



The effect of color and self-view priming in persuasive communications

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ABSTRACT

We examine how the associative properties of the color red relate to an independent self-view, and their impact on advertising message processing and persuasion. In study 1, using explicit measures, we demonstrate that red is associated with independence-focused words. In study 2, employing an Implicit Association Test, we further examine the congruence of independence and red, and observe an identical pattern of results. In study 3, we test these findings in a social marketing context (diabetes testing). We find that participants' behavioral intentions to comply with an advertisement's advocated position are enhanced when red ad backgrounds are matched with an independent self-construal prime. In study 4, these findings are replicated in a more typical consumer behavior context (restaurant patronage), and indicate that processing fluency and perceived ad believability are mediators of the observed effects on participants' behavioral intentions. We conclude by discussing the practical and theoretical implications of our work.

1. Introduction

Color plays an important role within a variety of marketing functions (Labrecque, Patrick, & Milne, 2013) and is the subject of a growing number of empirical investigations (Elliot & Maier, 2014). Extant research indicates that color plays a pivotal role in generating attention (Lee & Barnes, 1989), influencing consumer perceptions (Mehta & Zhu, 2009), and impacting purchase behavior (Bagchi & Cheema, 2013). Relevant to the current investigation, color has also been shown to influence consumers' responses to advertising (Gorn, Chattopadhyay, Yi, & Dahl, 1997; Kareklas, Brunel, & Coulter, 2014). For example, several advertising studies have examined how color affects advertising information processing (e.g., Gorn et al., 1997; Lichtlé, 2007; Pucinelli, Chandrashekar, Grewal, & Suri, 2013), as well as message persuasion (e.g., Chou & Wang, 2016; Gerend & Sias, 2009; Voss, Corser, McCormick, & Jasper, 2018). Nonetheless, in a recent review of color and psychological functioning, Elliot (2015) notes that existing theoretical and empirical work on the topic remains in an early stage of development. In particular, while several studies have explored color effects in advertising, the majority of this work lacks a strong theoretical foundation to account for the observed effects.

Our review of the literature indicates that color research in advertising and consumer psychology often focuses on the color red – examined in varying contexts, including firms' advertising responses to

product failures (Puzakova, Kwak, Ramanathan, & Rocereto, 2016), willingness-to-pay (Bagchi & Cheema, 2013), brand personality (Labrecque & Milne, 2012), cognitive task performance (Mehta & Zhu, 2009), risk taking (Gnambs, Appel, & Oeberst, 2015), approach/avoidance behaviors (Meier, D'Agostino, Elliot, Maier, & Wilkowski, 2012), and competitive interactions (Ten Velden, Baas, Shalvi, Preenen, & De Dreu, 2012). The color red has also been shown to evoke specific connotations (e.g., danger and mistakes) in consumers' minds (Mehta & Zhu, 2009). Furthermore, much like other colors, red has been shown to be associated with both positive (love, activity, energy, attention, power) and negative (aggression, dominance, fear, danger, stress) concepts (Buechner, Maier, Lichtenfeld, & Schwarz, 2014).

In the current investigation, we extend color research by examining the psychological properties of the color red as it relates to one's independent self-view, i.e., self-construal orientation (Agrawal & Maheswaran, 2005). While a growing body of work has focused on self-construal and its effects on consumer research (e.g., Hamilton & Biehal, 2005; Kareklas, Carlson, & Muehling, 2012), our work is the first to our knowledge to combine self-construal theorizing with an examination of the impact of the color red on message processing and persuasion in an advertising context. As we describe in greater detail below, we believe there is a natural congruence between the concepts the color red evokes and the motivations that define and are consistent with an independent self-construal. We find it interesting, for example, that someone with

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red hair or a “fiery red” personality is often described as bold, assertive, and strong-willed – traits often associated with an independent self-view (International Institute for Learning, 2018). Furthermore, we argue that under conditions of congruence, message processing and persuasion is enhanced, such that participants exposed to congruent color and self-view primes will exhibit more favorable intentions toward the promoted behavior.

In our work, we endeavor to contribute to the literatures on self-construal and color research by combining insights from these two, previously disparate domains. Our focus on self-construal is consistent with a growing body of literature that has examined the effects of chronic and/or situationally-derived self-construals (i.e., whether a consumer's self-view is primarily focused on “independence” or “interdependence”) when responding to advertising and marketing communications (Ahluwalia, 2008; Block, 2005; Kareklas, Carlson, & Muehling, 2014; van Baaren & Ruivenkamp, 2007). Moreover, by examining the congruence of self-construal and the color red we provide a strong theoretical basis for our expectations – in response to Elliot's (2015) observation that past color research often lacks a theoretical base.

In order to provide a foundation for subsequent observations, we first examine the relationship between the color red and an independent self-construal via a word-association task (study 1) (cf. Madden, Hewett, & Roth, 2000; Wexner, 1954), followed by an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) (study 2). We then test the effects of contextually-activated self-construal and red advertising backgrounds on advertising effectiveness in a social marketing setting (study 3). In our final study (study 4), we further examine color and self-construal by employing ads for a fictitious chain of restaurants, and offer additional empirical support for the theoretical processes we propose underlie the observed effects.

2. Conceptual development

As noted in our introduction, several studies in consumer psychology have explored effects related to color in advertising research (for a review, see Panigyrakis & Kyrousi, 2015). Much of this work has focused on the color red – the subject of the current investigation. A brief summary of past work in this domain – specifically focusing on the color red – is provided in Table 1. From these studies, it is apparent that the dependent variables explored in past consumer color research are indeed quite varied. Further examination of the studies suggests that many have examined the physiological properties of color (e.g., arousal and attraction) rather than the psychological properties of color (e.g., associations evoked in memory). In our work, we build on past findings related to the effects of the color red in advertising and consider psychological principles grounded in the self (i.e., self-construal) as well as the associative properties of color. In doing so, we examine *congruency* and *processing fluency* effects from a theoretical perspective and consider their impact on ad believability and behavioral intentions. The conceptual model that forms the basis of our investigation is shown in Fig. 1, and is described in greater detail below.

2.1. Color associations

Recent color research has investigated the link between color, meaning, and psychological functioning (Elliot, Maier, Moller, Friedman, & Meinhardt, 2007). From a marketing perspective, this research has confirmed that colors are capable of conveying psychological meaning, and are not merely a matter of aesthetics. Color meanings are thought to be implicit in many respects (Pravossoudovitch, Cury, Young, & Elliot, 2014). As such, our work is based upon the assumption that colors are associated with certain connotations, and that these associations often occur below conscious awareness (Horcajo, Briñol, & Petty, 2010).

In keeping with this notion, a growing body of research suggests

that throughout their lives, humans are exposed to both explicit and subtle pairings of colors with particular concepts, experiences, and situations. With repetition, through the socialization of color symbolism (Duckitt, Wall, & Pokroy, 1999; Kareklas, Brunel, & Coulter, 2014), these pairings create strong color associations in memory (Elliot et al., 2007). This “referential meaning” explanation of color effects relies upon the notion of a network of associations (Bower, 1981), whereby exposure to colors activate nodes and links to information stored in memory. As such, one may become conditioned over time to associate the color red with danger or aggression (Elliot et al., 2007) – or as we propose in the present work – with concepts consistent with an independent self-view.

Utilizing a variety of tactics and strategies, marketers often help shape and reinforce consumers' color associations (e.g., green being associated with environmental consciousness and pastel blues being associated with baby boys). Moreover, marketers use learned color associations to help distinguish their brands from their competitors' offerings (e.g., Coca-Cola's red vs. Pepsi's blue) (Labrecque & Milne, 2012). In our work, we propose that when matched with an appropriate prime of consumers' self-view, the use of the color red in marketing communications – specifically in ad campaigns – may be an effective means of driving purchase intentions.

