The Effect of Semantic Congruence Between Color and Music on Product Evaluation

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ABSTRACT
In this study, we document the amplifying effect of multisensory semantic congruence between color and music. In the context of e-book site and cosmetic store environment evaluation, the semantic association between color and music led to more favorable brand attitudes.

Key words: Multisensory, Color, Music, Fluency, Cognitive Flexibility

Recently, sensory marketing is gaining increased interest as a new way of connecting brands to customers (Gobe 2009, Krishna 2010, Peck and Childers 2008). A paucity of studies in the area focus on investigating the interplays between senses (Hoegg and Alba 2007, Krishna, Elder, and Caldara 2010) rather than the effects of single sense in isolation (Krishna, Lwin, and Morrin 2010, Peck and Shu 2009, Meyers-Levy and Zhu 2010). Consumers naturally process information utilizing all the senses in unison (Krishna 2010, Elder and Krishna 2010). The multi-sensory nature of perception leads to an important research agenda of investigating the impacts of synergies and interferences between the senses on brand evaluations and preferences (Hoegg and Alba 2007). For example, when visual and auditory stimuli compete for attention, consumers’ attention could be divided in between so the senses function as interference (Bonnel and Hafter 1998). In contrast, semantic congruence between smell and touched could create synergy and leads to more positive evaluations of product (Krishna, Elder, and Caldara 2010).

The sensory research that examined each sense in isolation has shown that color affects brand evaluation (Deng, Hui, and Hutchinson 2010, Gorn et al. 2004) so does music (Zhu and Meyers-Levy 2005, Meyers-Levy and Zhu 2010). In this study, we document the magnifying effect of multisensory semantic congruence between color and music. We manipulate one or all the three dimensions of color (hue, chroma, and value) and of music (tempo, tonality, and texture) to create specific semantic meanings and show that when the two senses align on the dimension of a particular semantic meaning they enhance brand evaluation. In the context of e-book purchase experience, the semantic association of relaxation between the blue (vs. yellow) color and slow (vs. fast) music shortens the perceived download time which leads to more favorable attitudes toward the website (Study 1). In a store environment setting, the semantic association of alluring vs. neat brand personality between brand, color (Kobayashi 1990) and music (Radocy 2003) enhances brand attitude (Study 2). Processing fluency mediates the effect of congruence between color and music.

In study 1, we examined how consumer’s time perception is affected by the integrated effect of color and music. 250 undergraduates were asked to review an e-book site and provide their opinion on it. We manipulated tempo of music and hue of color to induce the feeling of relaxation. Adapted from Gorn et al. (2004), the participants were introduced to a front page of an e-book site and asked to click a featured e-book, followed by a full screen of the assigned color and music and the word “Downloading…” and the downloading screen was remained on for 17.5 seconds before the book information popped up on the next page. Following the literature, we used blue 240 (vs. yellow 60) color with the same chroma and value levels of 100% extracted from the HSB model. The background music featured Bach’s Jesu, Joy of Man’s Desiring was played at a slow (vs. fast) tempo of 130% (vs. 70%) speed of original music to elicit more (vs. less) relaxed feelings (Gorn et al. 2004, Mehta and Zhu 2009). At last, participants responded to the dependent measures of the feelings of relaxation (1 = not at all ~ 9 = very much so: relaxed, calm, peaceful, uneasy, tense, and anxious), perceived download time (1 = slow, not speedy, not quick ~ 9 = fast, speedy, quick), attitudes (1 = negative, dislike, bad, unfavorable, unattractive, unpleasant ~ 7 = positive, like, good, favorable, attractive, pleasant), and recommendation intention (1 = very unlikely~7 = very likely) toward the website.

A 2 (color: blue vs. yellow) × 2 (music: slow vs. fast) between-subjects ANOVA revealed a significant interaction effect of color and music on the perceived download time F(1, 246)=18.84, p <.001, M_{blue,slow} = 6.86, M_{blue,fast} = 3.59, M_{yellow,slow} = 5.14,
M_{yellow,fast}=3.96), attitudes (F(1, 246)=9.60, p =0.002, 
M_{blue,slow} = 5.00, M_{blue,fast}=3.73, M_{yellow,slow} = 4.25, 
M_{yellow,fast}=3.79), and recommendation intention (F(1, 
246)=13.34, p <.001, M_{blue,slow} = 5.88, M_{blue,fast}=3.60,
M_{yellow,slow} = 4.66, M_{yellow,fast}=3.80) toward the website.
Follow-up contrasts revealed that when the slow music was presented with blue color the participants felt more relaxed, thought the download speed was faster, and revealed more favorable attitudes and recommendation intention toward the e-book site than when it was presented with yellow color. A 2way ANOVA also yielded a significant color ×
music interaction effect on feelings of relaxation (F(1, 246)=9.86, p =0.002) and processing fluency (1= difficult to understand, unclear to understand, a lot of effort to understand ~ 9 = easy to understand, clear to understand, not a lot of effort to understand; F(1,247)=7.03, p <.01, M_{blue,slow} = 5.16, M_{blue,fast}=3.33, 
M_{yellow,slow} = 4.55, M_{yellow,fast}=4.40).

