

The recording of one's dreams in children, adolescents, and adults: The UK library study

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Summary. Dream recording as a practice has been reported since the early days of empirical dream research. Online surveys have indicated that 17% to 24% of the participants have recorded their dreams at some point in their lives. The main factors associated with dream recording were dream recall frequency, gender, openness to experience, and low conscientiousness. The present study included 4849 participants (6 to 90 yrs. old) completing a dream questionnaire distributed via libraries throughout the UK. Overall, 14.77% of the sample reported that they had recorded dreams, with comparable figures in children, adolescents, and adults. The main factor associated with recording dreams was keeping a diary to record daytime events. Moreover, dream recall frequency, nightmare frequency, gender, and affinity to books (reading for fun, visiting the library) increased the likelihood of recording dreams. We were also able to replicate the finding that persons who record their dreams showed higher openness to experience and lower conscientiousness scores. It would be very interesting to study the motives for dream recording and its long-term effects, e.g., possible benefits regarding creative endeavors or coping with personal issues.

Keywords: Dream recording, keeping a diary, dream recall frequency, openness to experience, conscientiousness

1. Introduction

Many early dream researchers based their qualitative and quantitative analyses on their own dream experiences, i.e., recorded their dreams, sometimes over years (Calkins, 1893; Gießler, 1888; Hacker, 1911; Köhler, 1912; Saint-Denys, 1982; Van Eeden, 1913; Weed & Hallam, 1896; Weygandt, 1893). A well-known example is the guillotine dream of Alfred Maury (1861): just as the guillotine blade touched his neck, he woke up because a part of his four-poster bed had fallen on his neck. At that time he wrongly concluded that dreams are generated in seconds during the awakening process and not during sleep (Schredl, 2018b). Sigmund Freud (Freud, 1900/1991) and Carl Gustav Jung (Jung & Jaffé, 1963) also recorded their dreams and they published some of their dreams as examples to support their dream theories. Well-known writers and scholars like Arthur Schnitzler (Schnitzler, 2012), Emanuel Swedenborg (Swedenborg, 1989), Jack Kerouac (Kerouac, 1961), or Friedrich Hebbel (Engel, 2006) also kept dream diaries. In modern dream research, long dream series recorded by individuals provide, too, a valuable database to study changes in dream content over time (Bulkeley, 2018; Domhoff & Schneider, 2020; Marrou & Arnulf, 2018; Paquette, 2018), e.g., the frequency of former partner dreams years after separation (Schredl, 2018a). Despite these efforts, relatively little is known about the number of persons who record dreams and what factors are associated with this behavior.

Three online dream studies (Scapin et al., 2018; Schredl et al., 2014; Settineri et al., 2019) found that 17% to 24% of the participants had at some point recorded their dreams, with 2% to 5% doing it regularly (once a week or more often). As these samples include individuals who are interested in dreams and recall their dreams quite often and were thus more likely to participate in these studies than persons who are less interested in dreams, the percentages of persons recording their dreams in representative samples might be lower. In a sample of 1405 patients with sleep-related breathing disorders who filled in a questionnaire as a part of the diagnostic routines (about 95% completed the questionnaire, i.e., a sample not selected for specific interest in dreams), only 4% of the participants stated that they recorded their dreams (Schredl & Schmitt, 2019). That is, in a sample not selected for interest in dream, the figure for dream recording is much lower compared to the 17% to 24% in samples with participants that are interested in dreams.

The main factor associated with dream recording was dream recall frequency (Scapin et al., 2018; Schredl et al., 2014; Schredl & Schmitt, 2019; Settineri et al., 2019); this makes sense as it was not possible to record any dreams if no dreams were recalled. Moreover, women tended to record their dreams more often than men (Scapin et al., 2018; Schredl et al., 2014); this seems plausible as women were also more likely to keep diaries in which they enter daytime happenings (Burt, 1994; Thompson, 1982). However, no study has evaluated whether or not keeping a diary is associated with recording dreams. It was also found that nightmare frequency was associated with the recording of dreams (Schredl & Göriz, 2019), a finding which makes sense since writing down a nightmare might be chosen as a coping strategy for dealing with nightmares (Schredl & Göriz, 2014).

