

Does Complexion Color Affect the Experience of Blushing?

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This study examined the relationship between blushing and complexion color. Asian (n = 62), Black (n = 26), Hispanic (n = 18), and White (n = 165) respondents completed a self-report measure assessing various aspects of their typical blushing experience. In line with predictions, lighter complexioned individuals were more likely than darker complexioned individuals to report visible color change as part of their blushing experience and to indicate that changes in visible skin color influenced others' reactions to their blushes. Experiences which do not directly involve visibility such as the frequency, ease, latency, and duration of blushing showed no differences. No major sex differences emerged.

Blushing, though a fleeting episode, is experienced as an unwelcome public revelation of one's most private thoughts. By "blushing," we specifically mean the transient feeling of warmth and/or skin color change associated with the occurrence of acute self-consciousness.

If an emotional expression can be thought of as "popular," the 19th century Europeans' fascination with blushing as apparently the most civilized of expressions (Ricks, 1974) partially explains its serious treatment by scientists of the time. Thomas Henry Burgess published the first generally recognized scientific account of blushing in *The Physiology or Mechanism of Blushing* (1839), although it is Darwin's (1872/1955) account, which draws heavily on Burgess', that has served as the accepted wisdom on the subject. Only in recent years have investigators begun to

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turn their attention to the empirical study of this elusive expression of emotion.

Contemporary empirical work has largely focused on attempts to identify personality traits of individuals prone to report ready susceptibility to blushing. Leary and Meadows (1991) reported that the personality variables of embarrassability, interaction anxiousness, self-esteem, and refinement (i.e., the degree to which one enjoys or is repulsed by crass, uncouth, and vulgar behavior) accounted for 40% of the variance in blushing propensity scores. "Blushing propensity" refers to the self-reported degree to which one blushes in everyday social situations. Edelman and Skov (1993) found that blushing propensity was positively correlated with fear of anxiety, with social anxiety, and with fear of bodily sensations. Other research has yielded similar results. For example, both Edelman (1990a) and Crozier and Russell (1992) have found positive relationships between social anxiety and various measures of the magnitude (e.g., severity, frequency) of blushing. Age is also related to reported frequency of blushing. Shields, Mallory, and Simon (1990) interviewed self-identified frequent and infrequent blushers from 13 to 55 years of age and found that the reported frequency of blushing was significantly negatively correlated with age ($r = -.49$).

One individual difference that warrants empirical attention is complexion color. Some 19th Century writers seriously considered blushing to be limited to Caucasians. The issue was not complexion color. Rather, the debate centered on whether non-White races had the capacity for the refined moral sensibilities believed to be necessary for the true blush. Burgess (1839), expressing a very enlightened opinion for the time, asserted that the moral feelings which enable blushing are common to all races—after all, he reasoned, advanced intellectual abilities are not requisite for blushing as even women and children blush! Darwin (1872/1955), too, believed that blushing is evident in all races and summarized the reports of many travelers and naturalists to that effect.

That blushing occurs in all racial/ethnic groups is less surprising than the fact that it was ever seriously debated. More significant today is the question of how the meaning of the blush may change if the social component, that is, its visibility, changes. Cross-cultural studies of embarrassment conducted by Edelman and his colleagues suggest that ethnicity and complexion color may affect the perceived prevalence of blushing via their relationship with visibility. In open-ended retrospective reports of embarrassing situations, 55% of the respondents from the United Kingdom mentioned blushing as an accompaniment to embarrassment while 25% of the respondents from Greece and 21% of the respondents from Spain mentioned this; frequencies of respondents from Italy,

Japan, and West Germany who mentioned blushing were between these extremes (Edelmann et al., 1989). In another comparison, blushing was mentioned as an accompaniment to embarrassment significantly more often by respondents from the U.K. than by respondents from Portugal (Edelmann & Neto, 1989).

One reason for these differences may involve complexion color (Leary, Britt, Cutlip, & Templeton, 1992). It is possible that darker complexion color masks the blush to some extent, so individuals with lighter complexions, more frequent in the U.K., tend to have more visible blushes than individuals with darker complexions, more frequent in Greece and Portugal. Individuals' experiences of blushing may in turn be affected by how visible they perceive the blush to be to others. The end result is that individuals of ethnic groups with lighter complexions may report a greater likelihood of blushing than individuals of ethnic groups with darker complexions.

