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Personality and Individual Differences 38 (2005) 919–927
PERSONALITY AND INDIVIDUAL DIFFERENCES
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Dream recall frequency and attitude towards dreams: a reinterpretation of the relation

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Received 24 November 2003; received in revised form 26 May 2004; accepted 30 June 2004
Available online 11 September 2004

Abstract

Almost every published study having examined the association between people's dream recall frequency (DRF) and their Attitude Towards Dreams has found a positive relation. However, all but two of these studies have relied exclusively on Estimated DRF as the measure of DRF. The main goal of the present study was to evaluate the hypothesis that attitude towards dreams is not related to DRF but that it influences the estimated DRF through a process of selective attention. A secondary goal was to evaluate the adequacy of Estimated DRF as a measure of diary DRF as well as in relation to Attitude Towards Dreams. Participants' ($N = 82$) Attitude Towards Dreams and Estimated DRF were assessed by a self-reported questionnaire while diary DRF was calculated from a dream log. As predicted, Attitude Towards Dreams and diary DRF were independently related to Estimated DRF. In addition, estimations of DRF were found to be inaccurate; individuals with a negative attitude towards dreams were more likely to underestimate their diary DRF. The data show that the choice of DRF measures has a direct and significant impact on the pattern and magnitude of the relation between people's DRF and their Attitude Towards Dreams.

Keywords: Dreams; Dream recall; Attitude towards dreams; Measurement; Systematic error; Life-style hypothesis; Personality

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doi:10.1016/j.paid.2004.06.017

1. Introduction

As a part of her life-style hypothesis, Schonbar (1965) suggested that people who remember many dreams are generally interested in dreams, in trying to understand them, in increasing their dream recall frequency, and tend to have an overall positive attitude towards dreams. Almost every published study having examined the association between people's level of dream recall and their Attitude Towards Dreams has found a positive relation (Belicki, 1986; Belicki, Hunt, & Kelly, 1978; Cernovsky, 1984; Herman & Shows, 1984; Hill, Diemer, & Heaton, 1997; Robbins & Tanck, 1988; Rochlen, Ligiero, Hill, & Heaton, 1999; Schredl, Ciric, Götz, & Wittman, 2003; Schredl, Nuernberg, & Weiler, 1996). Only one study did not (Stickel & Hall, 1963). Consequently, it is well accepted that dream recall frequency is related to attitude towards dreams, even though the direction of the causality remains unclear. However, all but two of these studies have relied exclusively on estimated dream recall frequency as the measure of dream recall frequency (DRF). In one of these two studies (Robbins & Tanck, 1988) only poor correlations between diary measures of DRF and attitude towards dreams were found, while in the other (Hill et al., 1997), the attitude scale was completed after the dream diary and could have been influenced by it. Consequently, it is suggested that while attitude towards dreams might indeed be related to DRF, it is also possible that this relation reflects a bias in people's retrospective estimate of their dream recall frequency.

The main goal of the present study was to evaluate the relation between DRF and Attitude Towards Dreams. It was hypothesized that attitude towards dreams is not related to DRF per se, but rather that it influences Estimated DRF through a process of selective attention. To contrast this hypothesis with the traditional view that attitude towards dreams and DRF are positively related, Attitude Towards Dreams, Estimated DRF and Diary DRF were measured and correlated. According to the proposed hypothesis, Attitude Towards Dreams and Diary DRF should be independently related to Estimated DRF.

A secondary goal was to evaluate the adequacy of the Estimated DRF as a measure of Diary DRF and in relation to Attitude Towards Dreams. Measurement adequacy and inadequacy were operationalized as follows. According to the true score theory of measurement (Lord & Novick, 1968; Spearman, 1907), the total variation in any given score may be conceptualized as consisting of true variation (the variation of interest) and error variation (which can be divided into Random Error and Systematic Error). True variation is the variation which actually reflects differences in the construct under study, Random Error refers to "noise" in the score due to external factors, and Systematic Error refers to bias that influences scores in a specific direction in a fairly consistent way (i.e., bias of overestimation or underestimation). With respect to this definition, an adequate measure is defined as one in which the proportion of variation due to error is small. Consequently, evaluating a measure's adequacy is equivalent to assessing the relative importance of the Random Error and Systematic Error produced by the measure. However, an important methodological problem arises when trying to quantify a measure's error variation; the score obtained (i.e., estimated) needs to be compared to the true score even though the latter cannot be exactly known. The methodological solution to this problem is to approximate the true score using a measure known to be more accurate than the one under investigation. The more accurate the measure, the better the estimation of the error variation. Since data on true DRF cannot be easily obtained, Diary DRF was measured directly with a daily dream log. Even though Diary