As color-associated meanings have been shown to have a significant impact on consumers' cognition, affect, and behavior (Elliot & Maier, 2014), we are especially interested in the interplay of red color associations and consumers' psychological processes. In particular, our work builds on research which empirically supports the notion that colors may be associated with self-based motivations and behaviors (Bellizzi & Hite, 1992; Fetterman, Liu, & Robinson, 2015; Mehta & Zhu, 2009; Meier et al., 2012; Ten Velden et al., 2012). For example, employing simplified poker games, Ten Velden et al. (2012) found that a player's use of red chips signaled dominance, thereby provoking intimidation and withdrawal tendencies among the player's competitors. In the context of cognitive task performances, Mehta and Zhu (2009) hypothesized and found a similar pattern of relationships. Red computer backgrounds activated an avoidance motivation in participants, thus enhancing their performance on detail-oriented tasks, whereas blue-colored backgrounds prompted participants to pursue more explorative and risky behaviors (consistent with approach motivational tendencies), enhancing their performance on creative tasks (Mehta & Zhu, 2009). Similarly, Meier et al. (2012) found that exposure to the color red led to an increased speed of walking in a romance-related context (i.e., walking to a dating-related interview), but a decreased speed of walking in an achievement context (i.e., walking to an intelligence-related interview). In addition, Fetterman et al. (2015) observed a pattern of findings suggesting that preferences for, and biases to see, the color red may help to explain personality-related variations in interpersonal hostility.

2.2. Color and self-construal associations

We posit that if the color red carries associative properties (i.e., connotations) that align with self-related motivational principles, other psychological constructs grounded in the self (specifically, self-construal) might also be meaningfully examined in a color context. It is important to note that self-construal has not only been conceptualized as an individual's perception of him/herself, but as a factor that contributes to one's motivation to react and behave in a certain manner (Aaker & Lee, 2001). This perspective of the self, originally derived from cultural psychology, distinguishes between *independent* and *interdependent* self-construals (Fiske, Kitayama, Markus, & Nisbett, 1998). Research finds that the independent self is characterized by separateness and an internal motivation to promote one's own goals, whereas the interdependent self is characterized by connectedness and the pursuit of relational goals (Lin, Chang, & Lin, 2012).

Ample extant research has focused on the effects associated with

Table 1
Summary review of red color research in advertising.

Authors (year), journal	Independent variables	Dependent variables	Methodology	Findings/theoretical explanation
Gom et al. (1997), <i>Management Science</i>	Color hue (red vs. blue), color chroma, color value	Attitude toward ad, attitude toward brand, excitement, relaxation	Experiment; print ad	Participants exposed to the color red (vs. blue) reported stronger feelings of excitement.
Moore, Stammerjohan, and Coulter (2005), <i>Journal of Advertising</i>	Color background (red vs. blue), text color (black vs. white), website context congruity (congruent vs. incongruent)	Recall, attitude toward web site, attitude toward ad	Experiment; banner ad	There were no main effects of hue on the dependent variables. The incongruent red background and the congruent red- and blue background ads generated a more favorable attitude toward the ad than the blue incongruent background.
Lichtlé (2007), <i>Journal of Interactive Advertising</i>	Color hue (red vs. blue), saturation (low vs. high), lightness (low vs. high), optimal stimulation level	Emotions (arousal and pleasure), attitude toward ad	Experiment; print ad	Participants with a high optimal stimulation level (OSL) derived more pleasure from an ad with a red vs. blue hue. Additionally, those with a high OSL had a more favorable attitude toward the ad when the hue was red (vs. blue).
Mehta and Zhu (2009), <i>Science</i>	Color hue (red vs. blue)	Preference, creativity score, motivation, accuracy vs. speed, recall, reaction time	Experiment; online ad	The color red activated an avoidance motivation which led to increased attention, recall, and more favorable evaluations of prevention-framed ads.
Gerend and Sias (2009), <i>Journal of Experimental Social Psychology</i>	Color hue (red vs. gray), message frame (gain vs. loss)	Vaccination intentions	Experiment; print ad	Participants reported greater vaccination intentions when exposed to a loss- (vs. gain) framed message, but only when primed with red background (vs. gray).
Pucinelli et al. (2013), <i>Journal of Retailing</i>	Color hue (red vs. black), gender (male, female)	Perceived savings	Experiment; print ad	Male participants reported greater perceived savings when prices were advertised in red (vs. black).
Sokolik, Magee, and Ivory (2014), <i>Journal of Interactive Marketing</i>	Color hue (red vs. blue), type of ad (banner vs. box)	Click through rate	Experiment; banner ad	Participants clicked on more ads when a red (vs. blue) color scheme was used. The effect of red was even more pronounced for box ads.
Chou and Wang (2016), <i>Electronic Commerce Research and Applications</i>	Advertised game app (excited-happiness vs. calm-happiness), game app played (excited-happiness vs. calm-happiness), background color in ad (blue vs. red vs. gray)	Attitude toward ad, attitude toward product, click intentions, download intentions	Experiment; app ad	Participants reported greater click intentions, attitudes toward the ad, and attitudes toward the product when the ad had a red (vs. blue) background.
Puzakova et al. (2016), <i>Journal of Advertising</i>	Color hue (red vs. blue), firm response (denial vs. remedy)	Conceptual attention, attitude toward firm, trust in firm, purchase likelihood	Experiment; print ad	Red (vs. blue) hues resulted in greater conceptual attention to the firm failure and generated more negative attitudes toward the firm.
North and Ficorilli (2017), <i>Journal of Financial Services Marketing</i>	Color hue (red vs. blue)	Clicks on ad	Field study, census sample, banner ad	Participants clicked on more banner ads featuring a blue hue than banner ads featuring a red hue.
Mehta, Demmers, van Dolen, and Weinburg (2017), <i>Journal of Consumer Psychology</i>	Color hue (red vs. white), sensation seeking (high vs. low)	Non-Compliance with PSA recommendation	Experiment, online ad	The color red led to higher non-compliance with the PSA recommended behavior when sensation-seeking propensity was high (vs. low).
Voss et al. (2018), <i>Psychology and Health</i>	Color hue (red/orange vs. blue/purple), message frame (positive vs. negative), user status (non-user vs. user)	Behavioral intention to apply sunscreen	Experiment; print ad	Non-users reported greater behavioral intentions to apply sunscreen when reading a positively framed, short wavelength colored (blue/purple) ad. Non-users reported greater behavioral intentions to apply sunscreen when reading a negatively framed, long wavelength (red/orange) ad, however, the difference was not statistically significant.

Conceptual Model

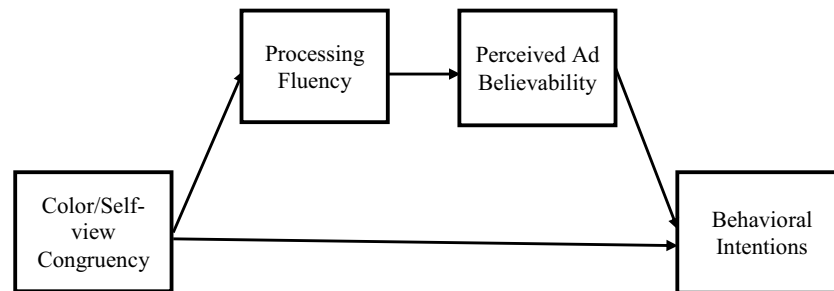


Fig. 1. Conceptual model.

self-construal in advertising. This research indicates that when ad communications are framed in a manner consistent with consumers' motivational orientations and/or self-views, perceptual “fit” occurs, thereby enhancing persuasiveness (Cesario, Higgins, & Scholer, 2008; Han & Shavitt, 1994; Kareklas et al., 2012). For interested readers, we have compiled a list of self-construal studies published in the advertising literature, outlining their focus, methodology, and key findings, as well as their theoretical explanation for the observed effects where applicable (see Table 2). As a whole, these studies document the importance of self-construal priming in advertising, as several studies find that message persuasion is enhanced under conditions of congruence between self-view conditions and other related variables (e.g., regulatory focus).

