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Eye color and the pupillary attributions of college students to happy and angry faces

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As a means of clarifying certain of Hess' (1975) unsubstantiated conclusions concerning the role of pupil size in nonverbal communication, the relationship between eye color and the pupillary attributions of college students to Hess' happy-angry face task was measured. The results supported Hess' claim that eye color is related to sensitivity to pupillary cues but were incongruent with his notion that blue-eyed people are especially sensitive due to some selective evolutionary process.

Recently, Hess (1975) claimed that blue-eyed people are more sensitive to pupil-size cues than are brown-eyed people. In part, this claim was based on his assertion that blue-eyed subjects were more likely to give positive attributions to a retouched photo of a face with large pupils and were more likely to give negative attributions to a retouched photo of the same face with small pupils than were brown-eyed subjects. Further, he reported a set of means that suggested that, compared with brown-eyed subjects, blue-eyed subjects tended to draw in larger pupils on a line drawing of a happy face and smaller pupils on a sketch of an angry face. Hess (1975) concluded that "perhaps it is not unwarranted to assume that the response [to pupillary cues] has been favored by evolutionary selection more in blue-eyed people than in brown-eyed people" (p. 119). Aside from the aforementioned means, which were presented in the form of a bar graph, Hess offered no other evidence for this conclusion. That is, he did not bother to report any statistical evaluation of the differences between these means, nor did he provide the sample sizes and the standard deviations that would have permitted others to do so. Perhaps it is this lack of concern for relevant detail on Hess' part that led Janisse (1977) to conclude, "it is difficult to seriously entertain the notion that the pupil plays a major role in nonverbal communication, for no convincing research has shown the proposed phenomenon to be veridical" (p. 170). Janisses's point is well taken, and perhaps even charitable, for Hess' apparent disdain for statistical evaluation of his data invites the speculation that possibly the obvious statistical tests were computed but were not reported because these results proved to be not significant. While we prefer a more sanguine interpretation of Hess' approach to reporting his data, the fact remains that the relationship between iride color and sensitivity to pupil-size cues that Hess suggested has, as yet, not been measured and this is the purpose of the present research.

METHOD

During their regular class periods, groups of undergraduate students were asked to draw in the pupils on the blank irides (diam = 5 mm) of exact copies of Hess' happy and angry faces (see Hess, 1975, p. 117). When this task was completed, the students were asked to write in their eye colors on the faces test form. From these responses, groups of brown-, blue-, and hazel-eyed subjects were selected. The total sample size was 180, and the number in each eye-color group is given in Table 1. The responses of these 180 subjects were measured with a metric ruler at the point of maximum horizontal diameter for each pupil. These measurements, which were made by individuals who were naive to the hypothesis, provided a happy- and angry-face pupil score for each subject.

RESULTS AND DISCUSSION

The happy- and angry-face means and standard deviations for the three eye-color groups are listed in Table 1. To analyze these data, first, a 3 by 2 factorial ANOVA with repeated measures in one factor (faces) was computed. The results of this analysis showed that both the face-type main effect and the interaction between eye color and face type were significant [$F(1,177) = 27.75$, $p < .001$, and $F(2,177) = 4.31$, $p < .05$, respectively]. The eye-color main effect was not significant [$F(2,177) = .053$], but this result only indicates that the combined happy- and angry-face means did not differ between the three eye-color groups.

Table 1
Mean Pupillary Attributions (in Millimeters) and Standard Deviations to the Happy and Angry Faces by the Various Eye-Color Groups

Eye Color	N	Face Type: Happy Mean	Happy SD	Angry Mean	Angry SD	Sensitivity Score Mean	Sensitivity Score SD
Brown	103	2.52	1.01	2.25	1.10	.27	1.13
Blue	52	2.69	.75	2.08	.75	.61	1.10
Hazel	25	2.84	.81	1.83	.65	1.01	1.07

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However, the significant Eye Color by Face Type interaction suggests that the eye-color groups were differentially sensitive to the happy and angry faces. We attempted to elaborate this finding in two ways. First, we tested the significance of the mean difference between the happy and angry faces for the brown-, blue-, and hazel-eyed groups and found that each difference was significant ($t = 2.39$, $p < .05$; $t = 6.49$, $p < .001$; and $t = 4.63$, $p < .001$, respectively). That is, all the eye groups gave pupillary attributions that reliably and appropriately, according to Hess' (1975) hypothesis, discriminated between the happy and angry faces. Next, to measure the relative sensitivity of each eye-color group to the two faces, we computed a sensitivity score for each subject by subtracting the angry-face score from the happy-face score. These data are summarized in Table 1. A one-way ANOVA was computed to analyze these sensitivity scores, and the result was significant [$F(2,177) = 4.98$, $p < .01$]. That is, as Hess had suggested, eye color is a factor in an individual's sensitivity to pupillary cues. As a means of further elaborating this result, separate ts were computed between the sensitivity score means of the eye-color groups. While the differences between the brown-blue and blue-hazel means approached significance ($t = 1.79$ and $t = 1.54$, respectively), only the brown-hazel difference was significant ($t = 3.08$, $p < .01$). These results seem to be incongruent with Hess' conclusion that blue-eyed people have had some selective evolutionary advantage with respect to sensitivity to pupillary cues. While our data suggest that hazel-eyed people seem to be more sensitive to pupillary cues, we feel that it would strain credibility to attempt to explain these differences in terms of a selective evolutionary process as Hess did. In fact, any explanation of the processes that might have led to the differential sensitivity of brown-, blue-, and hazel-eyed people to pupillary cues seems premature. For, as Janisse (1977) has correctly pointed out, it remains to be demonstrated that results such as these are veridical. Thus, subsequent research should focus on determining whether the apparent sensitivity advantages enjoyed by hazel- and perhaps blue-eyed individuals translate to more effective interpersonal skills.

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