Thus far, only one study has studied the personality correlates of recording dreams and found that neuroticism, openness to experiences, and low conscientiousness were associated with the frequency of recording dreams

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(Schredl & Göritz, 2019). The association with neuroticism seems plausible as working with dreams in a therapeutic context can help in dealing with personal problems (Pesant & Zadra, 2004). Unfortunately, empirical data on the beneficial effects of keeping a dream diary and working with the recorded dreams outside psychotherapy is still lacking. The association with openness to experience is also easy to understand as persons who are interested in a lot of things (Shirae, 2017) are also interested in learning more about themselves by taking a closer look at their dream life by recording dreams.

Several authors (Garfield, 1973; Nelson, 1888) pointed out that recording dreams directly upon awakening is an arduous task and, thus, one would imagine that self-discipline, which is a facet of conscientiousness, would help. However, the negative association between conscientiousness and the frequency of recording dreams indicates that other aspects of conscientiousness are of importance, e.g., achievement striving (Costa et al., 1991): it could be that conscientious persons are more likely to focus on their career than recording dreams in the morning. To summarize, recording dreams does occur in the general population and is related to factors like dream recall frequency, gender, openness to experience, neuroticism, and low conscientiousness. However, several questions have not yet been addressed, e.g., how often do children and adolescents record their dreams, or is diary-keeping related to the recording of dreams. The basic idea is that recording dreams is an indicator that the person takes dreams seriously and is willing to put in the work necessary to record them.

The present study is based on 4849 children, adolescents, and adults who participated in the UK Library study (Schredl et al., 2016a; Schredl, Struck, et al., 2019). The first aim was to obtain figures as to how many participants (also children and adolescents) record their dreams and whether recording dreams was associated with keeping a diary for entering daytime events (a positive association was expected). Next, we aimed at replicating previous findings regarding the factors associated with dream recording like dream recall frequency, nightmare frequency, gender, openness to experience, neuroticism, and low conscientiousness. In an exploratory manner, we studied possible relationships between keeping a dream diary and time spent with reading and the frequency of library visits. The idea was that bibliophile persons ("bookworms") might also be more interested in recording dreams.

2. Method

2.1. Participants

The sample included 4849 participants (3061 females, 1788 males) with the mean age of 15.88 ± 11.50 yrs. (6 to 90 yrs.). The children's version of the questionnaire (see section below) was completed by 3535 participants, the adult version by 1314 participants. The adult version sample included 911 females and 403 males with a mean age of 26.45 ± 18.06 . The age ranged from 8 years to 90 years, including 145 children (12 yrs. or younger), 609 adolescents (13 to 17 yrs.), and 560 adults. The children version sample included 2150 females and 1385 males with a mean age of 11.95 ± 1.85 yrs. (range: 6 to 18 yrs.). As the two versions of the questionnaire were not explicitly marked, children and

adolescents sometimes completed the adult version, and many adolescents and very few adults (18 yrs. old) completed the children's version. For the present analysis, the total sample (both questionnaire versions) was divided into three age groups: children (6 to 12 yrs.) with a sample size of $N = 2423$ (1470 girls, 953 boys), adolescents (13 to 17 yrs.) with a sample size of $N = 1850$ (1151 females, 699 males), and adults ($N = 576$, 440 women, 136 men) with a mean age of 41.97 ± 17.60 yrs. (18 to 90 yrs.).

2.2. Dream questionnaire

The questionnaire entitled "Dream lab: The big library experiment" was devised in two versions (for adults and for children) by the Library Association (United Kingdom) and Mark Blagrove. The questionnaire covered reading habits, frequency of library visits, and several questions about dreaming. The frequency of library visits was measured via a five-point scale: 4 = 4-7 times per week, 3 = 1-3 times per week, 2 = 1-4 times per month, 1 = 1-11 times per year and 0 = less than 1 time per year, or never. The participants were asked how much time in a week they usually spend reading books for fun. The estimate should be given in hours and minutes. The first question of the dream section covered dream recall frequency and used the above mentioned five-point format: "How often do you wake up and recall a dream?". After presenting a brief definition ("A nightmare is a vivid dream that is frightening or disturbing, and which you can remember clearly and in detail when you wake up") nightmare frequency was measured with a similar five-point scale. Another item elicited journal keeping: "Do you keep a diary or journal in which you record what has happened to you during the day?" (Yes/No). The question "Do you ever write down your dreams?" was also presented within a binary format (Yes/No).

