

DO PEOPLE STILL REPORT DREAMING IN BLACK AND WHITE? AN ATTEMPT TO REPLICATE A QUESTIONNAIRE FROM 1942¹

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Summary.—In the 1940s and 1950s many people in the United States appear to have thought they dreamed in black and white. For example, Middleton (1942) found that 70.7% of 277 college sophomores reported “rarely” or “never” seeing colors in their dreams. The present study replicated Middleton’s questionnaire and found that a sample of 124 students in 2001 reported a significantly greater rate of colored dreaming than the earlier sample, with only 17.7% saying that they “rarely” or “never” see colors in their dreams. Assuming that dreams themselves have not changed over this time period, it appears that one or the other (or both) groups of respondents must be profoundly mistaken about a basic feature of their dream experiences.

In the 1940s and 1950s, dream researchers commonly thought that dreams were primarily a black-and-white phenomenon (Middleton, 1942; Hall, 1951; de Martino, 1953; Calef, 1954; Knapp, 1956; Tapia, Werboff, & Winokur, 1958; Garma, 1961; for retrospective assessments see Suinn, 1966; Yazmajian, 1968). However, by the 1960s, most researchers reported a high incidence of color in dreams (Kahn, Dement, Fisher, & Barmack, 1962; Berger, 1963; Suinn, 1966; Herman, Roffwarg, & Tauber, 1968; Snyder, 1970; Padgham, 1975). Part of this change in opinion may have been the result of a change in method. Whereas earlier research was conducted primarily by questionnaire and interview during normal waking hours, later research generally involved either awakening subjects during REM sleep and gathering immediate reports (Kahn, *et al.*, 1962; Berger, 1963; Herman, *et al.*, 1968; Snyder, 1970; Roffwarg, Herman, Bowe-Anders, & Tauber, 1978) or asking subjects to record the incidence of color in their dreams after natural awakening (Suinn, 1966; Padgham, 1975; Jankowski, Dee, & Cartwright, 1977; Gackenbach & Schillig, 1983; López, Sánchez, Arriaga, & Saldivar, 1986).

It is possible that this change in professional psychological opinion corresponded to a change in popular opinion about the presence or absence of colors in dreams. Anecdotally, it seems that people now, at least in the United States, tend unreflectively to assume that their dreams are colored but did not a few decades ago. Color movies, television, and photography were replacing black-and-white media in technologically advanced countries

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through the 1950s and 1960s, and people, both in the general public and the scientific psychological community, may have some tendency to assimilate their dreams to the media of their day. Conventional wisdom about dreams may also have been influenced by word of the new research results described above, as filtered through the popular press and psychology textbooks. It is even conceivable (although in my view unlikely) that dreams themselves gained colorization during this period. (For more on the issues discussed in this paragraph, see Schwitzgebel, 2002.)

Regardless of cause, if popular opinion about the presence of colors in dreams has indeed changed, then we should expect questionnaires given during normal waking hours to generate very different results now than they did in the 1940s and 1950s. The evidence on this topic is mixed. In 1993, Stepansky, Holzinger, Schmeiser-Rieder, Saletu, Kunze, and Zeitlhofer (1998) surveyed a representative sample of the Austrian population between the ages of 14 and 69 and still found that only a minority (37% of the 1,000 respondents) claimed to dream in color, while 47% said they did not dream in color and 16% did not answer or said they did not know. In 1999, America On-Line conducted an informal poll which found 56% of approximately 40,000 respondents claimed dreaming in color, 4% claimed dreaming in black and white, 27% claimed dreaming both in color and in black and white, and 13% said that they did not know.

The present study attempted a more careful replication of one of the older studies of the incidence of color in dreams to see if the results differ even when the older methodology is used. The study chosen was Middleton (1942), involving a questionnaire distributed to 277 college sophomores presumably from DePauw University or nearby locations in the United States (they were not described). Although the original questionnaire is no longer available, it contained three target questions: (1) How frequently do you dream? (2) Do you see colors in your dreams? and (3) Do you experience colored hearing? Each question presented choices of "very frequently," "frequently," "occasionally," "rarely," or "never." Middleton stated that he provided "adequate definitions of terms" and "specific instructions as to the kinds of information that were desired," but he does not say what these definitions or instructions were. He also provided space for voluntary comments on the questions. A summary of his quantitative results is presented in Table 1 below.

METHOD

Two versions of the questionnaire were administered to separate groups of students. The primary form of the questionnaire (Version 1) was given to 124 students (80 women, 44 men) attending introductory psychology and mathematics courses at colleges in southern California. Respondents first an-

swered questions about their sex, age, and years in college, then proceeded to three questions: (1) How frequently do you dream? (2) Do you see colors in your dreams? and (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?