In the present research, we reasoned that for those components of blushing for which the visibility of the blush is directly implicated, individuals with lighter complexions would be more affected than would individuals with darker complexions. When visibility of the blush is not involved, lighter and darker complexioned individuals should report similar blushing experiences. Specifically, we predicted that lighter complexioned individuals (i.e., Asians, Hispanics, Whites) would be more likely to report that color change was part of their blushing experience than darker complexioned individuals (i.e., Blacks). In questions on the social context of blushing (e.g., how others know one is blushing, attempts to stop blushing), we predicted that the lighter complexioned would be more likely than the darker complexioned to endorse responses that involved a change in facial skin color. In contrast, we did not expect differences in the frequency, ease, latency, or duration of blushing because these experiences do not directly involve the visibility of the blush, but instead, involve dispositional blushing propensity.

Women's and men's experiences of blushing were also examined. Darwin (1872/1955), as well as Burgess (1839) before him, took for granted a greater frequency of blushing among females. As with complexion, the expected sex-related difference is not surprising in light of the prevailing belief in upper-class women's moral sensibilities and modesty (Shields, 1975). Nevertheless, contemporary research does not typically find a gender difference in college students' self-reports of such characteristics as blushing frequency (Crozier & Russell, 1992; Shields, Mallory, & Simon, 1990) or blushing propensity (Edelmann & Skov, 1993; Leary & Meadows, 1991). In work using physiological measures, Shearn, Bergman, Hill, Abel, and Hinds (1990) found no differences

between females' and males' cheek coloration, ear temperature, or skin conductance during blush-inducing stimulation. Females' cheek temperature did tend to rise higher than males' during blush-inducing stimulation but not during nonblush-inducing stimulation. Given that the bulk of this previous work does not support the existence of female-male differences in blushing, we predicted that no major sex-related differences would emerge in the present studies.

In this study, we compared women and men in four racial/ethnic groups regarding their experience of blushing.¹ Blushing was defined as involving "a feeling of warmth on the face and/or a change in skin color in response to being made the center of attention, embarrassing situations, or similar circumstances." To control for the effects of age on blushing, we used participants who were from 18 to 25 years old.²

METHOD

Subjects

Participants were 302 university student volunteers (median age = 20) drawn from two northern California universities who completed a blushing questionnaire in return for course extra credit.

The final sample consisted of 180 women, 109 men, and three individuals who did not specify their sex. The racial/ethnic composition of the final sample was 21% Asians ($n = 62$), 9% Blacks ($n = 26$), 6% Hispanics ($n = 18$), 57% Whites ($n = 165$), and 6% Other and non-Black ($n = 18$), race unspecified. An additional 1% ($n = 3$) declined to specify race/ethnicity. One question asked whether the typical blushing experience included a feeling of warmth plus color change, color change only, warmth only, or a complete absence of blushing when self-conscious or embarrassed. Eight individuals (1 Asian, 4 Blacks, 1 Hispanic, and 2 Whites) reported that they never blush and two others did not answer. Responses from these 10 participants (6 women, 4 men) were eliminated from the analyses.

¹ Our focus in this study is on complexion color, one physical characteristic that has often been used to classify people into different racial groups. Based on participants' own responses, we categorized them into four racial groups based on complexion color: Asians (e.g., Vietnamese and Chinese individuals), Blacks (e.g., African-American and African individuals), Hispanics (e.g., Mexican-American and Spanish individuals), and Whites (e.g., Arabic and Irish individuals). We recognize that these are gross racial classifications and that race typologies are difficult to determine. We also recognize that the four groups we have identified are also ethnic groups; therefore, we will refer to the four groups as racial/ethnic groups, with the emphasis being on complexion color differences between the four groups.

² Our previous work suggests that variability in blushing reports in this age group is unlikely to be due to age differences among research participants. Preliminary analyses comparing the group of youngest versus oldest participants in the present sample indicated no age effects.

Materials and Procedure

A composite blushing questionnaire was developed based on items used in the earlier interview study by Shields et al. (1990). Blushing was first defined for participants in the manner described above. Participants then responded to 15 questions regarding their experience of blushing. The 15 items are listed below in the same order in which they appear in the Results section. When an item will not be discussed in detail in the Results section, possible item responses are listed in parentheses.

Ease: "Think about people you know who are the same sex and about the same age as you. Do you blush as easily as they do?" (more easily; about the same; less easily)

Frequency: "How frequently do you blush?"

Location: "Choose the ONE statement that best describes your typical experience [of blushing]." (This is the question referred to in the preceding subsection.)

Specific location: Another item more specifically addressed warmth/color changes by requiring respondents to shade in the areas of a schematic head (scalp, forehead, brow, nose bridge, nose, upper lip, chin, neck, upper chest/shoulders, cheeks, side of face, ears) where warmth and color changes occur. Non-overlapping area of warmth and of color change were labeled by participants.

