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Red enhances women's attractiveness to men: First evidence suggesting universality

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Abstract

Recent research in the U.S. and Europe indicates that viewing red enhances men's attraction to women. This red effect may reflect a basic predisposition shared across cultures, and may thus represent a functional human universal – that is, a psychological process that carries the same meaning in all human societies (Norenzayan & Heine, 2005). We conducted a first test of this universality hypothesis by examining the influence of red on attraction among men living in an isolated traditional small-scale society in Burkina Faso where red carries explicitly negative associations. The results indicated that the red effect is present in Burkina, and that it emerges in culturally appropriate expressions of attraction. These findings represent first evidence suggesting that red may operate as something of a *lingua franca* in the human mating game.

Keywords

Red, color, attraction, human universal, mate selection

Recent research in the U.S. and Europe has revealed that men perceive women to be more attractive and sexually desirable when seen on a red background or in red clothing (Elliot & Niesta, 2008; Gueguen, 2012, Pazda, Elliot, & Greitemeyer, 2012; Roberts, 2010). A likely source of this red-attraction link is societal conditioning, as red is commonly used to convey sex and romance in arts and literature (e.g., *The Scarlet Letter*), cosmetics (e.g., rouge), and prostitution (e.g., red-light districts).

It is possible that the red-attraction link is a product of societal conditioning alone, but it is also possible that it emerges from rudimentary learning or a predisposition to perceive red as a sexual signal. Women's face, neck, and upper chest redden during the blush of flirtation and the flush of sexual excitation (Changizi, 1989; Eibl-Eiblsfeldt, 1989; Katchadourian, 1984). As such, a red-attraction link could emerge as a function of classical conditioning (i.e., men encountering the repeated pairing of red and women's sexual arousal). Furthermore, when nearing ovulation, women are more easily sexually aroused, their general skin tone lightens, and they wear more revealing clothing (Bullivant et al., 2004; Durante, Li, & Haselton, 2008; Lynn, McCord, & Halliwell, 2007); together, these changes may enhance the prevalence and salience of visible redness on women's skin during peak fertility. Discriminating men acting on this red sexual signal may have incurred a fitness advantage, leading to the emergence of a basic psychological adaptation (for parallels with nonhuman primates, see Deschner, Hiestermann, Hodges, & Boesch, 2004; Dixson, 1983). From this perspective, the aforementioned societal uses of red both reinforce and extend a natural physiological process. As such, red may not only carry sexual meaning when viewed on a women's face or body, but also when viewed on her clothing, accessories, or in close proximity to her person.

If the red-attraction link indeed represents a fundamental, physiologically-based association or predisposition, it should be observed across cultures (i.e., universally). To date, human research on the red-attraction link has been conducted exclusively in the U.S. and Europe. Herein we commenced examination of the universality question by testing the red-attraction link in a traditional small-scale society in Burkina Faso. Burkinabes in general have little access to other cultures due to their nation's poverty, illiteracy, and lack of development (*United Nations Human Development Report*, 2010), and we targeted isolated people living in rural Burkina for our experiment (this population was recruited and sampled by the second author in prior research testing the universality of psychological effects in other domains; see Tracy & Robins, 2008). Furthermore, ethnographic evidence provided by our Burkinabe collaborator indicates that in this small-scale society, the explicit, culturally-shared associations with red are negative (it represents bad luck, sickness, death), and red carries no overt romantic connotations (J. Traore, personal communication, June 22, 2010). Thus, if participants from this population show the same red-attraction effect that has been found in the U.S. and Europe, it would provide first, suggestive evidence that the red-attraction link may represent a human universal.

In the present research, we followed prior work by examining the red-attraction effect using several different measures, including those focused on attraction and romance, as well as those overtly focused on sex. However, societal norms regarding sexual attitudes, sexual behavior, and even talking openly about sex are considerably more conservative in Burkina Faso than in the U.S. and Europe (Amuyunzu-Nyamongo, Biddlecom, Ouedraogo, & Woog, 2005; Brady, Saloucou, & Chong, 2007; Karibu & Ezeh, 2007), and it is notoriously difficult to acquire accurate, truthful responses to questions containing sexual content in Burkina and other Sub-

Saharan African countries (Kelly et al., 2012; Wellings et al., 2006). Given this context, data from our measures overtly focused on sex are best considered exploratory.

Method

Participants

Forty-two males participated in the experiment in exchange for a large bag of rice.¹ The mean age of participants was 26.8 (range=18-30). Participants were recruited via word of mouth; all lived in small, rural settlements several miles from Toussianna, a small, remote village in Southwest Burkina Faso. Most participants were subsistence farmers, and all inhabited mud huts with no electricity or plumbing.