Whereas the above mentioned items were exactly the same in both versions, only the adult version included 40 adjectives based on a study by Saucier (1994) measuring the Big Five personality factors. For neuroticism, the adjectives were: anxious, irritable, moody, jealous, temperamental, envious, relaxed (reversed), and unenvious (reversed). For extraversion, the adjectives were: talkative, bold, energetic, shy (reversed), extroverted, quiet (reversed), bashful (reversed), and timid (reversed). For openness to experience, the adjectives were: creative, imaginative, philosophical, intellectual, complex, deep, uncreative (reversed), and unintellectual (reversed). For agreeableness, the adjectives were: sympathetic, warm, kind, helpful, cold (reversed), unsympathetic (reversed), rude (reversed), and harsh (reversed). For conscientiousness, the adjectives were: organized, efficient, practical, thorough, disorganized (reversed), sloppy (reversed), inefficient (reversed), and careless (reversed). The participants were presented with the following text: "Put a tick next to any of the following words that you, or your friends and family, would use to describe yourself." and the list of adjectives was in alphabetical order. The sum scores for the total sample including several participants with missing age and/or gender ($N = 1369$) showed the following indices of reliability (Cronbach's alpha): neuroticism ($r = .577$), extraversion ($r = .560$), openness to experience ($r = .585$), agreeableness ($r = .470$), and conscientiousness ($r = .693$).

Table 1. Means and standard deviations and percentages for the total sample and for each age group

Category	Children (6 to 12 yrs.) (N = 2423)	Adolescents (13 to 17 yrs.) (N = 1850)	Adults (18 yrs. and older) (N = 576)	Total sample (N = 4849)
Dream(s) recording	14.27% (N = 2403)	14.49% (N = 1836)	17.77% (N = 574)	14.77% (N = 4813)
Diary keeping	27.27% (N = 2409)	26.26% (N = 1839)	22.30% (N = 574)	26.30% (N = 4822)
Dream recall frequency	2.60 ± 1.28 (N = 2381)	2.68 ± 1.14 (N = 1828)	2.36 ± 1.17 (N = 570)	2.60 ± 1.22 (N = 4779)
Nightmare frequency	1.54 ± 1.21 (N = 2411)	1.28 ± 1.11 (N = 1843)	0.97 ± 0.89 (N = 569)	1.37 ± 1.13 (N = 4823)
Reading for fun (hrs./week)	4.55 ± 5.71 (N = 2350)	4.21 ± 5.09 (N = 1719)	7.64 ± 6.14 (N = 540)	4.79 ± 5.64 (N = 4609)
Frequency of library visits	2.48 ± 1.12 (N = 2400)	2.42 ± 1.32 (N = 1826)	2.40 ± 1.07 (N = 564)	2.45 ± 1.20 (N = 4790)

2.3. Procedure

The Allensbach Institute of Demoscopy carried out surveys The dream lab questionnaire in both versions was distributed to libraries all over the United Kingdom in early 2002. The text explicitly stated that one does not have to remember dreams, go to a library, or read regularly to fill in the questionnaire: this was in order to minimize possible selection effects. The completed questionnaire could be returned to the library or sent to the Library Association anonymously. The adult and children versions did differ regarding several questions (see above) and their cover page (a cartoon of a child sleeping in a bed that is on the top of a stack of large books in the children version, whereas the adult version shows different objects and an ECG recording). As there was no specification regarding age on the cover page, adolescents and even children sometimes completed the adult version of the questionnaire and adults the children version.

Logistic regressions were computed using the SAS 9.4 for Windows software package (SAS Institute Inc., Cary, NC, USA). In the basic analysis, age group and gender were entered simultaneously. As the logistic procedure does not provide all comparisons between the age groups, the comparison between adolescents and adults were computed with an additional contrast statement that does not provide a standardized estimate. Gender effects of the "recording dreams" variable within age groups were also analyzed with logistic regressions; these analyses were repeating with adding the "Keeping a diary" variable as a possible confounder. In subsequent analysis, personality and reading/

library-related variables were also entered simultaneously (see Tables in the Results section). Effect sizes (similar to Cohen's *d*) based on chi-square values of the single factors were computed according to Cohen (1988). As missing values occurred, exact sample sizes were given with the descriptive statistics. For the regression analyses, only participants with no missing values were included, i.e., the sample size is typically somewhat reduced.