Latency: "How long does it typically take for [your] blush to occur?" (1-4 seconds; 5-10 seconds; 11-25 seconds; half a minute or more).

Duration: "How long does a blush typically last for you?" (1-25 seconds; at least 30 seconds but less than 1 minute; at least 1 minute but less than 2 minutes; 2-3 minutes; more than 3 minutes).

Symptoms/Reactions: "Do you typically notice any physical symptoms or reactions other than warmth while you blush?"

The following questions focus on the social context of blushing.

Description: "Think of a recent situation in which you blushed. Briefly describe the situation....How long ago did this happen? How many other people were there? How typical was this as an instance of blushing?"

Age of first blush: "At what age do you first remember blushing?" (0 to 5 years; 6-9 years; 10-12 years; 13-16 years; 17 or more years)

Visibility: "Sometimes a person may not feel a blush even though it is visible to others....Has this ever happened to you?"

Stopping a blush: "Have you ever tried to stop blushing once it has started?" (yes; no) "If you have tried to stop, how well do the strategies work?" (well; makes the blushing worse; has no effect; I don't know)

Others' reactions: "When other people notice your blushing, what kinds of things do they do or say?" (they tease and try to get me to blush)

more; they act like they don't notice; they talk about what it is that got me to blush).

How others know: "When you blush, how do others know that you are blushing?"

Frequency of others' comments: "When you blush, do the people you are with comment on it?" (yes, always; yes, often; sometimes they do, sometimes they don't; no, they rarely or never comment on it)

Content of others' comments: "If the people you're with comment on your blushing, what do they typically comment on?"

Concealment: "What strategies do you use to conceal your blush...?" (there is nothing I can do that would work; try not to act embarrassed; put on some other emotion; try to stop blushing as quickly as possible)

Questionnaires were completed by individual participants anonymously in groups ranging from approximately 15 to 50 people.

RESULTS

Responses were first examined for sex differences within each of the four specific racial/ethnic groups: Asian (43 women, 18 men, 1 sex unspecified), Black (18 women, 6 men, 2 sex unspecified), Hispanic (10 women, 8 men), and White (99 women, 66 men). A series of chi-square analyses were performed separately for each racial/ethnic group. Four minor sex differences emerged: Three were between Asian women and men, with two involving differing reports regarding the specific location of the typical blush and one involving differing reports regarding how others know one is blushing. The fourth involved differing reports by Hispanic women and men regarding the duration of the typical blush. Because of the small number and apparent unimportance of significant sex differences, women's and men's responses were combined for all comparisons of Asians, Blacks, Hispanics, and Whites. An α level of .05 was used for all statistical tests.

Ease and frequency of blushing. A chi-square analysis showed no significant differences by race/ethnicity on the "ease of blushing" item. All respondents were most likely to report blushing with "about the same" ease as others.

Five blushing frequency categories derived from Shields et al. (1990) were available in response to the frequency question: "once a day or more," "3-5 times per week," "1-2 times per week," "1-2 times per month," and "fewer than once per month." Both a chi-square and a Kruskal-Wallis analysis showed no significant differences by racial/ethnic group. As can be seen in Table 1, 27% to 39% of respondents in each of the four groups reported blushing "1-2 times per month," 16% to

TABLE 1 Reported Frequency of Blushing by Race/Ethnicity and Complexion Color

<i>Frequency Interval</i>	<i>Black</i>	<i>Hispanic</i>	<i>Asian</i>	<i>White</i>
Once a day or more	12	6	10	9
3-5 times per week	15	6	13	19
1-2 times per week	35	22	16	24
1-2 times per month	27	39	36	32
Fewer than once per month	12	28	26	16

Note: Figures are percentages and may not equal 100% due to rounding. Sample sizes are as follows: Black (n = 26), Hispanic (n = 18), Asian (n = 62), White (n = 165).

35% reported blushing "1-2 times per week," and 12% to 28% indicated they blush less than once per month.

The typical blush: Location, latency, duration. As indicated earlier, one question asked whether the typical blushing experience included a feeling of warmth plus color change, color change only, warmth only, or complete absence of blushing when self-conscious or embarrassed. A chi-square analysis by race/ethnicity was performed on the first three categories only, with the result emerging as significant, $\chi^2(6, N = 271) = 62.99, p < .001$. As can be seen in Table 2, lighter complexioned respondents were more likely to report both color and warmth as components of blushing than were darker complexioned respondents, who were more likely to report the sensation of warmth only: The majority (50% to 77%) of Hispanics, Asians, and Whites reported warmth plus color change while only a small number of Blacks indicated this. Conversely, a majority of Blacks (77%) reported warmth with no color change, compared to much lower percentages of Hispanics, Asians, and Whites.