A number of traits, behaviors, and emotions have specifically been linked to an *independent* self-construal (Cross, Hardin, & Gercek-Swing, 2011; Kitayama, Duffy, & Uchida, 2007). Among these are *assertiveness* and *aggression* (Cross & Madson, 1997; Polyorat, Jung, & Hwang, 2012), *anger* (Akutsu, Ayano, Kim, & Oshio, 2016), *uniqueness* and *independence* (Markus & Kitayama, 1991), *narcissism* (Konrath, Bushman, & Grove, 2009), and *dominance* (Bushman & Baumeister, 1998) – concepts that as we have observed, have also been associated with reactions and/or behaviors related to the color red (Aaronson, 1970; Bagchi & Cheema, 2013; Bellizzi, Crowley, & Hasty, 1983; Buechner et al., 2014; Drummond & Quah, 2001; Hemphill, 1996; Hill & Barton, 2005; Martinez-Conde & Macknik, 2014; Ten Velden et al., 2012; Wiedemann, Burt, Hill, & Barton, 2015).

Of particular relevance to the current investigation, several color studies have specifically focused on the subconscious associations between the color red and emotional states. Among these findings, red colorations have been shown to have an implicit association with *anger* (Fetterman, Robinson, & Meier, 2012), *failure* (Moller, Elliot, & Maier, 2009), *potency* (Soriano & Valenzuela, 2009), *dominance* (Mentzel, Schucker, Hagemann, & Strauss, 2017), and *danger* (Pravossoudovitch et al., 2014). By way of example, Pravossoudovitch et al. (2014) used a variant of the Stroop word evaluation task, and asked participants to classify words and symbols by whether they were safety- or danger-related. They found that words and symbols that were associated with danger were classified faster (i.e., observed response latency times were shorter) when shown in red (as compared to when shown in gray or green). As we describe in further detail in the next section, congruent associations tend to be processed more fluently, which is evidenced by shorter response times (Lee & Aaker, 2004).

Furthermore, research has documented that the avoidance of danger is a fundamental mechanism involved in self-preservation, which is considered a basic/survival instinct, not only for humans, but for most organisms (Elliot & Maier, 2014). Moreover, research suggests that just like the immune system responds to pathogens to protect against

disease, similarly, “the psychological immune system initiates protective adaptations under impending threats to the self” (Sherman & Hartson, 2011, p.131). These adaptations include strategies related to self-serving judgements, self-enhancement, and self-affirmation (Sherman & Hartson, 2011). Similarly, a growing literature employing both behavioral and neuroimaging studies reports that when individuals face social-evaluative threat, they respond by emphasizing their own desirability (Zhang, Xi, Jin, & Wu, 2017; see also, White, Argo, & Sengupta, 2012). Such findings offer some evidence in support of the notion that when color/self-view congruencies exist, mental associations with the color red may be more impactful for individuals motivated by independence (which is characterized by a focus on one's own goals), as opposed to interdependence (consistent with the pursuit of relational goals) (Lin et al., 2012).

Given all of the above evidence from past studies on the self and on the related connotations that the color red has been shown to evoke, we expect that the color red will be psychologically linked to an independent self-view orientation. Our reasoning is based on the congruency of associations activated by the independent view of the self when matched with the color red. From this, we believe that red is more likely to resonate with individuals whose motivational tendencies are consistent with an independent self-construal. Thus, we hypothesize:

H1. The associations evoked by the color red will be more consistent with those evoked by an independent self-construal orientation, as opposed to an interdependent self-construal orientation.

The downstream effects of congruency on the processing of advertising information are described next in greater detail.

2.3. Congruency and processing fluency

Ease of processing (called *processing fluency*) is believed to arise from exposure to physical elements of a stimulus (e.g., colors, shapes, modalities, etc.), as well as from the conceptual meanings associated with these elements (Lee & Labroo, 2004; Reber, Schwarz, & Winkielman, 2004; Whittlesea, 1993). As such, a growing body of research has demonstrated that ad-based judgments are influenced not only by the information that is available to consumers, but also by the ease with which this information is processed (Lee & Aaker, 2004; Schwarz, 2004). As Egner (2007) has pointed out, when various dimensions of stimuli display high levels of structural, conceptual, or perceptual similarity, “congruency” effects are expected to arise. We posit that greater processing fluency is likely to occur when ads featuring a dominant red background are paired with congruent ad elements activating an independent (as opposed to interdependent) self-view.

The effects of congruency (or compatibility) on processing fluency are well documented in the advertising and psychology literature (Chae

Table 2
Summary review of self-construal (self-view) and advertising research.

Authors (year), journal	Independent variables	Dependent variables	Methodology	Findings/theoretical explanation
Aaker and Lee (2001), <i>Journal of Consumer Research</i>	Regulatory focus (promotion vs. prevention), self-view (independent vs. interdependent)	Website evaluation index	Experiment; online advertisement	Individuals with a situationally primed independent self-view rated website evaluations higher when the ad information was promotion (vs. prevention) focused. Individuals with a situationally primed interdependent self-view rated website evaluations higher when the ad information was prevention (vs. promotion) focused.
Agrawal and Maheswaran (2005), <i>Journal of Consumer Research</i>	Brand commitment (high vs. low), primed self-view (independent vs. interdependent), chronic self-view (independent vs. interdependent)	Brand evaluations	Experiment; print advertisement	Under high commitment, brand evaluations were higher when the ad appeal was consistent with the participant's chronic self-construal regardless of the primed self-construal. Under low commitment, brand evaluations were higher when the ad appeal was consistent with the primed self-construal.
Hamilton and Biehal (2005), <i>Journal of Consumer Research</i>	Primed self-view (independent vs. interdependent), regulatory focus (promotion vs. prevention)	Budget allocation	Experiment; print advertisement	Regulatory focus mediated the relationship between self-view and product choice. Independent self-view consumers focused on promotion benefits while interdependent self-view consumers focused on prevention benefits. Interdependent self-view participants made less risky choices than independent self-view participants.
Polyorat, Alden, and Alden (2005), <i>Journal of Advertising</i>	Need for cognition (high vs. low), self-construal (independent vs. interdependent)	Brand attitudes, purchase intentions	Experiment; print advertisement	Participants who were low in need for cognition and a low independent self-construal had higher purchase intentions and brand attitudes with comparative advertisements. For individuals with high-need for cognition, comparative ads were more persuasive than non-comparative ads regardless of self-construal congruity.
Block (2005), <i>Journal of Applied Social Psychology</i>	Self-referencing (self vs. other), measured self-construal (independent vs. interdependent)	Attitude toward ad, recall	Experiment; print advertisement	Individuals with chronic independent (vs. interdependent) self-construal have better attitudes toward the ad and greater recall when the advertisement is framed with an other-referenced fear appeal than self-referenced fear appeal. The opposite is true for guilt appeals.
Chang (2009), <i>Health Communication</i>	Ad type (self-referencing vs. other referencing), primed self-construal (independent vs. interdependent)	Antismoking attitudes	Experiment; print advertisement	Self-congruent ads (independent and self-referencing; interdependent and other-referencing) generated less favorable smoking attitudes than ads that were not congruent.
Sung and Choi (2011), <i>Journal of Advertising</i>	Regulatory focus (promotion vs. prevention), measured self-construal (independent vs. interdependent)	Attitude toward ad, attitude toward brand, purchase intention	Experiment; print advertisement	Participants with a chronic independent self-construal showed a more favorable attitude toward ad when the ad was promotion framed. Conversely, participants with a chronic interdependent self-construal showed a more favorable attitude toward the ad when the ad was prevention framed.
Kareklas et al. (2012), <i>Journal of Advertising</i>	Regulatory focus (promotion vs. prevention), manipulated self-view (independent vs. interdependent), type of appeal (environmental vs. personal health)	Brand attitudes	Experiment; print advertisement	When using an environmentally framed ad, a prevention-framed message led to more favorable brand attitudes for participants primed with an independent self-view. Conversely, a promotion-framed message led to more favorable brand attitudes for participants primed with an interdependent self-view. When using a personal health benefits framed ad, a promotion-framed message led to more favorable brand attitudes for participants primed with an independent self-view. A prevention-framed message led to more favorable brand attitudes for participants primed with an interdependent self-view.
Kwon and Sung (2012), <i>International Journal of Electronic Commerce</i>	Regulatory focus (promotion vs. prevention), primed self-construal (independent vs. interdependent)	Attitude toward the review, attitude toward the brand, purchase intention	Experiment; consumer reviews	Participants primed with an independent self-construal reported more favorable attitudes and purchase intentions when the consumer review was promotion framed. Conversely, participants primed with an interdependent self-construal reported more favorable attitudes and purchase intention when the consumer review was prevention framed.