Procedure, Materials, and Measures

Participants were run individually by a male experimenter blind to hypotheses and experimental condition. All experimenters were born in Toussianna, but had left the village to attend school in one of Burkina's urban areas (all experimenters were literate in French). Prior to conducting the experiment, all instructions and questions were translated from English to French by a bilingual individual, and then back-translated by another bilingual individual to verify accuracy. The local dialects spoken by participants were *Dioula* and *Toussian*, neither of which has a formal written form. Accordingly, our university-educated Burkinabe collaborator (who is fluent in French) discussed and reached consensus with experimenters on the correct local translations for the instructions and questions; during experimental sessions, the experimenters translated aloud from French to one of the local dialects.

In the experiment, participants viewed a black and white photograph of a West African woman with either a red ($n=21$) or blue ($n=21$) border (see Figure 1). Blue is an optimal, conservative contrast to red because it is a chromatic color that allows non-hue color properties

to be controlled, and it is a positively evaluated color in nearly all countries in which color preferences have been investigated (Madden, Hewett, & Roth, 2000; Philbrick, 1976). The 4.75” x 5.75” photograph was printed on 8.5” x 11” Epson Ultra Premium paper; the colored borders were manipulated using Adobe Photoshop by filling the space between the photograph and the edge of the page with color. The materials were created with an Epson Stylus Photo printer. A GretagMacBeth Eye-One Pro spectrophotometer was used to determine the color parameters from the spectral data (red LCh[42.7, 51.5, 20.4]; blue LCh[43.3, 51.5, 269.8]); the red and blue hues were of equal lightness and chroma.

After viewing the photograph for five seconds, participants responded to a series of questions about the target woman. One set were attraction-based questions with no overt mention of sex: “How attractive do you think this person is?” (Kruger, 2006), “Would you want to court (date) this person?” (based on Greitemeyer, 2005), and “Would you volunteer to meet and talk with the woman in the picture?” Another set of questions focused overtly on sex: “Would you want to have sexual intercourse with the woman?” (based on Greitemeyer, 2005) and “She is interested in sex” (Pazda et al., 2012). We also asked participants’ to report their general positive evaluation of the woman: “How much do you think you would like this person if you got to know her?” (Jones, Pelham, Carvallo, & Mirenberg, 2004). For each question, participants were shown five circles, increasing in size from left to right and representing “Not at all,” “A little,” “Somewhat,” “Quite a bit,” and “Very much,” respectively (see Figure 2). Participants were instructed to respond by pointing to the appropriate circle. Prior to the actual questions, an example was provided and the response options were carefully explained; the explanation continued until the experimenter was satisfied that the participant could use the response scale correctly.² Experimenters recorded participants’ responses (converted into a 1-5 scale).

After responding to the questions, participants were asked to guess the purpose of the study; experimenters recorded their response. Then, familiarity with outside culture was tested by showing participants 4" x 6" laminated photographs of well-known individuals representing different national backgrounds and ethnicities: Emmanuel Adebayor, Tom Cruise, Michael Jackson, Nelson Mandela, and Nicholas Sarkozy; these individuals were chosen to capture a wide range of outside cultural knowledge, as they had acquired fame in diverse ways (i.e., sports, film, music, politics). For each photograph, participants were asked, "Who is the person in this photograph?" and experimenters recorded their response. Participants were also shown 4" x 6" laminated photographs of two well-known individuals within Burkina Faso: President Blaise Compaore and former revolutionary leader Thomas Sankara (pictures of these two individuals are displayed in markets throughout the country, even in remote settlements), to ensure that they understood the recognition task. Finally, participants reported information access to Western media and formal education.

Results

In accord with prior research in the U.S. and Europe, independent samples t-tests indicated that men in the red, relative to the blue, condition rated the woman as more attractive, $t(40) = 2.10, p = .042, d = .66$ (Ms = 4.62 and 4.14, SDs = .59 and .85), were more interested in courting her, $t(40) = 2.12, p = .040, d = .65$ (Ms = 4.14 and 3.43, SDs = 1.06 and 1.12), and were more likely to volunteer to meet her, $t(40) = 2.35, p = .024, d = .72$; Ms = 4.52 and 3.86, SDs = .68 and 1.12; see Figure 3). However, men in the red condition did not report a stronger desire to have sexual intercourse with the woman, $t(40) = .11, p = .91$; Ms = 3.71 and 3.67, SDs = 1.38 and 1.43), nor did they report that she was more interested in sex, $t(40) = -.64, p = .53$; Ms = 3.19 and 3.48, SDs = 1.40 and 1.50). Together, these results indicate that the red effect is present in

this sample, but is specific to culturally appropriate expressions of attraction. Also in accord with prior research, no differences emerged in men's ratings of the woman's general likeability, $t(40) = .35, p = .73$; $M_s = 3.90$ and 3.76 , $SD_s = 1.22$ and 1.41), suggesting that the red effect is specific to culturally appropriate expressions of *romantic* attraction.

