Do We Dream in Color? Cultural Variations and Skepticism

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In the United States, the rise and fall of the opinion that we dream in black and white coincided with the rise and fall of black and white film media over the course of the 20th century, suggesting that our opinions about the coloration of our dreams are subject to cultural influences. This study generalizes that conclusion cross-culturally. Three groups of Chinese respondents, similar in age but differing in history of colored media exposure, were given questionnaires replicating those of Middleton (1942) and Schwitzgebel (2003). As expected, the groups with longer histories of colored media exposure reported more colored dreaming.

KEY WORDS: dreams, color, black and white, methodology, cross-cultural

You probably think you dream in color. If our anecdotal impressions and previous research are trustworthy, most contemporary English speakers do (Schwitzgebel, 2003). Apparently, so did Aristotle (in Gallop, 1996), Descartes (1649/1985), Freud (1900/1931), and everyone else we've been able to find who wrote on the topic prior to the 20th century. In the middle of the 20th century, however, research psychologists and the general public in the United States thought they dreamed primarily in black and white (e.g., Middleton, 1942; Hall, 1951; de Martino, 1953; see Schwitzgebel, 2002 for a review).

We think it highly unlikely that people's dreams actually changed from colored to black and white and back again. For one thing, the rate of color term use in mid-century dream reports appears to be virtually identical to the rate of color term use in late-century dream reports (see Schwitzgebel, 2002, note 4, for details). For another, there is no plausible cause of such a change in the nature of our dream

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lives over the period in question. Even though black and white film media may have had some marginal effect on the content of dreams in the 1940s and 1950s, we find it untenable to suppose that the media by themselves could cause a radical alteration in our daily dreams about the people and places we see in color every day.

Consequently, at least one group must have been quite seriously mistaken about the nature of their dreams. Could it be us? This question has significance not only for our understanding of our dream lives but also for the light it shines on the trustworthiness of our reports about basic features of our conscious experience—a topic of considerable interest in the burgeoning field of consciousness studies (see, e.g., Jack and Roepstorff, Eds., 2003, 2004).

In exploring this question, we felt it would be helpful to examine more precisely the role of media exposure in reports of colored dreaming. The timing of the rise and decline of the view that dreams are black and white, and the ready analogy between dreams and movies, invite the conjecture that even if the media did not change our actual dreams, they were nonetheless a principal cause of our change in *opinion* about our dreams. The present study, then, was aimed at determining whether the apparent relationship between media exposure and reports of colored dreaming in the United States holds cross-culturally. In Mainland China, the population of different subgroups has had over the past 10 years very different rates of exposure to black and white and colored film media, allowing for cross-group comparisons. We were also interested in exploring what aspects of media exposure were best related to variations in dream report: childhood versus present exposure, frequency of exposure, and the relative importance of the absence of colored media versus the presence of black and white media.

METHOD

The respondents chosen for this study were all students in their first year of university or their last year of high school, almost exclusively 15–20 years of age. The first group (the "technologically advanced" group) was drawn from the University of Science and Technology in China (USTC) in Hefei, a city of approximately one million residents in the central part of Eastern China. USTC is one of the leading universities in China and attracts mostly urban students of comparatively high socioeconomic status. The second group (the "intermediate" group) was drawn from Anhui University, also located in Hefei, but attracting largely students from the rural areas of Anhui province. The third group (the "least technologically advanced") was drawn from high school students in the rural Anhui town of Tongcheng, population approximately 50,000. We also examined data from college students in Southern California (collected in 2001, reported in Schwitzgebel, 2003) and historical data from sophomores at DePauw University in Indiana around 1940 (reported in Middleton, 1942).

The primary version (Version 1) of the questionnaire was completed by 92 students (46 male) in the technologically advanced group, 64 (32 male) in the intermediate group, and 144 (60 male) in the least technologically advanced group. The questionnaire began with questions about sex, age, and years in school, then proceeded to the three questions asked by Middleton in 1942 (and replicated in Schwitzgebel, 2003):

1. How frequently do you dream?

2. Do you see colors in your dreams?

3. Some people say that when they listen to music or hear people talking they simultaneously sense particular colors—for example, someone might have a sensation of green as they listen to a particular piece of music. Do you experience colored hearing?

Very frequently, *frequently*, *occasionally*, *rarely*, and *never* were the response options for all three questions.