(continued on next page)

Table 2 (continued)

Authors (year), journal	Independent variables	Dependent variables	Methodology	Findings/theoretical explanation
Lin et al. (2012), <i>Journal of Business Research</i>	Regulatory focus (promotion vs. prevention), primed self-construal (independent vs. interdependent), perceived risk (low vs. high)	Attitude toward the product, purchase intention	Experiment, print advertisement	Perceived risk moderates the effect of regulatory focus and self-construal on attitudes and purchase intention. When perceived risk is low, a promotion framed message is more effective with an independent self-construal. Conversely, a prevention framed message is more effective with an interdependent self-construal. When perceived risk is high, a prevention framed message is more effective regardless of self-construal.
Spassova and Lee (2013), <i>Journal of Consumer Research</i>	Measured self-construal (independent vs. interdependent), temporal construal (proximal vs. distant)	Attitude toward the ad	Experiment; print advertisement	An independent (vs. interdependent) self-view with a distant (vs. proximal) ad generates more favorable attitudes toward the ad. Conversely, an interdependent (vs. independent) self-view with a proximal (vs. distant) ad generates more favorable attitudes toward the ad.
Pounders, Lee, and Mackert (2015), <i>Journal of Advertising</i>	Primed self-construal (independent vs. interdependent), temporal construal (proximal vs. distant), message frame valence (gain vs. loss)	Healthy behavioral intentions	Experiment; print advertisement	Message frame moderates the relationship between temporal frame and self-view such that healthy behavioral intention is greater in a gain frame when there is a match between independent self-view and distal temporal frame. Conversely, healthy behavioral intention is greater in a loss frame when there is a match between an interdependent self-view and proximal frame.
Chang and Feng (2016), <i>International Journal of Advertising</i>	Primed self-construal (independent vs. interdependent), nostalgia (personal vs. historical vs. non-nostalgia), consumption context (public vs. private)	Attitude toward ad, attitude toward brand, purchase intentions	Experiment; print advertisement	Participants reported higher attitudes and purchase intentions when an interdependent self-construal was primed and when personal nostalgia (vs. historical nostalgia) was used in a private consumption context. When an independent self-construal was primed, neither type of nostalgic appeal nor consumption context affected attitudes and purchase intentions.
Chen (2016), <i>Journal of Business Research</i>	Message framing (gain vs. loss), primed self-view (independent vs. interdependent), temporal construal (distant vs. proximal)	Product attitudes	Experiment; print advertisement	Independent self-view participants gave more favorable product attitudes when the message frame was a gain (vs. loss) and when the temporal construal is distant (vs. proximal). Conversely, interdependent self-view participants gave more favorable product attitudes when the message frame was a loss (vs. gain) and when the temporal construal is proximal (vs. distant).
Hesapci, Merdin, and Gorgulu (2016), <i>Journal of Consumer Behavior</i>	Participant ethnicity (Turkish vs. Kurdish), ad model ethnicity (Turkish vs. Kurdish), measured self-construal (independent vs. interdependent)	Attitude toward ad, attitude toward brand, purchase intention	Experiment; print advertisement	Participants with an interdependent self-construal reported more favorable attitudes and purchase intentions when exposed to an ad with a model of a different ethnic group.

& Hoegg, 2013; Labroo & Lee, 2006; Lee, Keller, & Sternthal, 2010; White, MacDonnell, & Dahl, 2011). For example, in two experiments utilizing separate measures of processing fluency (self-reports and a perceptual identification task), Lee and Aaker (2004) found that participants in a promotion-focused condition perceived a congruent (gain-framed appeal) to be easier to process than an incongruent (loss-framed appeal), whereas prevention-focused participants perceived the loss-framed (as opposed to gain-framed) appeal to be easier to process. In addition, participants in congruent conditions were able to recall more target-relevant words than participants in incongruent conditions, as explained by the ease by which the stimuli were processed. Similarly, Chae and Hoegg (2013) found that the congruence between the horizontal presentation of a product in an advertisement and individuals' expected spatial representation of time increased processing fluency. Specifically, before-and-after pictures with a "before" picture placed on the left side of the ad (as opposed to the right side) yielded enhanced perceptions of processing fluency.

Categorization theory is sometime used to explain congruency effects on processing fluency in these contexts – suggesting that individuals naturally categorize the objects in their environment in order to facilitate efficient processing (Sujan, 1985). For example, in a study of mobile shopping, Sohn (2017) found that perceptions of processing fluency were higher when visual congruence existed between a mobile online store and a fixed online store (see also, Orth & Wirtz, 2014; van Rompay, de Vries, & van Venrooij, 2010). Likewise, research focusing on stereotypes has suggested that individuals are able to process information more easily when it is consistent (vs. inconsistent) with their stereotypical view (Fiske & Neuberg, 1990; Sherman, Lee, Bessenoff, & Frost, 1998).

Consistent with these findings, we propose:

H2. Participants exposed to congruent combinations of color and self-view words or primes (i.e., red/independence) will process stimuli more fluently, as compared to when incongruent combinations (red/interdependence) are employed.

2.4. Congruency and persuasion

Congruency has also been shown to enhance the persuasive effects of various types of communications (Hermann, Zidasek, Sprott, & Spangenberg, 2013; Lee & Aaker, 2004; Shah & Oppenheimer, 2007; Sherman, Mann, & Updegraff, 2006), brand marketing strategies (Misra & Beatty, 1990) and product design (van Rompay, Pruyn, & Tieke, 2009). This is due in part to the observation that stimuli matching the physical features of a target make the target more meaningful (Labroo, Dhar, & Schwarz, 2007; Whittlesea, 1993). Kuo and Rice (2015), for example, found that when an advertisement featured congruence between colors and a charitable cause (e.g., the color pink matched with breast cancer research), advertising effectiveness was enhanced, as evidenced by individuals' increased willingness to participate in the cause. Likewise, van Rompay et al. (2010) found that picture-text congruency in an online environment had a positive impact on evaluations of the sponsor brand (hotel).

Hence, we hypothesize that congruent color and self-view prime combinations will result in greater persuasive effects, such that:

H3. Participants exposed to ad congruent combinations of color and self-view primes (i.e., red/independence) will report more favorable behavioral intentions, as compared to when incongruent combinations (red/interdependence) are employed.

2.5. Mediating factors

Similar to other studies that have examined the effects of congruency on behavioral intentions (e.g., Badrinarayanan, Becerra, Kim, & Madhavaram, 2012; Lee & Koo, 2015; Malodia, Singh, Goyal, & Sengupta, 2017; Sherman et al., 2006; White et al., 2011), our investigation identifies and examines relevant factors that are likely to mediate this effect – namely processing fluency and perceived ad believability. Several studies from the consumer psychology literature have shown that the effects of congruency on brand-related judgments are mediated by processing fluency. Illustrative of this work is that of Lee and Aaker (2004), who found that congruence (i.e., the match between message frame and regulatory focus in their advertising stimuli) had a positive impact on brand evaluations, and that the mechanism underlying this relationship was the ease by which the stimuli were processed (i.e., processing fluency); see also, Lee and Labroo (2004) and Labroo et al. (2007). The rationale for such an effect is that stimuli with congruent features are considered to be more easily processed and, therefore, are generally evaluated in more favorable terms (Reber et al., 2004; Shah & Oppenheimer, 2007).

Furthermore, consumer research has shown that processing fluency has a positive effect on product evaluation (Lee & Labroo, 2004) and brand choice (Lee, 2002; Shapiro, MacInnis, & Heckler, 1997). For example, White et al. (2011) tested and found empirical support for the mediating effect of processing fluency on behavioral intentions. Ads that were matched in terms of message frame and appeal type were perceived as easier to process, which subsequently increased participants' intentions to recycle their waste. Interestingly, the research conducted by Winkielman and Cacioppo (2001) using facial electromyography (EMG), offers additional, psychophysiological evidence, that processing fluency may also be hedonically marked (Winkielman, Schwarz, Fazendeior, & Reber, 2004), eliciting more favorable affective responses.

