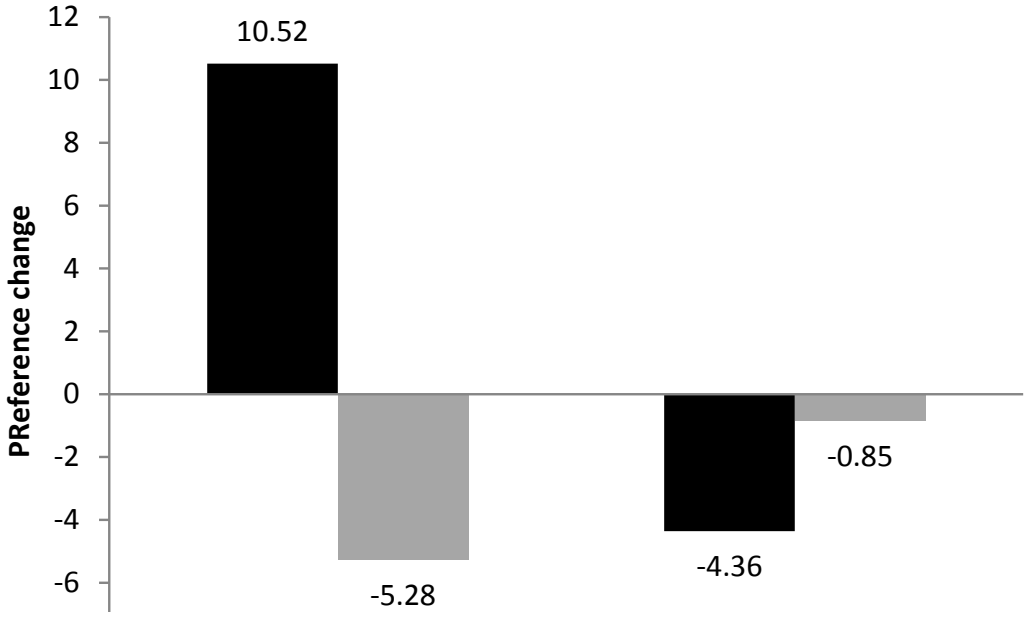
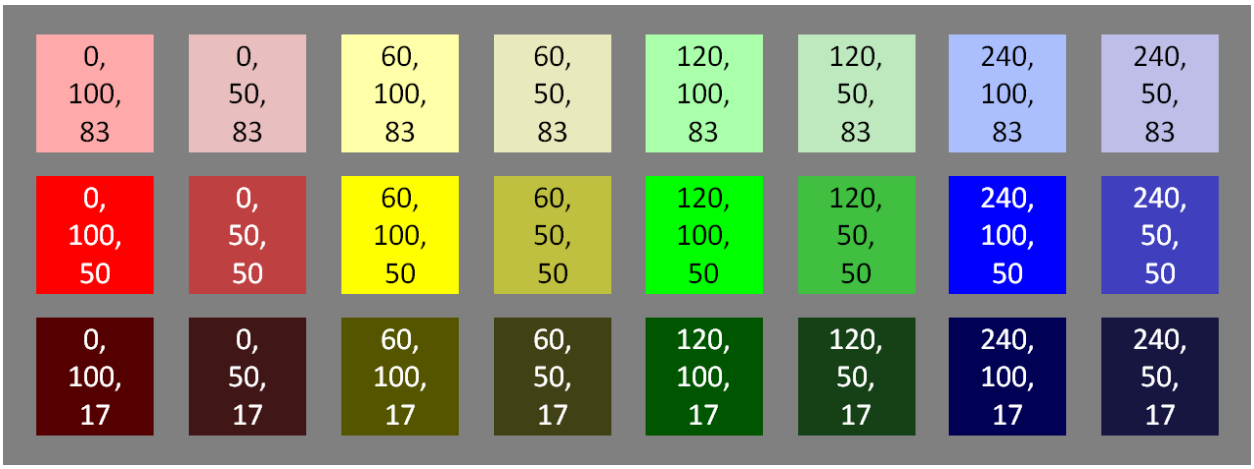