3. Results

Within the total sample, about 15% reported that they had recorded dreams (see Table 1). The percentage of persons who recorded daytime events was higher (about 26%); this difference was statistically significant (Sign Test: $M = 277$, $p < .0001$, effect size = 0.288). The mean value of dream recall frequency was between 1-3 times per week and 1-4 times per month whereas the nightmare frequency mean was lower, near once a month (= 1-11 times per year, see Table 1). Only 8.10% of the participants stated that they recall dreams less than once per year, or never. On average, the participants read for fun about 5 hours per week and visited their library regularly (between 1-3 times per week and 1-4 times per month on average; see Table 1).

The regression analysis indicated that recording dreams did not differ between the groups whereas, compared with adults, children and adolescents more often stated that they kept a journal for recording daytime events (see Table 2). Females tended to report dream recording (18.38% [N = 3041 females] vs. 8.58% [N = 1772 males]; effect

Table 2. Logistic regression analyses for recording dreams and keeping a diary variables

Variable	Recording dreams			Keeping a diary			
	SE	χ^2	p	SE	χ^2	p	
Age group (Children vs. Adolescents)	.0014	0.0	.9544	-.0196	1.0	.3128	
Age group (Children vs. Adults)	.0261	1.4	.2441	-.0835	17.1	<.0001	
Age group (Adolescents vs. Adults)	---	1.2	.2756	---	11.5	.0007	
Gender (1 = f, 0 = m)	.2302	79.2	<.0001	.3691	281.0	<.0001	
		N = 4813			N = 4822		

SE = Standardized estimates

Table 3. Logistic regression analyses for the recording dreams variable

Variable	Recording dreams			
	SE	χ^2	p	Effect size
Age group (Children vs. Adolescents)	.0109	0.2	.6862	0.013
Age group (Children vs. Adults)	.0898	11.9	.0006	0.104
Age group (Adolescents vs. Adults)	---	9.6	.0020	0.093
Gender (1 = f, 0 = m)	.0910	9.4	.0022	0.092
Keeping a diary	.4542	373.6	<.0001	0.606
Dream recall frequency	.2429	61.9	<.0001	0.238
Nightmare frequency	.0774	8.5	.0035	0.088
Reading for fun (hrs./week)	.1115	24.4	<.0001	0.149
Frequency of library visits	.0826	9.0	.0026	0.090
N = 4438				

SE = Standardized estimates

size = 0.259) and recording of daytime events (34.62% [N = 3047 females] vs. 12.00% [N = 1775 males]; effect size = 0.498) more often than males (see Table 2). The gender difference regarding dream recording was found in children ($d = 0.303$) and adolescents ($d = 0.355$) but not in adults ($d = -0.021$). Accounting for the gender difference in keeping a diary, the gender difference regarding recording dreams became smaller in children ($d = 0.107$) and adolescents ($d = 0.146$) but both differences were still significant.

Adding more variables to the regression (all variables were entered simultaneously), yielded the following picture (see Table 3). The factor most closely related to dream recording was keeping a diary. Only 7.01% of the participants that never kept a diary recorded their dreams, whereas 36.25% of the persons who kept a diary also recorded dreams. The second most important factor was dream recall frequency; the association with nightmare frequency was very small but still significant. Reading and visiting the library were also variables that were independently associated with recording dreams. Children and adolescents were more likely to

record dreams than adults (very small effect), keep in mind that "keeping a diary" which was found less often in adults is now statistically controlled. The gender difference is smaller compared to the regression analysis depicted in Table 2, but still significant.

For the subsample of participants completing the adult version of the questionnaire, the regression analysis (controlled for age, gender, dream recall frequency, and nightmare frequency) indicated that openness to experience was the strongest personality trait related to recording dreams (effect size = 0.330; see Table 4, Analysis 1). Moreover, low conscientiousness was also related to recording dreams (effect size = 0.158). Adding the "keeping a diary" variable to the analysis revealed again that this variable showed the strongest association to dream recording but including this variable did not affect the relationship of dream recording with openness to experience (effect size = 0.283) and conscientiousness (effect size = 0.151; see Table 4, Analysis 2).