A series of regression analyses showed that (1) color × music interaction was significant for processing fluency (β = .304, p<.001); (2) processing fluency on perceived download time was significant (β = .349, p<.001); and (3) the originally significant direct effect of color × music interaction on perceived download time (β = .483, p<.001) was still significant, but the effect size became smaller (β = .415, p<.001) after processing fluency was included (β =.223, p<.001). The same results emerged for attitudes and recommendation intention. The bootstrap procedure for indirect effects in multiple mediator models(Preacher and Hayes 2008) confirmed that the influence of color × music interaction led to enhanced feelings of relaxation, and then to processing fluency, and, as a result, to less perceived download time, more favorable attitudes, and more positive recommendation intention.

Study 2 replicates the results of Study 1 and also extends them by examining the synergic effect of three way semantic congruency between brand image, color, and music. In addition, we test the effect of color combination (Deng, Hui, and Hutchinson 2010) using multiple color pairs instead of a single color in this study. 477 undergraduates were randomly assigned to evaluate a 3D video clip displaying a store environment newly launched by a cosmetics brand. A pretest chose two contrasting real brands with a distinct brand image of “alluring” vs. “neat.” The three color combinations for the semantic meanings of alluring and neat were picked from color image scale using RGB model (Kobayashi 1990). The same background music as Study 1 (Bach’s Jesu, Joy of Man’s Desiring) was professionally recorded by varying playing techniques of guitar to manipulate brand personality expressed by the adjective descriptors of alluring and neat. After being exposed to the stimuli, the participants evaluated the store environment (1 = negative, dislike, bad, unfavorable ~ 7 = positive, like, good, favorable).

A 2 (brand: alluring vs. neat) × 2 (music: alluring vs. neat) × 2 (color: alluring vs. neat) between-subjects ANOVA yielded a significant brand × music × color interaction on attitude toward the store (F(1, 470)=7.35, p =.007, M_{alluring,alluring,alluring} =
4.44, M_{alluring,alluring,neat} = 2.66, M_{alluring,neat,alluring} =
3.28, M_{alluring,neat,neat} = 4.14, M_{neat,alluring,alluring} =
3.53, M_{neat,alluring,neat} = 3.61, M_{neat,neat,alluring} = 3.04, M_{neat,neat,neat} =
4.70). As hypothesized, a regression analysis yielded a significant 4-way interaction effect of cognitive flexibility × brand × music × color showing that cognitive flexibility moderated the effect (β = 1.991, p<.001). Follow-up contrasts revealed that the brand × music × color interaction has a significant effect on attitudes for the participants with high cognitive flexibility (β_{low}=.178, p=.07 vs. β_{high}=.567, p<.001). Cognitive flexibility × brand × music × color interaction was also significant on processing fluency (β = 1.259, p=.076) and planned contrasts revealed that brand × music × color interaction on fluency was significant only for the participants with high cognitive flexibility (β_{low}=.024, p>.1 vs. β_{high}=.333, p=.053).

A series of regression revealed that the effect of the 4 way interaction was fully explained by the mediating role of processing fluency. High level of semantic congruence combined with high cognitive flexibility led to higher fluency (β = .131, p<.01); Processing fluency had a positive effect on attitudes (β = .480, p<.001). The significant direct effect of the 4 way interaction on attitudes (β = .225, p<.001) was still significant but the size of the impact became smaller (β = .165, p<.001) after fluency was included in the model (β = .458, p<.001). The bootstrap procedure for indirect effects confirmed that the congruent semantic meaning to processing fluency mediated the effect of brand, color, music interaction on attitude toward the store environment. A mediated moderation analysis (Muller, Judd, and Yzerbyt 2005) showed a significant moderating effect of the participants’ cognitive flexibility.
REFERENCES