FIGURE 6: PREFERENCE CHANGE (EXPERIMENT 4)

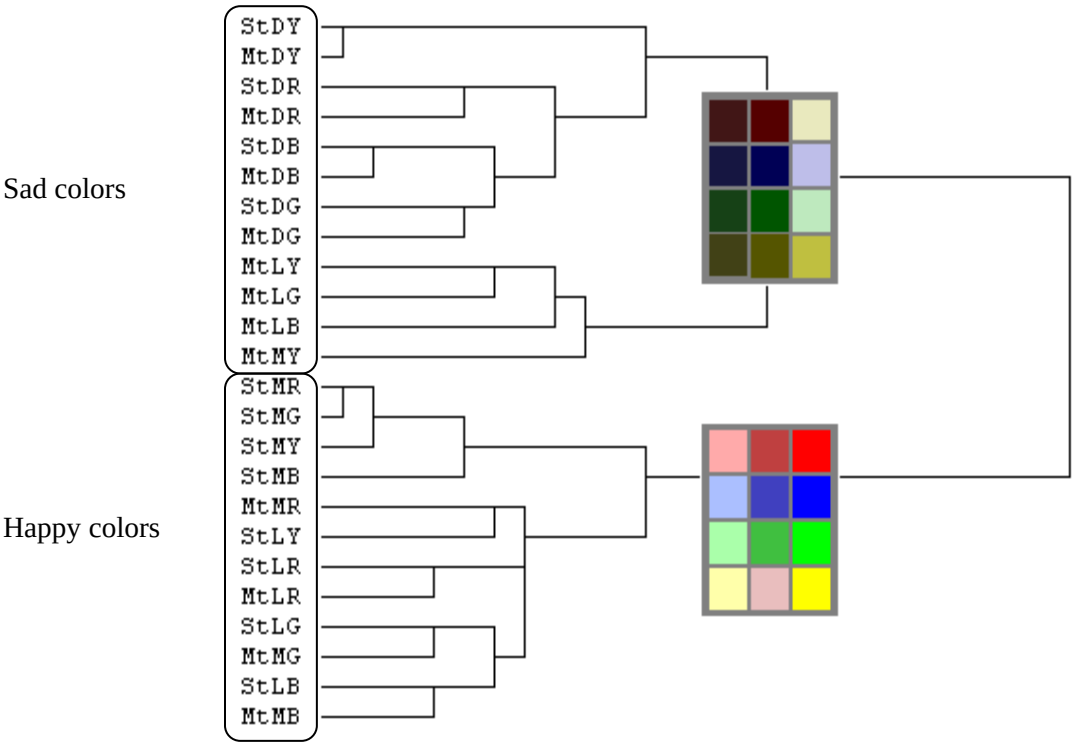


APPENDIX 1: 24 COLOR STIMULI IN PRETEST AND STUDY 1



(Hue ^{o}, Saturation %, Lightness %)

APPENDIX 2: 24 COLOR STIMULI CLUSTERS (PRETEST FOR EXPERIMENT 1)



Color name annotation (example: StDY = Saturated Dark Yellow = (H: 60 ^{o}, S: 100%, L:17%))

- St/Mt = Saturated (100%) / Muted (50%)
- L/M/D = Light (83%) / Middle (50%) / Dark (17%)
- R/Y/G/B = Red (0^{o}) / Yellow (60^{o}) / Green (120^{o}) / Blue (240^{o})

APPENDIX 3: 20 T-SHIRT STIMULI (EXPERIMENT 2 AND 4)

APPENDIX 4: COLOR STIMULI (EXPERIMENT 3)

Dark-Muted (Sad) vs.
Bright-Saturated (Happy) colors

Dark-Muted (Disgusting) vs.
Bright-Saturated (Clean) colors