No participant correctly guessed the purpose of the experiment. Twelve (28.6%) participants correctly identified at least one of the famous people from other cultures. Nearly all recognized the two well-known Burkinabes, Blaise Compaore (39 [92.9%]) and Thomas Sankara (37 [88.1%]), suggesting that participants' general failure to recognize famous people from other cultures was not due to a failure to understand the task. Fifteen (35.7%) participants indicated that they had seen Western television or movies more than once in their lifetime, and twelve (28.6%) indicated that they had received at least some form of schooling. To ensure that the observed red effect was not driven by participants in these categories (any of which could reflect access to non-Burkinabe cultural knowledge), we reanalyzed the data omitting these subsets of participants. The results reported above held in these analyses (see Table 1), including those from analyses omitting all three categories simultaneously (i.e., results from the subsample representing the most culturally isolated, non-literate participants).

Discussion

The present results indicate that the red-attraction link observed in the U.S. and Europe is also present in culturally isolated individuals living in a traditional small-scale society. Red enhanced Burkinabe men's attraction to a target woman, and this red effect was specific to culturally appropriate expressions of attraction. Also consistent with prior research, the red effect was shown to be specific to *romantic* attraction; it did not extend to overall positive evaluation.

Participants were not aware that the research focused on the influence of color, but color had an influence on their responses nonetheless.

Given the extreme cultural isolation of the participants in our research, it is highly unlikely that these results are due to shared cultural knowledge from an outside source. Furthermore, the red-attraction link that we observed runs counter to the explicit negative associations with red that exist in this culture. As such, documenting the red effect in our Burkinabe sample provides initial support for the premise that the red effect may represent a functional human universal – that is, a psychological process that carries the same meaning and serves the same function across all human societies (Norenzayan & Heine, 2005).

It is important to note that research testing the generalizability of an effect across cultures using the maximally divergent population approach adopted herein (Norenzayan & Heine, 2005) is a difficult enterprise, as there are many potential obstacles and threats to validity in such work (Tracy & Robins, 2008). Here, these included the need to translate instructions and questions from English to French and then from French to a spoken dialect, the need for non-literate participants to remember questions that were read aloud and keep in mind the meaning of pictorial response options, and the overall novelty of the data collection process for our participants. Given these issues, our results seem rather compelling evidence for a pancultural universal (Brown, 2004). Furthermore, the more divergent the cultures being considered, the stronger the case for universality (Norenzayan & Heine, 2005), and it is difficult to imagine more divergent samples than the U.S. and European undergraduates who participated in the prior research and the isolated, non-literate Burkinabes in the present research.

Although the present research yielded evidence supportive of universality, this evidence is by no means definitive. Provocative claims require a particularly strong evidentiary base, and

future research is needed to extend these findings. Perhaps foremost on the empirical agenda is the need to attend further to the null results that we obtained with the questions focused overtly on sex. One possibility is to conduct a subsequent experiment with a similar sample, but using an “audio computer-assisted self-interviewing” (ACASI) approach, rather than the standard “face-to-face interviewing” (FTFI) approach (Kelly et al., 2012, p. 1) to try to acquire more accurate, truthful data on these sensitive questions. This alternative data collection methodology has been implemented with some success in empirical work facing similar challenges (Kelly et al., 2012), and could shed light on whether our interpretation regarding the null results is indeed correct. Another possibility for subsequent research is to examine the red-attraction link in a wider array of more easily accessible, but nevertheless diverse, cultural groups (Buss, 1989; Schwartz, 1992). To the extent that the red effect is replicated in a large number of culturally distinct populations across the globe, the case for universality would be further bolstered.³ In short, our research should be considered a first step in the gathering of evidence on the universality question (Lonner, 1980; Norenzayan & Heine, 2005) -- a foundation on which a sustained program of empirical work may be built.