Relatedly, we expect ad messages that are easier to process will be perceived as more believable, consistent with the notion that consumers place greater weight on (and are more acceptant of) information that is processed more fluently (Reber et al., 2004; Shah & Oppenheimer, 2007). In support of this relationship, Shah and Oppenheimer (2007) asked participants to rate stocks along several dimensions based on a series of cues (manipulated to be either relatively easy or difficult to pronounce). Their findings indicated that easier to pronounce cues were weighted more heavily and led to more favorable evaluations of the stocks, than the cues that were difficult to pronounce (Shah & Oppenheimer, 2007).

More generally, a significant body of research has examined consumers' evaluations of advertising content and its subsequent effect on brand attitudes and purchase intentions (e.g., Gardner, 1985; MacKenzie, Lutz, & Belch, 1986), and has reported a positive relationship between ad evaluations and brand evaluations. In his seminal piece on ad believability, Maloney (1963, p. 8), noted "the advertiser must remember that the most persuasive advertising messages are those which are most congruent with the consumer's experiences, both past and present." Since then, researchers (e.g., Kim, Oh, Yoon, & Shin, 2016; O'Cass & Griffin, 2006; Sigurdsson, Menon, Hallgrímsson, & Fagerstrom, 2017; Wu, Linn, Fu, & Sukoco, 2011; Yagci, Biswas, & Dutta, 2009) have found evidence to support the notion that greater ad believability has a positive influence on intentions to behave in a manner consistent with an advertisement's advocated position. Conversely, skepticism of advertising claims has been shown to have a negative impact on purchase intentions (Obermiller, Spangenberg, & MacLachlan, 2005).

Given these findings, we hypothesize:

H4. The differential effects of exposure to a congruent (red/independent) vs. incongruent (red/interdependent) ad stimulus on participants' behavioral intentions will be mediated by (a) processing fluency and in turn, by (b) perceived ad believability.

3. Experimental materials and methods

3.1. Study 1

In our initial study, we sought to determine whether, and to what extent, the color red may be associated with words used to describe characteristics of an independent self-construal orientation. Past research focusing on the color red has often used the color blue as a comparative referent, because these two colors (a) appear on opposite ends of the color spectrum (blue is the coolest color; red is the warmest), (b) have been shown to evoke contrasting connotations (Mehta & Zhu, 2009), (c) have differing physiological and behavioral effects on humans (Bagchi & Cheema, 2013), and (d) are prevalently used in marketing (e.g., in advertising, branding, package design, and retail atmospherics), and when used they tend to elicit opposing effects (Bellizzi & Hite, 1992; Crowley, 1993). Consistent with this literature, we use blue as a referent to red in our first two empirical investigations. In our last two studies, we focus exclusively on the color red.

3.1.1. Participants, measures, and procedures

In all, 112 undergraduate students (53.6% female; $M_{\text{age}} = 21.49$) from a public university participated in this study. Participants were told they would be shown two randomly chosen colors on a computer screen and would be asked some questions about them. All participants were shown a red and a blue square displayed on a computer screen in counterbalanced order. Following Mehta and Zhu (2009) and other past color research endeavors (see Table 1), we manipulated only hue, keeping the other two dimensions of color (i.e., saturation and value) constant. During exposure to the colored image, participants were asked to indicate the extent to which each color was associated with eight randomly-ordered pairs of words corresponding to terms synonymous with self-construal (e.g., 1 = “alone”/7 = “together;” see Appendix A for study 1 stimuli). A self-construal index was subsequently created for each color by averaging participants' responses to their corresponding eight item-pairs (self-construal, red: $\alpha = 0.91$; blue: $\alpha = 0.94$).

3.1.2. Results

In support of H1, the results of a paired samples *t*-test indicated that the color red was associated more closely with independence ($M = 3.48$), while the color blue was associated more closely with interdependence ($M = 4.71$; $t(111) = 5.57$, $p < .001$). In addition, one-sample *t*-tests using “4.0” as the test value also revealed that the association for red with independence was significantly lower than the neutral mid-point ($t(111) = 4.54$, $p < .001$). These results provide some preliminary evidence in support of the hypothesized relationship between the color red and an independent self-construal.

3.2. Study 2

Recognizing that our hypothesized effects may operate below consciousness, and given that explicit measures of association may be subject to respondent bias due to introspection (Greenwald et al., 2002), we wished to verify our study 1 findings using implicit (i.e., indirect/automatic) measures of association. Research suggests that combining implicit and explicit measures increases predictive validity, because each type of measure predicts a distinct portion of variance in

the dependent variable (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Therefore, in study 2 we employed the Implicit Association Test (IAT; Greenwald et al., 1998), which has been shown to be a useful, indirect measure of consumer social cognition (Brunel, Tietje, & Greenwald, 2004), as it taps into associated automatic processes (Kareklas, Brunel, & Coulter, 2014). Specifically, the IAT builds on the associative network view of memory and was developed to assess the extent to which different concepts are related in memory by measuring the “relative strength of automatic association between concepts” (Brunel et al., 2004, p. 388). Furthermore, the IAT has been found to be an effective measure of associations between one's view of the self and other related concepts (Brunel et al., 2004).

3.2.1. Participants, measures, and procedures

A total of 434 undergraduate students (43.8% female; $M_{\text{age}} = 21.54$) from a public university participated in this study. Participants completed an IAT and reported their gender and age. We employed the standard experimental protocol for IAT studies (Greenwald, Nosek, & Banaji, 2003). The images used were six matched pairs of red/blue geometric shapes (adapted from Kareklas, Brunel, & Coulter, 2014), while the words used were six of the eight pairs of independent and interdependent words used in study 1 (see Appendix B). Following recommendations from the literature (Greenwald et al., 1998), the IAT consisted of seven blocks; blocks 1, 2, and 5 were “practice blocks;” blocks 3, 4, 6, and 7 were “measurement” blocks. On-screen instructions informed participants which blocks were for practice and which were measurement blocks.

Participants completed a classification task consisting of 40 trials in each measurement block, which involved assigning randomly presented stimuli (i.e., red or blue geometric shapes and independent or interdependent words) to the appropriate category by using either the “D” or “K” key on their keyboard. Appendix C presents four screenshots taken from the measurement blocks to further illustrate the process involved in this study for readers who are not familiar with implicit measures such as the IAT. As shown, during the measurement blocks, participants assigned randomly selected stimuli that consisted of either one of the 12 focal images (red or blue geometric shapes) or one of the 12 focal (individual/independent or collective/interdependent) words to the appropriate category. As shown in this appendix, the pairing of red images with individual words and blue images with collective words was reversed in later trials and which of these pairings appeared on the right versus the left side of the screen was counterbalanced consistent with past IAT studies (e.g., Brunel et al., 2004; Kareklas, Brunel, & Coulter, 2014).

The software used (Inquisit 4) recorded participants' response latencies (i.e., the duration in milliseconds from the onset of each stimulus until its correct classification) in each measurement block, which was later used to calculate their automatic preferences using the *D* score algorithm (Greenwald et al., 2003). Consistent with the analytical approaches described by Greenwald et al. (2003), which are widely used by researchers employing implicit measures of association (e.g., Kareklas, Brunel, & Coulter, 2014), we dropped sixty participants who responded quicker than 300 milliseconds on more than 10% of trials, or who had errors on more than 15% of trials, leaving 374 participants in the final analysis.

3.2.2. Results

Participants exhibited a significant automatic association between red geometric shapes and independence-focused words, and between blue geometric shapes and interdependence-focused words (effect size: $\text{Mean}D = 0.07$, $p < .001$). We also replicated this analysis using the complete initial sample of 434 participants and the results were identical, which supports previous findings that IAT measures tend to

exhibit high internal consistency and reliability (Brunel et al., 2004). In support of H1, and replicating study 1 findings, this significant IAT result suggests that red is semantically associated with independence.