TABLE 2 Reported Location of Blushing by Race/Ethnicity and Complexion Color

<i>Location</i>	<i>Black</i>	<i>Hispanic</i>	<i>Asian</i>	<i>White</i>
"When I blush, my face... gets hot and changes color."	12	50	57	77
changes color, but doesn't get hot."	12	22	11	13
gets hot, but doesn't change color."	77	28	32	11

Note: Figures are percentages and may not equal 100% due to rounding.

Respondents also shaded in the areas of a schematic head where warmth and color changes occur. No racial/ethnic group differences emerged in warmth and color analyses of the specific body regions. Warmth changes were fairly liberally distributed across regions for all racial/ethnic groups, with changes most frequently reported for the cheeks and side of face. Color changes were not as widespread across region or racial/ethnic group as were warmth changes, especially for Blacks. Again, the cheeks and side of face were most frequently reported to be regions where color change occurs.

There were no significant racial/ethnic group differences in estimates of latency or duration of the typical blush. The vast majority (94%) of individuals indicated it took either 1 to 4 seconds or 5 to 10 seconds for their blush to occur. Almost 50% indicated that their typical blush lasts 1 to 25 seconds, while 28% reported that a blush typically lasts from 30 seconds to less than one minute.

In regard to the physical symptoms/reactions that accompany blushing, between 6% and 32% of respondents in each of the four racial/ethnic groups reported that a change in muscle tension and gastrointestinal reactions (e.g., upset stomach or "butterflies") are typical accompaniments. Reports of an "increase in heart rate" were noted by nearly equal proportions of each group (45% of Asians, 44% of Blacks, 50% of Hispanics, and 51% of Whites). The only significant racial/ethnic differences occurred in response to a "change in breathing pattern," $\chi^2(3, N = 268) = 14.52, p < .01$, and to "sweat," $\chi^2(3, N = 268) = 8.40, p < .05$. In both cases, the differences were attributable to the responses of Asians, with 27% indicating a breathing change (compared to 12% of Whites, 4% of Blacks, and no Hispanics indicating this) and 50% indicating sweating as a symptom (compared to 36% of Whites, 28% of Hispanics, and 20% of Blacks indicating this).

The social context of blushing. In response to the question asking for a description of a recent episode of blushing, the majority of respondents in each group recalled an incident which had occurred within the past week up to sometime within the past month, an incident which involved the respondent with a group (i.e., any size of more than one but less than "large," as in a classroom of people), and an incident which could best be described as a "typical" case of blushing versus an incident involving an "atypical" situation (e.g., the individual blushed in a situation in which he or she usually doesn't) or involving a "difference in situation awareness" (i.e., the individual reported being more aware of his or her blush than usual).

The majority of respondents reported that they first remember blushing from 6 to 9 or from 10 to 12 years of age, with Asians, Hispanics, and Whites most frequently placing their first recollection between 6 and 9

years of age, and most Blacks between 10 and 12 years. Although not significant, this difference suggests the important role that others' reactions play in developing an awareness of one's own blush, or even the occurrence of blushing itself. The significance of others in drawing attention to one's own blush is further suggested by responses to the question asking whether respondents had ever not felt a blush even though it was visible to others. Approximately 60% or more of Asians, Blacks, and Whites responded in the affirmative while almost 42% of Hispanics did so.

The question regarding attempts to stop a blush once it had started yielded group differences. Compared to 23% of Blacks, 10% to almost 40% more Asians, Hispanics, and Whites reported that they have tried to stop blushing once it has started, $\chi^2(3, N = 271) = 15.91, p = .001$. Further, those who have tried to stop blushing generally indicated they did not know how well these strategies worked.

In regards to the question asking what others do or say when respondents blush, the most frequently chosen alternative was "they tease and try to get me to blush more." Although not significantly different, Asian, Hispanic, and White respondents more often responded in this way than did Black respondents.

When respondents were asked how others know that they are blushing, lighter complexioned respondents frequently chose the alternative that has to do with the visibility of the blush: 46% of Asians, 63% of Hispanics, and 72% of Whites indicated it is a "change in my skin color." In contrast, only 22% of Blacks chose this response. Darker complexioned respondents chose an alternative that did not involve visibility: 59% of Blacks indicated "I act embarrassed." In comparison, 46% of Asians, 31% of Hispanics, and 25% of Whites picked this alternative. Most other respondents indicated that others "don't know [I'm blushing] unless I tell them." A chi-square analysis on these three categories proved to be significant, $\chi^2(6, N = 277) = 33.88, p < .001$.