Five questions were added to the end of the questionnaire that did not appear in the Middleton (1942) or Schwitzgebel (2003) questionnaires:

4. Was the majority of your childhood spent in an urban area or in a rural area? (response options: *urban*, *rural*)

5. At what age did you first have frequent access (at least once per month) to black and white media (TV or movies)? (Response options: *0–3 years old*, *4–6 years old*, *7–10 years old*, *11–14 years old*, *15 years old or older*, *never*)

6. At what age did you first have frequent access (at least once per month) to colored media (TV or movies)? (Response options: *0–3 years old*, *4–6 years old*, *7–10 years old*, *11–14 years old*, *15 years old or older*, *never*)

7. How many hours per week do you watch TV or movies? (Response options: *0–1 hours*, *2–5 hours*, *5–10 hours*, *11 hours or more*)

8. What percentage of the TV and movies you watch is in black and white (as opposed to color)? (Response options: *0–20%*, *21–40%*, *41–60%*, *61–80%*, *81–100%*).

For purposes of comparison, we assumed that 100% of the respondents in Middleton (1942) would have answered *never* to Question 6 and that 100% of the respondents in Schwitzgebel (2003) would have responded *0–3 years old*.

An alternative form of the questionnaire (Version 2) was given to 96 additional students in the technologically advanced group, 133 students in the intermediate group, and 150 students in the least technologically advanced group. Version 2 differed from Version 1 only in the crucial second question:

2. Do you dream in color or black and white? (Response options: *color*, *black and white*, *both*, *neither*, *don't know*).

This question replicates the second question in Version 2 of Schwitzgebel (2003).

RESULTS

The data were treated as ranked and nonparametric. An alpha level of .05 was used for the principal statistical tests, and an alpha level of .01 was used for the

remaining tests (as a correction for multiple comparisons). All Mann–Whitney tests were adjusted for ties, which were numerous. The results for Version 1, Question 2 are given in Table 1, along with the corresponding data from Middleton (1942) and Schwitzgebel (2003). All percentages exclude nonrespondents, which were always fewer than 10%.

Group Comparisons

As expected, the percentage of respondents reporting an urban background varied significantly between the three groups (62.0%, 34.9%, and 2.1%, respectively), as did the percentage of respondents reporting either no frequent exposure to colored media or their first frequent exposure to colored media coming at age 11 or older (23.9%, 53.1%, and 81.0%, respectively) and the percentage of respondents reporting some regular media exposure (either color or black and white) by age 4–6 (82.6%, 62.5%, and 39.2%, respectively) (χ^2, all tests $p < .001$). All groups reported less current exposure to black and white than to colored TV and movies, though in the least technologically advanced group, a substantial minority (47.2%) reported that 41% or more of their current media exposure was black and white. Only one respondent, in the least technologically advanced group, reported no regular media exposure at all.

Respondents in the groups with the longest exposure to colored TV and movies tended to report the most colored dreaming, confirming the principal hypothesis of this study. The median of *frequently* for the colored dreaming question in Schwitzgebel (2003) was significantly higher than the median of *occasionally* for the corresponding question in the technologically advanced group, which was in turn significantly higher than the median of *rarely* in the remaining groups (Mann–Whitney, one-tailed, all tests $p \leq .01$). Correspondingly, there was a high and significant correlation between the percentage in each group who described themselves as dreaming in color at least occasionally and the percentage who were first regularly exposed to colored TV and movies before the age of 11 ($r = .93$, $p = .02$; see Table 2).

The results for the colored dreaming question in Version 2 are given in Table 3, along with the corresponding results from Schwitzgebel (2003). The differences are sizable, generally in the predicted directions, and highly significant ($p < .001$ for the χ^2s on percentage reporting *color* and separately on the percentage reporting *black and white*), thus further supporting the main hypothesis. Because we were surprised by the higher rate of *color* response in the intermediate than the tech-

Table 1. Version 1, Question 2: Do You See Colors in Your Dreams?

	Very frequently (%)	Frequently (%)	Occasionally (%)	Rarely (%)	Never (%)
Schwitzgebel (2003)	28.7	27.8	24.4	14.3	4.7
Technologically advanced	6.5	18.5	27.2	33.7	14.1
Intermediate	1.6	8.1	29.0	35.5	25.8
Least advanced	0.0	5.6	23.1	45.5	25.9
Middleton (1942)	3.3	7.0	19.0	30.8	39.9

Table 2. Group Correlation: Reported Color Dreaming and Media Exposure

	Percentage reporting colors at least occasionally	Percentage reporting access to colored media before age 11
Schwitzgebel (2003)	80.9	100 (inferred)
Technologically advanced	52.2	76.1
Intermediate	38.7	46.9
Least advanced	28.7	19.0
Middleton (1942)	29.3	0.0 (inferred)

nologically advanced group, we ran a separate χ^2 comparing just the proportion reporting colored dreaming in those two groups. The difference was within the range of sampling error ($p = .13$).