The observed significant IAT results further suggest that the combination of red and independence-focused stimuli were more accessible in memory than incongruent combinations (i.e., red with interdependence and blue with independence). This strength of automatic association between various concepts in memory is captured by examining response latencies for categorizing related (vs. unrelated) concepts (Brunel et al., 2004). As noted in the literature (e.g., Fang, Singh, & Ahluwalia, 2007), processing fluency can be reliably measured using response latency measures, such as the IAT. Therefore, and consistent with this literature, our IAT results provide preliminary support for H2, suggesting that congruence between compatible associations in memory reduces response times and enhances processing fluency (Lee & Aaker, 2004).

3.2.3. Discussion

A meta-analysis of studies using explicit and implicit measures suggests that combining explicit measures (such as self-report survey instruments similar to those used in study 1) with implicit measures (such as the IAT used in study 2) increases predictive validity (Greenwald et al., 2009) and improves behavioral predictions (Kareklas, Brunel, & Coulter, 2014). Our first two empirical investigations offer empirical evidence in support of the notion that there is a congruence among the semantic associations linked to the color red and those of an independent self-view (as per H1), and that this congruent combination of stimuli leads to enhanced processing fluency (as per H2). Next, we turn our attention to assessing the managerial usefulness of these initial findings, through additional empirical examinations in more applied settings, and with a greater emphasis placed on understanding their underlying theoretical properties.

3.3. Study 3

Our third study was designed to further explore our proposed color/self-construal congruency effects in a social marketing context. Specifically, we used Public Service Announcements (PSAs) encouraging consumers to seek a diabetes test as the focal stimuli.

3.3.1. Participants, measures, and procedures

Given that past research has shown that self-views can be situationally activated using primes (Aaker & Lee, 2001; Aaker & Williams, 1998; Kareklas et al., 2012), participants in the current study were shown a PSA that was designed to activate the desired self-view by displaying the silhouette of an individual, which has previously been used to activate *independence* (Aaker & Lee, 2001; Kareklas, Carlson, & Muehling, 2014), or the silhouettes of a family of four to activate *interdependence*, also adapted from prior self-construal research (Kareklas, Carlson, & Muehling, 2014). Additionally, the ad claims used in the PSAs were designed to reinforce the intended self-view prime, and were adapted from prior research (Aaker & Lee, 2001; Kareklas, Carlson, & Muehling, 2014; Kareklas, Muehling, & Weber, 2015). Specifically, the PSAs that were used to prime an independent self-view, included ad claims focusing on the personal benefits of getting a diabetes test. In contrast, the PSAs that were used to prime an interdependent self-view, employed ad claims focusing on the benefits of getting a diabetes test, not only for the viewer of the PSA, but also for her/his family (see Appendix D).

One hundred participants (42.0% female, $M_{age} = 33.05$, range = 18–72) were recruited from Amazon's Mechanical Turk (*MTurk*). Recent evidence from studies designed to test the validity and appropriateness of *MTurk* for academic research suggest that it is a viable option that affords researchers a high level of data quality,

provided that crowdsourcing guidelines detailed by Goodman and Paolacci (2017) are followed. In particular, Kees, Berry, Burton, and Sheehan (2017), recently compared five samples and found that the data collected from *MTurk* “outperformed panel data procured from two separate professional marketing research companies across various measures of data quality,” and that *MTurk* data were “at least comparable in quality,” as compared to two separate samples with student participants. Hence, we opted to use a sample made up of *MTurk* panelists (participants) for studies 3 and 4.

A single-factor design was employed for this study. Participants were randomly assigned to one of the two experimental conditions (red/independent self and red/interdependent self), and given 1 min to view the PSA. Notably, demographic measures were taken at the beginning of the study, so that participants assigned to an independent self-view prime viewed a PSA matching their gender (i.e., a female or a male silhouette), so as to avoid any potentially confounding gender issues when responding to an ad featuring a member of the opposite gender than the participant. Finally, participants were asked to respond to several survey items, which are described below.

To assess behavioral intentions, participants responded to the questions: “What is the likelihood that you will ask for a diabetes test the next time you visit your doctor?” and “What is the likelihood that you will get a diabetes test in the future?,” followed by four 7-point item pairs (“Unlikely”/“Likely,” “Improbable”/“Probable,” “Impossible”/“Possible,” and “Uncertain”/“Certain”). These items were subsequently combined to form two indices, with larger values indicating greater likelihood ($Ask_Diabetes_Test: \alpha = 0.94$; $Get_Diabetes_Test: \alpha = 0.95$).

3.3.2. Results

To test the hypothesized relationships, we first conducted a MANOVA using self-view prime (i.e., independent vs. interdependent) as the fixed factor, and $Ask_Diabetes_Test$, and $Get_Diabetes_Test$ as dependent measures. Consistent with H3 expectations, a significant result was observed ($F(1, 98) = 8.75, p < .01$). Follow-up univariate ANOVA tests indicated that when a red background PSA included an independent self-view prime, participants indicated that they were more likely to *ask* for a diabetes test the next time they visited their doctor ($M_{Ask_Diabetes_Test - Ind} = 4.39$), as compared to when an interdependent self-view prime was used ($M_{Ask_Diabetes_Test - Inter} = 3.40$; $F(1, 98) = 8.43, p < .01$). Similarly, when a red background PSA included an independent self-view prime, participants indicated that they were more likely to *get* a diabetes test in the future ($M_{Get_Diabetes_Test - Ind} = 5.21$), as compared to when an interdependent self-view prime was used ($M_{Get_Diabetes_Test - Inter} = 4.23$; $F(1, 98) = 8.75, p < .01$).

3.4. Study 4

Our final study was designed to investigate the hypothesized color/self-view congruency effects on consumer information processing within a more traditional advertising context. Specifically, in the present study we used advertisements for a fictitious chain of restaurants as our experimental stimuli. Importantly, this study was also designed to further investigate the process that underlies our observed effects regarding the congruency of color and self-view orientations, by focusing on the mediating effects of processing fluency and perceived ad believability described previously in our conceptual model.

3.4.1. Procedures

Participants were again exposed to advertisements designed to activate a desired self-view. To prime an independent self-view, ads featured a picture of a single coffee cup placed below the headline: “Dining alone?” followed by ad claims emphasizing the personal benefits of dining in the featured restaurant. To prime an interdependent self-view,

ads featured a picture of three coffee cups placed below the headline: “Dining with others?” followed by ad claims emphasizing the relational benefits of dining with family and friends at the featured restaurant (see Appendix E).

3.4.2. Study 4, pretest

While past research has used pictures of individuals versus families to prime independence versus interdependence similar to our study 3 stimuli (e.g., Aaker & Lee, 2001; Kareklas, Carlson, & Muehling, 2014), the present study is the first to our knowledge to attempt to prime these self-views using inanimate objects (i.e., coffee cups), with related, accompanying ad claims focusing on independence versus interdependence. Hence, before launching the main study 4, we pretested our ad stimuli with 63 undergraduate students from a public university. Participants were shown one of the two ads at random and were asked to complete two manipulation checks regarding: (1) the background color of the advertisement (“red,” “blue,” “I cannot remember”), and (2) the extent to which they “thought about themselves” (*Independent Self-View*; 3 items, $\alpha = 0.95$) versus “themselves with others” (*Interdependent Self-View*; 3 items, $\alpha = 0.93$), adapted from Aaker and Lee (2001).

A significant majority (95.2%) of participants correctly recalled the background color of the ad, confirming the efficacy of the color manipulation. Similarly, participants exposed to the independent primes reported significantly more independent-focused ($M = 4.57$) as compared to interdependent-focused thoughts ($M = 3.34$; $t(61) = 2.78$, $p < .01$), while participants exposed to the interdependent primes exhibited more interdependent ($M = 4.91$) as compared to independent thoughts ($M = 3.35$; $t(61) = 4.06$, $p < .001$).

3.4.3. Study 4, main study

To further extend the applicability of our findings, we used a larger (as compared to studies 1–3), national sample of participants in our final study. Three hundred and one participants (48.5% female, $M_{\text{age}} = 36$, range = 18–74) were recruited from MTurk. Participation was limited to U.S. residents (confirmed through examination of the participants' IP internet addresses), who did not participate in study 3 (established through means of a screening survey that screened participants based on their MTurk IDs). Participants were randomly assigned to one of two self-view prime conditions (independent vs. interdependent) embedded in an ad featuring a red-colored background. They were subsequently asked to complete items measuring purchase consideration, processing fluency, perceived ad believability, and demographics.