The initial sentence in the third question was added to approximate the definition of colored hearing that Middleton was likely to have given, based on his description of the phenomenon in the introduction to his 1942 paper. No other definitions were given. In piloting, respondents did not request clarification of other terms, and Middleton presented none in his article. As in Middleton, respondents were given the choice of "very frequently," "frequently," "occasionally," "rarely," and "never," and they were invited to comment on the questions and describe relevant experiences in spaces provided below the questions.

An alternate form of the questionnaire (Version 2) was given to 67 students (43 women, 24 men) in a different introductory psychology course on the same day. The three nondemographic questions were (1) When you wake up in the morning, how often do you remember having had a dream? (2) Do you dream in color or black and white? and (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. For these people, it is not merely a matter of being *reminded* of the color; they actually have a sensory experience of it. Do you experience colored hearing of this sort?

The response options were the same, except for the second question, which presented the options of "color," "black and white," "both," "neither," or "don't know."

RESULTS AND DISCUSSION

The data were treated as ranked and nonparametric, and an alpha level of .05 was used for all statistical tests. All Mann-Whitney tests were adjusted for ties, which were numerous. Results for all questions except the color dreaming question in Version 2 (which did not have the same response options as the other five questions), are given in Table 1.

The results do not total to 100% in the fifth and sixth columns of the table because some students did not respond to these questions. No significant relationships were found between sex or age and any of the target questions, using Mann-Whitney and Spearman rank correlation tests.

As expected, the median of "frequently" for the color dream question in Version 1 differed significantly from the median of "rarely" for the hearing question in Version 1 (Mann-Whitney, one-tailed $p < .0001$), implying

TABLE 1
PERCENT RESPONDING TO THREE QUESTIONS IN TWO STUDIES

	Scale				
	Very Frequently	Frequently	Occasionally	Rarely	Never
From Middleton, 1942 ($N = 277$)					
How frequently do you dream?	13.4	24.9	41.5	19.9	0.3*
Do you see colors in your dreams?	3.3	7.0	19.0	30.8	39.9
Do you experience colored hearing?	4.9	6.8	20.6	17.4	50.6
Current Study, Version 1 ($N = 124$)					
How frequently do you dream?	27.4	33.9	25.0	13.3	0.4†
Do you see colors in your dreams?	26.6	25.8	22.6	13.3	4.4†
Do you experience colored hearing?	4.8	4.0	33.9	21.4	32.7†
Current Study, Version 2 ($N = 67$)					
How often do you remember having had a dream?	6.0	30.0	41.8	19.4	3.0
Do you experience colored hearing?	3.0	9.1	13.6	22.4	52.3

*Middleton actually reports 0.03% for this cell, but that is very likely a typographical error.

†One respondent drew a large circle encompassing both "rarely" and "never" and was treated as giving an intermediate response.

that subjects reported they saw colors in their dreams more often than they experienced colored hearing. Similar analysis of Middleton's data did not yield a significant difference ($p = .12$; medians "rarely" and "never," respectively) despite his having more than twice as many respondents.

The primary hypothesis of this study was strongly supported. On Version 1 of the questionnaire, the median of "frequently" for the color-dreaming question differed significantly from the median of "rarely" for the color-dreaming question of Middleton's questionnaire (Mann-Whitney, one-tailed $p < .0001$). The undergraduates in the present study reported much more colored dreaming than Middleton's undergraduates in 1942. On Version 2 of the questionnaire, 62.1% of the subjects reported dreaming in color, no subjects reported dreaming in black and white, 22.7% reported dreaming both in color and in black and white, none responded "neither," and 15.2% said they did not know. These results closely match the America On-Line results and differ greatly from the Stepansky, *et al.* results (1998), although since the response options were not the same, statistical analysis may not be appropriate. Demographic differences may partly explain the match between the results of the present survey and the America On-Line results, and the divergence from the Stepansky, *et al.* results, since the respondents in the present study were probably more similar demographically to 1999 America On-Line survey respondents than to the 14- to 69-yr.-old Austrians in 1993 who responded to the Stepansky, *et al.* survey.

The present findings suggest that at least among samples of college students in the United States there has been a pronounced increase since 1942 in the tendency to report color in dreams. If it is plausible to suppose that dreams themselves have not changed from black and white to color in this interval, we may conclude that one or another (or both) groups of respondents were profoundly mistaken about a basic feature of their dream experiences.

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