Our results have practical, as well as conceptual, implications. For example, red’s deeply ingrained sexual meaning may be of interest to marketers, advertisers, and fashion and product designers across the globe. Although fads and fashions change rapidly and most preferences exhibit considerable regional variability, there may be some deeply rooted, evolved predilections that anchor consumer behavior (Saad, 2008; 2011). Red may be one such anchor in the realm of romance-relevant merchandise.

Ongoing research on sexual attraction in humans is revealing a wide range of subtle factors that influence men’s attraction to women, such as facial symmetry, low waist-to-hip ratio,

and high vocal frequency (Collins & Missing, 2003; Gangestad & Scheyd, 2005; Rhodes, 2006).

The present research contributes to this literature by suggesting that red operates as something of a lingua franca in this domain, carrying amorous meaning across cultures.

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Footnote

1. Individuals who self-identified as either color-deficient or homosexual were not included in the study.
2. Three individuals who failed to understand or follow the experimenter's instructions were omitted from the database a priori.
3. It would also be helpful to systematically investigate men's desire for short-term versus long-term relationships as a function of red across cultures.

Table 1: *t* values for subsamples of participants

	A (<i>n</i> =30)	B (<i>n</i> =30)	C (<i>n</i> =27)	D (<i>n</i> =23)
Perceived attractiveness	2.71**	2.04*	3.09**	2.89**
Interested in courting	3.18**	2.21*	2.14*	2.10*
Volunteer to meet	1.90 [†]	2.21*	2.32*	2.06*
Perceived sexual receptivity	.16	-.44	-.887	-.84
Desire sexual intercourse	.17	-.20	.32	.20
Perceived likeability	.30	.47	.92	.55

Note. A = subsample after omitting participants who correctly identified a famous person from another culture; B = subsample after omitting participants who had received some form of schooling; C = subsample after omitting participants who had seen Western television or movies more than once in their lifetime; D = subsample after omitting participants who fit any of the above categories (leaving the most culturally isolated, non-literate participants). $p = .068^{\dagger}$, $p < .05^*$, $p < .01^{**}$

Figure Captions

Figure 1. The between-subjects color manipulation.

Figure 2. Response scale used by participants (participants pointed to one of the circles to indicate their answer).

Figure 3. Mean values; standard errors are indicated by vertical lines. For measure -- attractiveness, interest in courting, and volunteer to meet -- the means for the red condition were significantly greater than those for the blue condition. All of these results held when participants who could recognize famous people from other cultures or who had received any formal education were omitted.

Figure 1

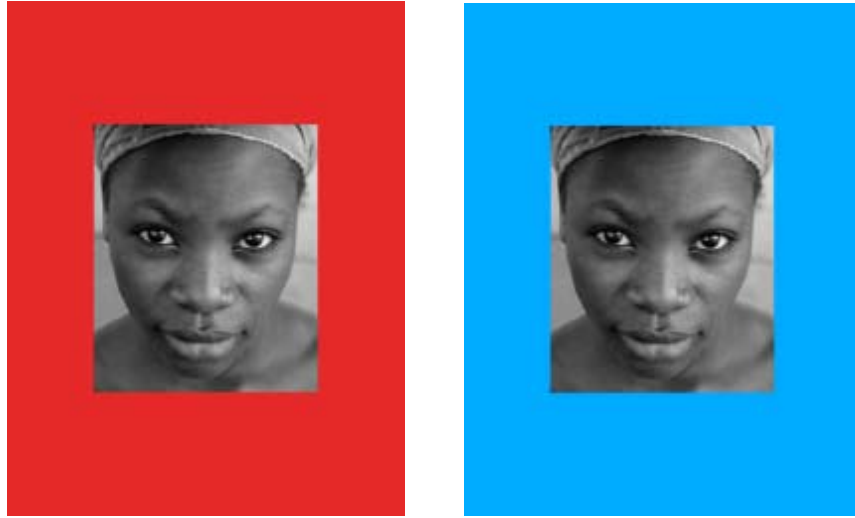


Figure 2

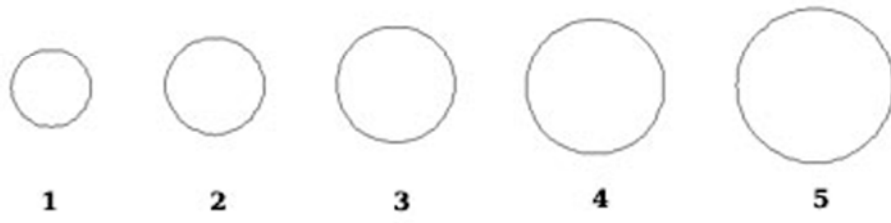


Figure 3