The primary dependent variable (*Behavioral Intentions*, $\alpha = 0.94$) was measured by recording participants' responses to the following question: “When Avery's Corner Café locates in an area near you, what is the likelihood that you would consider eating there?” (1 = “Unlikely”/7 = “Likely,” 1 = “Improbable”/7 = “Probable,” and 1 = “Uncertain”/7 = “Certain”). A 3-item measure adapted from Study 1A (p. 755) of Newman, Howlett, and Burton (2016) was used to assess Processing Fluency. Specifically, participants responded to the statement, “Given the advertisement I just saw,” followed by: “it is easy to determine the product/service offerings of Avery's Corner Café;” “it is clear whether Avery's Corner Café would provide a pleasant dining experience for patrons;” and “I feel confident about whether Avery's Corner Café would be a good place to dine” (1 = “Strongly Disagree”/7 = “Strongly Agree”). Consistent with past literature (Alter & Oppenheimer, 2009), these items were intended to tap several relevant aspects of processing fluency, namely processing ease, liking, and decision-making confidence. Factor analysis indicated that these items loaded onto a single factor and were thus combined to form a *Processing Fluency* scale ($\alpha = 0.83$).

Our measure of *Perceived Ad Believability* ($\alpha = 0.88$) was adapted

from Beltramini (1982) and Lee and Aaker (2004) and consisted of two items (1 = “Not Believable”/7 = “Believable” and 1 = “Unconvincing”/7 = “Convincing”). Finally, participants were also asked whether they were colorblind (“Yes,” “No,” “Don't know”). Two participants responded affirmatively to this question and were excluded from all subsequent analyses ($n = 299$).

3.4.4. Results

Consistent with H3 expectations, a significant result was observed ($F(1, 297) = 11.57$, $p < .001$). When red background ads contained an independent self-view prime, participants were more likely to consider eating at Avery's Corner Café ($M_{PC} = 5.35$) than those participants in the red/interdependent condition ($M_{PC} = 4.77$; $t(297) = 3.40$, $p < .001$).

To investigate the underlying processes potentially driving the effect of self-view and the color red on behavioral intentions, we tested PROCESS Model 6 relationships (Hayes, 2013). Two mediators – *Processing Fluency* and *Perceived Ad Believability* – were tested in serial fashion, consistent with the hypothesized relationships proposed in our conceptual model. Statistical tests included a series of bootstrap analyses with 5000 samples and 95% bias-corrected confidence intervals (CIs) (Preacher & Hayes, 2008; Zhao, Lynch, & Chen, 2010).

As anticipated, we found a significant indirect effect of *Color/Self-view* condition (dummy coded 1 = independent/congruent; 0 = interdependent/incongruent) on *Behavioral Intentions* ($b = 0.26$, CI [0.0837, 0.4579], CI not including zero) when the ad background color was red. Consistent with our conceptual model, two factors – *Processing Fluency* and *Perceived Ad Believability* – fully mediated the relationship between *Color/Self-view* and *Behavioral Intentions*, as the direct effect of *Color/Self-view* on *Behavioral Intentions* ($b = 0.19$, CI [−0.0280, 0.4157]) was nonsignificant (i.e., the CI contained zero). In addition, results indicated that *Processing Fluency* was significantly influenced by whether *Color/Self-view* was red/independent or red/interdependent ($b = 0.40$, CI [0.1152, 0.6938]), with more positive effects occurring in the congruent (i.e., red/independent) condition. This finding offers additional empirical support for the relationship hypothesized in H2.

Regarding the serial nature of the mediating effects proposed in our conceptual model, PROCESS Model 6 results provide support for both H4a and H4b expectations. *Processing Fluency* mediated the effects of *Color/Self-view* on *Perceived Ad Believability* ($b = 0.99$, CI [0.9000, 1.0882]), while *Perceived Ad Believability* mediated the effects of *Processing Fluency* on *Behavioral Intentions* ($b = 0.65$, CI [0.5447, 7544]). No other tests of relationships between model variables reached levels of statistical significance, further supporting the observed effects.

4. General discussion

A majority of past research emerging from the color literature has sought to answer practical questions, often with limited theoretical grounding and support (Elliot & Maier, 2012). Additionally, while exposure to color is ubiquitous in our daily lives, much remains to be learned about the more subtle effects of color on psychological functioning, as extant work has predominantly focused on physiological reactions to color (Elliot et al., 2007; Wright, 1998). As such, our work was designed to contribute to the advertising, consumer psychology, and color processing literatures by highlighting the associative properties of the color red – viewed from a theoretical perspective – and by validating and extending past findings regarding the effects of color on consumer response.

4.1. Conclusion

The studies reported in this paper demonstrate that concepts such as color and self-construal can be usefully integrated into larger theories of

persuasion that include congruency and processing fluency. Additionally, they underscore the importance of congruence among visual and textual elements in advertisements. As a result, our work joins a number of other studies that have found that by carefully matching advertising executional features to consumers' motivational tendencies, the persuasive effect of an ad can be enhanced (e.g., Lee & Aaker, 2004; Lin et al., 2012). However, our studies not only replicate the congruence effects observed in past studies, but they extend them by examining the processes underlying consumers' responses to congruence in a color context.

In our initial studies, we observed a pattern of findings demonstrating that the color red shares associations with an independent self-view orientation. These associations were observed by means of both explicit (study 1) and implicit (study 2) measurement techniques. Furthermore, our latter studies helped to establish that the congruency effects derived from these associations are capable of influencing behavioral intentions in both social marketing (study 3) as well commercial marketing (study 4) contexts. Additionally, the IAT response latency findings of study 2 offer empirical support that congruent stimuli may be processed more fluently (i.e., with greater ease).

Whereas the findings from study 3 offer theoretical and practical support for color/self-view congruency effects in a persuasive communication context, the findings of study 4 provide additional evidence with regard to the processes and factors underlying this effect. Specifically, study 4 allowed us to further document that processing fluency is instrumental in driving the effects of congruent ad elements (Hermann et al., 2013; Lee & Aaker, 2004), and that fluent processing enhances perceptions of ad claim believability. This last finding is consistent with research showing that consumers are more acceptant of marketing information when it is easier to process (Reber et al., 2004) – and helps to explain how/why congruency indirectly affects behavioral intentions.

Theoretically-based as well as practitioner-relevant implications may be derived from our work. On a theoretical level, our research extends past motivational research (e.g., Bagchi & Cheema, 2013; Mehta & Zhu, 2009) finding the color red to be aligned with other self-focused (e.g., approach vs. avoidance motivation) principles (Elliot, Maier, Binser, Friedman, & Pekrun, 2009). Building on the work of these and other researchers who have focused on the influence of the color red in business settings, we show that congruent color/self-view combinations impact consumers' behavioral intentions across different advertising contexts. In addition, our work adds to an increasing body of research that focuses on the effects of priming (Bargh & Chartrand, 1999), and suggests that motivational processes may be influenced by a combination of subtle (color-based) as well as visually/verbally primed (self-based) cues placed in advertising. In study 3 (employing a social marketing PSA) and study 4 (using an ad promoting retail patronage), a central message proved to be more impactful when the message prime (i.e., independence) was congruent with a peripheral cue (i.e., red background color). Such a finding suggests that the “central” and “peripheral” routes of persuasion explained in the Elaboration Likelihood Model (Petty, Cacioppo, & Schumann, 1983), while distinct, may be capable of achieving synergies when central and peripheral ad elements are congruent. Thus, our research further reinforces the notion that the persuasiveness of marketing communications may be impacted by cues that are peripheral to the advertiser's central message (Gerend

& Sias, 2009). Likewise, our research builds on the color literature which has suggested that consumers' affective and behavioral responses to color may occur outside their conscious awareness (Elliot & Maier, 2014).