Responses to Question 3, the colored-hearing question, were roughly similar to the responses to the analogous questions in Middleton (1942) and Schwitzgebel (2003) (median *rarely*), except in the technologically advanced group, which reported considerably more colored hearing (median *occasionally*; Mann–Whitney, two-tailed, $p < .001$).

Other Relationships

Reports of colored dreaming on Question 2 did not vary detectably by gender, by age of first regular exposure to black and white TV and film (Question 5), by reported amount of current exposure to TV or movies (Question 7), or by reported current ratio of black and white to colored TV and movies (Question 8).

Respondents with a principally urban childhood (Question 4) reported significantly more colored dreaming (median *occasionally*) than respondents raised in rural areas (median *rarely*) (Mann–Whitney, one-tailed, $p < .0001$), and age of first regular exposure to colored TV and movies (Question 6) was negatively correlated with report of colors in dreams (Spearman's rank correlation = .26, $p < .001$). However, both relationships may be principally group effects since within the three cultural subgroups the relationships were weaker and not statistically detectable.

DISCUSSION

As indicated in the introduction, we do not take our questionnaire to reveal genuine variation in the rates of colored dreaming between individuals or groups.

Table 3. Version 2, Question 2: Do You Dream in Color or Black and White?

	Color (%)	Black and white (%)	Both (%)	Neither (%)	Don't know (%)
Schwitzgebel (2003)	62.1	0.0	22.7	0.0	15.2
Technologically advanced	33.7	9.5	25.3	13.7	17.9
Intermediate	43.6	9.8	24.8	0.0	21.8
Least advanced	9.4	22.1	42.3	4.7	21.5

However, we do think our results support the hypothesis that *opinions* about color in dreams vary between groups and that this variation is related to group exposure to colored film media. We cannot entirely rule out the possibility that some other cultural factor is at play, of course, but no plausible alternative explanation comes readily to mind. It does not appear to us that there is any substantial variation between the Chinese groups in their nonmedia exposure to color or their general cultural attitudes toward color: The population of rural Tongcheng, for example, seems to dress every bit as colorfully as the population of urban Hefei.

Two aspects of the data strike us as somewhat problematic. First, we were puzzled that in the intermediate group 68.4% would report dreaming either in color or both in color and black and white on Version 2 of the questionnaire, while on Version 1, given simultaneously to other students in the same classroom, 61.3% would say they *rarely* or *never* saw colors in their dreams. This apparent conflict raises the possibility that some respondents interpreted our question about "seeing colors" in dreams as implying an experience other that than of having normally colored dream imagery. Though in piloting very few subjects reported such confusion, it was partly in response to this concern that we distributed Version 2 of the questionnaire. Since the reports of colored and black and white dreaming on Version 2 show a shift similar to that on Version 1, we feel that overall our principal hypothesis is still supported.

Another concern arises from the fact that more than half of the technologically advanced group reported at least *occasionally* experiencing colored hearing. Since it seems unlikely to us that a majority of this group are true synaesthetes (though we know of no systematic research on rates or attitudes toward synaesthesia in Chinese culture), it is possible that they misunderstood the question; but that raises the issue of why the other groups didn't misunderstand the question, or misunderstood it less. More problematic for our hypothesis is the possibility that subjects in the technologically advanced group were biased toward the middle of the scale or more apt than others falsely to impute coloration to their experiences. If they did so on the colored hearing question, then it is possible that it is these tendencies, rather than a specific difference in opinion about the coloration in dreams, that underwrite the difference between them and the other Chinese groups in the reported rate of colored dreaming. While we acknowledge that there may be a genuine source of distortion here, we also believe that the size and consistency of the relationship between colored media exposure and reports of colored dreaming, across all five groups, cannot wholly be explained by such factors.

One interesting feature of the data is the strong between-groups relationships coupled with the poor within-group relationships. In our view, this suggests that the phenomenon in question is a *cultural* phenomenon, rather than an individual one. In other words, it appears that whether you think you dream in color or black and white depends not so much on your individual exposure, past or present, to black and white or colored media as on the general views about dreaming current in your subgroup.

While we think it unlikely that many people actually dream in black and white, we do think it is an open question whether our dreams are as thoroughly colored as most contemporary English speakers appear to think. Dreams may be *neither* colored nor black and white, leaving the colors of most of their objects unspecified, as novels do (see Schwitzgebel, 2002). Perhaps it takes time and energy to fill in all

the colors in a richly detailed scene, with the result that most of our dream imagery is fairly sketchy, even if that sketchiness is not recognized by the dreamer. On the other hand, some research suggests that brain areas in the extrastriate visual cortex associated with color perception show elevated activity during REM sleep (Braun et al., 1998; Wehrle et al., 2005). Since daytime reports about the coloration of dreams appear to be illicitly driven by analogy to film media, we do not think they should be relied on to settle this question.

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