Table 4. Logistic regression analyses for recording dreams and keeping a diary variables

Variable	Recording dreams (Analysis 1)			Recording dreams (Analysis 2)		
	SE	χ^2	p	SE	χ^2	p
Age	.1108	5.2	.0220	.1247	6.0	.0140
Gender (1 = f, 0 = m)	.0502	1.0	.3062	-.0405	0.6	.4400
Dream recall frequency	.2975	27.8	<.0001	.3035	25.8	<.0001
Nightmare frequency	.0651	1.9	.1728	.0532	1.1	.2865
Neuroticism	.0238	0.3	.5896	.0200	0.2	.6703
Extraversion	-.0321	0.6	.4578	-.0238	0.3	.6067
Openness to experience	.2673	34.0	<.0001	.2422	25.1	<.0001
Agreeableness	.0925	3.5	.0617	.0793	2.3	.1281
Conscientiousness	-.1286	7.9	.0049	-.1334	7.2	.0075
Keeping a diary				.4176	101.1	<.0001
N = 1282			N = 1277			

SE = Standardized estimates

Table 4. Ordinal regression analyses for nightmare distress (with and without the attitude towards nightmare scale)

Variable	Nightmare distress without beliefs scale			Nightmare distress with beliefs scale		
	SE	χ^2	p	SE	χ^2	p
Age	.0460	3.1	.0780	.0484	3.4	.0651
Gender (1 = f, 0 = m)	.1707	42.7	<.0001	.1647	39.3	<.0001
Education	-.0482	3.7	.0543	-.0116	0.2	.6470
Nightmare frequency	.4592	276.3	<.0001	.4346	245.2	<.0001
Beliefs about nightmares scale				.2776	108.7	<.0001
N = 1613, R ² = .2029			N = 1613, R ² = .2573			

SE = Standardized estimates

4. Discussion

The present findings indicate that dreams were not only recorded by adults – as demonstrated in previous studies (Scapin et al., 2018; Schredl et al., 2014; Settineri et al., 2019) – but also by 14% to 15% of children and adolescents. The main factor associated with recording dreams was keeping a diary to record daytime events. Moreover, dream recall frequency, nightmare frequency, gender, and affinity to books (reading for fun, visiting the library) were associated with a greater likelihood of recording dreams. We were also able to replicate the finding that persons who record their dreams showed higher openness to experience and lower conscientiousness scores.

Several methodological issues regarding the UK library study have to be addressed. First, the sample was self-selected; despite the instruction that the questionnaire can also be filled out if dream recall frequency is very low; the percentage of about 8% of individuals with none or very rare dream recall in the present sample is distinctively lower compared to representative samples (about 30%; Schredl et al., 2014). As dream recall frequency was related to the recording dreams variable, one would expect a lower percentage of individuals who record their dreams in representative samples. However, this bias should have only a minimal effect on the factors associated with dream recording as all the participants completed the same questionnaire and dream recall frequency was controlled for in the regression analyses. Despite this bias toward higher dream recall, it should be mentioned that the large sample of the UK library study offers unique opportunities for analyses (Georgi et al., 2012; Lambrecht et al., 2013; Schredl & Blagrove, 2020; Schredl et al., 2012, 2016a, 2016b; Schredl, Struck, et al., 2019; Stephan et al., 2012) as this sample differs from the samples of psychology students typically used in dream research (Schredl, 2018b). Another methodological issue concerns the relatively simple nature of the items eliciting dream recording (Yes/No) or keeping a diary. It would have been interesting to use a more differentiated scale, e.g., the eight-point frequency scale used in Schredl et al. (2014), because the binary format restricts variance and can therefore reduce the magnitude of correlation and regression coefficients. Another methodological issue is that only writing down dreams was elicited. Even though smart phones with voice recording might not have been that widespread among children and adolescents in 2002, future studies should account for the possibility of voice-recording, or even video-recording. Interestingly, a recent study (Schredl, Dreer, et al., 2019) indicated that voice-recorded

dream reports were much longer (higher mean word count) than written dream reports, indicating that voice-recording might have been perceived as less demanding.