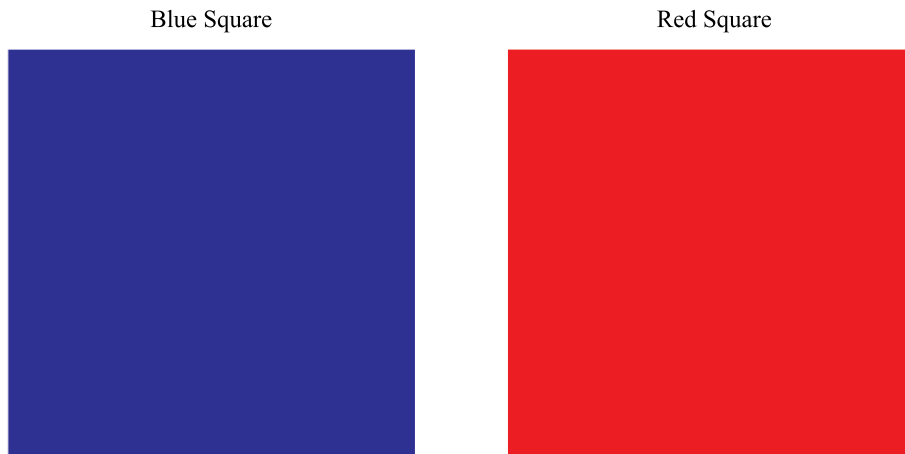
4.2. Limitations and future research

Nonetheless and consistent with the empirically-derived observations of Amsteus, Al-Shaabani, Wallin, and Sjöqvist (2015) and Meier et al. (2012), we acknowledge here the context-related properties of color associations. In other words, common associations with and perceptions of the color red may be quite different when displayed/used in specific contexts. As such, future work may wish to consider other behavioral contexts where self-based motivations may impact decisions. For example, recent research in the area of organic food consumption has shown that consumers may choose organic over conventional foods for both *egoistic* reasons (e.g., due to concerns over personal health), as well as *altruistic* reasons (e.g., because of environmental concerns, as organic consumption is less harmful to the environment) (Kareklas, Carlson, & Muehling, 2014). Our present work suggests that advertisements focusing on egoistic claims to promote organic brands would appear to be most persuasive when paired with the color red as the predominant ad background color.

Furthermore, future research should extend our work by examining additional colors that may serve as useful comparative referents to red in testing our propositions. In our preliminary studies (studies 1 and 2), we used the color blue as a referent. This choice was driven by the fact that these two colors appear on opposite ends of the color spectrum and because they have been shown to evoke contrasting connotations (Mehta & Zhu, 2009), as well as having divergent physiological and behavioral effects on humans (Bagchi & Cheema, 2013). Given the inevitable, widespread use of color in marketing (e.g., in advertising, branding, package design, and retail atmospherics), additional colors should be explored for their relationship to self-construal (i.e., for the extent to which they elicit independent versus interdependent associations).

Additional opportunities may exist for marketing managers who are interested in swaying consumer product/brand sentiment by employing color-based strategies in combination with self-view primes in other marketing contexts, such as packaging, product design, and labeling. For example, our findings suggest that individualistic (vs. collectivistic) products (Morling & Lamoreaux, 2008) may be more favorably evaluated when colored red and/or promoted using predominantly red ad color schemes. Furthermore, investigation of our findings in other countries is another worthy research pursuit, given that colors often have contrasting cultural meanings (Elliot et al., 2007; Kareklas, Brunel, & Coulter, 2014), and relatedly, self-views may be influenced by prevailing cultural norms (Fiske et al., 1998). At the present time, it remains unclear whether shared associations between colors and self-view orientations are primarily: (a) innate and biologically-based (Bellizzi et al., 1983; Crowley, 1993; Mollon, 1989), (b) the result of associative learning processes (Kareklas, Brunel, & Coulter, 2014; Labrecque et al., 2013; Ten Velden et al., 2012), or (c) a combination of both (Elliot et al., 2007). Attempts to further determine the root sources of color/self-view associations would be valuable extensions to our current work.

Appendix A. Study 1 Stimuli



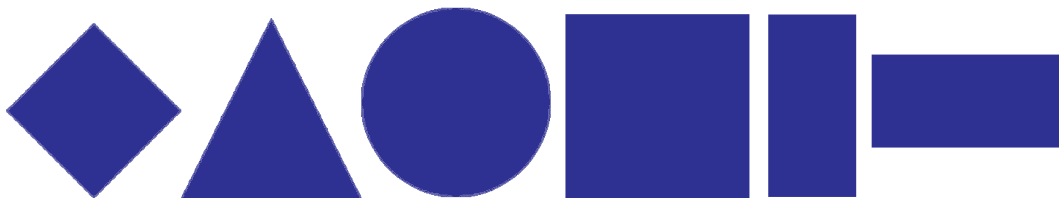
Independent Words: “individual,” “independent,” “me,” “member,” “alone,” “separate,” “individualism,” and “personal.”

Interdependent Words: “group,” “interdependent,” “us,” “team,” “together,” “united,” “collectivism,” and “communal.”

Note: The color scheme used for the blue square was RGB code: 0, 0, 255 (i.e., 0% red, 0% green and 100% blue), while the red square used RGB code: 255, 0, 0 (i.e., 100% red, 0% green and 0% blue). Both color stimuli were presented at a resolution of 500 × 500 pixels.

Appendix B. Study 2 Stimuli

Blue Geometric Shapes:



Red Geometric Shapes:



Independent Words: “me,” “member,” “alone,” “separate,” “individualism,” and “personal.”

Interdependent Words: “us,” “team,” “together,” “united,” “collectivism,” and “communal.”

Note: Blue stimuli used RGB code: 0, 0, 255, while red stimuli used RGB code: 255, 0, 0. All stimuli were presented at a resolution of 270 × 270 pixels.

Appendix C. Study 2 Screenshots

Screenshot 1

PRESS 'D' FOR
Individual
OR
RED



PRESS 'K' FOR
Collective
OR
BLUE

PRESS 'D' FOR
Individual
OR
RED

Screenshot 2

PRESS 'K' FOR
Collective
OR
BLUE

Member

Screenshot 3

PRESS 'D' FOR
Individual
OR
BLUE



PRESS 'K' FOR
Collective
OR
RED

PRESS 'D' FOR
Individual
OR
BLUE

Screenshot 4

PRESS 'K' FOR
Collective
OR
RED

Team

Note: Depicted are four screenshots taken from the measurement blocks of the IAT used in study 2. As shown, participants were asked to assign randomly selected stimuli that consisted of either one of the 12 focal images (red or blue geometric shapes) or one of the 12 focal (individual or collective) words to the appropriate category. Pairings of the two focal colors (red vs. blue) with the focal conceptual category of words (individual vs. collective) was counterbalanced across the measurement blocks, as was the positioning of these pairings on the right versus the left side of the screen. Consistent with [Kareklas, Brunel, and Coulter \(2014\)](#), the tested conceptual category and its associated words (e.g., “member,” “team,” etc.) were presented in purple, using an RGB color code that is exactly between the colors blue and red.

Appendix D. Study 3 Stimuli

Independent (Male)/Red Background

You have much to gain
... by getting a diabetes test.

Take the test, and you will receive important information about the likelihood of developing diabetes.

<http://www.diabetes.org>

Diabetes leads to heart disease
– the leading cause of death in the U.S.
79 million Americans are pre-diabetic.
Many of them don't even know it.

Independent (Female)/Red Background

You have much to gain
... by getting a diabetes test.

Take the test, and you will receive important information about the likelihood of developing diabetes.

<http://www.diabetes.org>

Diabetes leads to heart disease
– the leading cause of death in the U.S.
79 million Americans are pre-diabetic.
Many of them don't even know it.

Interdependent/Red Background

You and your family have much to gain
... by getting a diabetes test.

Take the test, and you and your family will receive important information about the likelihood of developing diabetes.

<http://www.diabetes.org>

Diabetes leads to heart disease
– the leading cause of death in the U.S.
79 million Americans are pre-diabetic.
Many of them don't even know it.

Note: Stimuli with a red background used RGB code: 255, 0, 0. All stimuli were presented at a resolution of 700 × 525 pixels.

Appendix E. Study 4 Stimuli

Independent/Red Background

Interdependent/Red Background

Note: Stimuli with a red background used RGB code: 255, 0, 0. All stimuli were presented at a resolution of 450 × 600 pixels.

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