The vast majority of respondents reported that others "sometimes," "often," or "always" comment on their blush. In regards to *what* others comment on, 43% of Blacks noted that it is "something about my appearance other than a change in my skin's appearance," versus the majority of Asians, Hispanics, and Whites (67%, 77%, and 82% respectively), who noted that others comment on a "change in face color, appearance of red face." Thirty percent of Blacks also indicated that "no one ever notices (my blushing), so this question isn't applicable to me," while only 6% to 18% of the other groups responded this way. A chi-square performed on these three items revealed significant racial/ethnic group differences, $\chi^2(6, N = 251) = 56.56, p < .001$.

No significant racial/ethnic group differences emerged on the "concealment" item. The most frequent strategy used by all participants to conceal a blush was "try not to act embarrassed," with 42% of Asians, 46% of Blacks, 50% of Hispanics, and 49% of Whites noting this.

DISCUSSION

The results of the present study support our predictions regarding blushing and its relationship to complexion color. Race, ethnicity, and complexion color are most strongly associated with those aspects of individuals' blushing experiences where the visibility of the blush is directly implicated. Lighter complexioned individuals were more likely than darker complexioned individuals to report visible color change as a part of their blushing experience. Likewise, lighter complexioned individuals were more likely than darker complexioned respondents to indicate that changes in visible skin color influenced others' reactions to their blush. In contrast, experiences which do not directly implicate visibility such as the ease, frequency, latency, and duration of blushing showed no differences. Gender had no major effect in individuals' experiences of blushing. As predicted, no major sex differences were revealed.

Several of the patterns observed in the present study are similar to patterns observed in other investigations of blushing, providing some evidence for the construct validity of the present measure. In regard to the location and symptoms of blushing, Leary and Meadows (1991) reported that warmth and color change on the cheeks were the two most frequently reported accompaniments of blushing. These were also frequently mentioned by our subjects as part of their typical experience of blushing. Leary et al. (1992) suggest that the region of the blush is generally confined to the face, ears, neck, and upper chest and that blushing is accompanied by increased activity in the sympathetic nervous system. Both of these trends were observed in the present research.

In regard to the social context of blushing, Edelman (1990b) reported that the first remembrance of blushing in chronic blushers was in early adolescence, and our results are certainly consistent with this. Some evidence for reliability was also found. In another blushing study, using 134 White college undergraduates (Simon & Shields, 1991), several of the present results for White individuals were replicated. The reported ease, frequency, location, and symptoms of the typical blush for this latter sample were much like the reports provided by White subjects in the present sample.

Women's and men's reports about blushing were highly similar to one another. The only differences to emerge were four minor, rather inconsequential sex differences within the Asian and Hispanic groups.

Lack of sex differences is in line with predictions and past blushing research. Virtual absence of gender differences in emotion are always noteworthy because retrospective self-reports of emotional experience frequently yield patterns consistent with gender stereotypes (Shields, 1991).

Blushing is not generally experienced as a pleasurable or desirable event (Shields et al., 1990). Although people recognize that there are situations in which it can be desirable to blush, a large number also readily note the many situations in which it is undesirable to blush (Simon & Shields, 1991). Many individuals note that they feel more negative about themselves after blushing than they had before the blush occurred (Simon & Shields, 1991). The results of the present study suggest that it is not the sensation of blushing per se, but the reactions of others that people find most unpleasant about the experience. Other emotional expressions do not seem to elicit explicit attention from observers with such regularity. Unlike most other emotional expressions, people do not deliberately attempt to manifest the expression. When the blush appears, people may use strategies for limiting it or hiding it, but they are not confident that their efforts are successful.

Our major goal was to investigate the general influence of complexion color on blushing. To meet this goal in a fairly timely and efficient manner, we purposely operationalized complexion color in a very "rough" way. We realize that some individuals we categorized as White (e.g., Arabic individuals) tend to have darker complexions than other individuals categorized as White (e.g., Irish individuals). We also understand that some individuals we described as "lighter complexioned" (e.g., dark complexioned Hispanics) may actually be darker than some individuals described as "darker complexioned" (e.g., light complexioned Blacks). Future investigations in which access to a diverse population is not problematic should focus on specific complexion differences both within and between racial/ethnic groups.

This research has provided much descriptive information on the relationship between ethnicity, complexion color, and blushing. This information would be richer if similar research using more objective measures of blushing phenomena were conducted. A logical next step for emotion researchers is to evaluate the current findings using physiological measures and observational behavioral measures of blushing versus subjective-based self-report measures.

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