The reliability coefficients of the five personality dimensions ranged from .470 to .693 and, thus, were smaller than the coefficients (range from .74 to .83) reported by Saucier (1994); therefore, the non-significant findings should be viewed with caution as error variance is increased due to low reliability. However, the significant correlation with openness to experience and dream recording should not be affected by this methodological problem. Unfortunately, it is beyond the scope of this study to look deeper into factors that might have reduced internal consistencies in measuring the Big Five personality dimensions.

The percentage of participants that recorded their dreams (14% to 18%) is roughly comparable with the figures of 17% to 24% reported in online studies (Scapin et al., 2018; Schredl et al., 2014; Settineri et al., 2019). The new finding of the study is that children and adolescents also record their dreams; the percentages are comparable to adults. Females recorded their dreams more often than males, although the effect size of this gender difference was smaller compared to gender difference regarding keeping a diary which is a well-documented gender difference (Accardo et al., 1996; Burt, 1994; Thompson, 1982). However, even after controlling for the keeping a diary variable, the gender difference in dream recording remained significant for children and adolescents, i.e., the gender difference in dream recording is not fully explained by the gender difference in keeping a diary, it is dream-specific. This might be explained as a part of a gender-specific dream socialization, i.e., girls are more likely to be encouraged to take an interest in dreams (for example, talking more often about dreams among peers) compared to boys (Schredl et al., 2015). It would be interesting to study whether dream recording in childhood/adolescence has long-term “aftereffects”, for example, that these individuals are also more interested in dreams as adults.

The most important factor associated with recording dreams is keeping a diary: About one third of the individuals keeping a diary also recorded dreams whereas only 7% recorded only dreams and nothing related to daytime events. That is, dream recording can be part of recording one's experiences. However, in addition to this variable, several other variables could be identified in relationship to dream recording. As pointed out in the introduction, the relationship between dream recall frequency and recording dreams is easily explained since only individuals who can remember

their dreams can record them (Schredl et al., 2014). Also the finding that nightmare frequency is related to dream recording (cf. Schredl & Göritz, 2019) is plausible, i.e., recording dreams might have been used as coping strategy to deal with nightmares (Schredl & Göritz, 2014). Lastly, the affinity to books (amount of time spent with reading and frequency of library visits) contributed, independently of the other factors, to dream recording. One might speculate that this might be related to the general trait of openness to experience (see below) as both variables were associated positively with openness to experience in this data set (the results are not presented).

The findings of the subsample of participants completing the adult version of the questionnaire replicated the earlier finding that openness to experience and low conscientiousness is related to dream recording (Schredl & Göritz, 2019). Whereas the relationship between dream recording and openness to experience seems very plausible, the association to low conscientiousness is more difficult to explain. Schredl and Göritz (2019) speculated that individuals who record their dreams are not as achievement-oriented and career-focused as individuals who do not record their dreams. It would be very interesting to pursue this line of research by eliciting the motives that govern dream recording. As pointed out in the introduction, some individuals record their dreams due to professional interests, e.g., Rizzolo (1922) recorded 100 dreams for his master thesis on dream research. Some writers like Arthur Schnitzler and many others artists have used dreams as source of inspiration or creativity (Barrett, 2001, 2007, 2015; Klepel et al., 2019) and, therefore, recorded their dreams. Whereas in the previous study (Schredl & Göritz, 2019) neuroticism was related to dream recording, this was not the case in the present study. One might speculate that individuals dealing with personal problems might use dreams to increase their understanding of their own inner world and their relationship to the world around them (Pesant & Zadra, 2004). There is some evidence that working on dreams in non-therapeutic settings can be beneficial, e.g., reading books about dream interpretation (Schredl, 2000, 2011; Schredl & Göritz, 2020). Coping with nightmares might also be a motive for recording dreams (Schredl & Göritz, 2014), but maybe it is simply curiosity (a facet related to openness to experiences) that stimulates dreamers to record their dreams and, thus, is not related to neuroticism.

Overall, the findings of the present study indicate that a substantial percentage of individuals (children, adolescents, and adults) record their dreams – at least sometimes. A variety of factors are related to recording dreams like dream recall frequency, nightmare frequency, gender, affinity to reading, and most importantly keeping a diary for recording daytime events. It would be very interesting to study the motives for dream recording and the long-term effects, e.g., possible benefits regarding creative endeavors or coping with personal issues.

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