DRF has some disadvantages (see Schredl & Montasser, 1996–1997, for a review), it is clearly considered as a more direct and valid measure than Estimated DRF, mainly because it minimizes errors of retrospective estimation. The amount of Systematic Error and Random Error in Estimated DRF was then calculated using Diary DRF as an indicator of true DRF.

Since we postulate that the relation between Attitude Towards Dreams and Estimated DRF is not a function of true DRF, it follows that Attitude Towards Dreams is related to the Estimated DRF's error variation and not to its true variation. We thus hypothesized that through a process of selective attention, positive attitudes towards dreams are associated with a tendency to systematically overestimate DRF and, conversely, that negative attitudes are associated with a tendency to systematically underestimate DRF. Since a positive Attitude Towards Dreams is related to a greater level of attention towards the dream experience, it should also be related to a smaller amount of Random Error (i.e., to a more precise estimation).

2. Methods

2.1. Participants

Participants were 82 undergraduate students (72 females, 8 males and 2 gender not specified), primarily Caucasians, who were recruited as nonpaid volunteers from an undergraduate psychology class. Their age ranged from 20 to 54 (M = 23.4 y; SD = 6.0). Prospective participants were told that the study concerned the relation between dreams and measures of personality and well-being. Those interested by the study were provided with the required materials and detailed instructions at the beginning of their class.

2.2. Procedure

Participants completed two research protocols. The first contained the McGill Sleep & Dream Questionnaire and several measures of personality and psychological well-being which were included as part of a separate study. The second research protocol required participants to record upon awakening all remembered dreams on the daily dream log provided for 3–4 consecutive weeks. The participants completed the two research protocols at home. They were instructed to complete and return the first protocol before beginning the dream recording set.

2.3. Measures

2.3.1. Estimated DRF and Attitude Towards Dreams

These two variables were derived from answers to questions in the McGill Sleep & Dream Questionnaire, a 72 item self-report questionnaire that evaluates several dimensions of dream experiences, including dream recall frequency, attitude towards dreams, and frequency and content of nightmares, bad dreams, lucid dreams, and recurrent dreams. Only the items related to estimated dream recall frequency and participants' attitude towards dreams were tabulated. Estimated DRF was measured with a single question (In general, how many dreams do you remember per week?) and Attitude Towards Dreams was measured by three questions which were answered

on a 7-point scale: (a) How often do you discuss your dreams with family or friends?; (b) How much attention do you usually pay towards your dreams?; (c) How much significance do you usually attach to your dreams? The scores from these three items were averaged to form a single composite measure of Attitude Towards Dreams. Both scales were similar to scales traditionally used in studies assessing the relation between Estimated DRF and Attitude Towards Dreams. The internal consistency of the Attitude scale, as evaluated with Cronbach's alpha, was very good ($a = 0.81$) while the correlations among the scale's three items ranged from 0.43 to 0.74 ($p < 0.05$, $n = 82$). The scale was thus considered to be adequate for the purposes of the study.

Even though a recent study (Schredl et al., 2003) suggested that traditional scales assessing Attitude Towards Dreams were confounded with DRF, such a traditional scale was used in this study for three reasons. First, the goal of this study was to clarify the body of knowledge showing an association between traditional attitude scales and DRF. Second, in their study, Schredl et al. (2003) used an estimated measure of DRF and we argue that such a measure might not be adequate to evaluate DRF. Third, we suggest that these traditional scales are not related to DRF even though they are correlated with Estimated DRF.

2.3.2. Diary DRF

Participants were asked to record upon awakening all remembered dreams on the daily dream log provided for 3–4 consecutive weeks. In addition to providing a complete written description of each dream recalled, they were required to specify the date, the main emotions present (if any), the intensity of these emotions, and the clarity of recollection associated with each remembered dream. Diary DRF was calculated from the dream log. We first counted the number of dreams reported in the log and the duration of the log was then determined by counting the number of days between the first and the last date recorded inclusively. The total number of dreams recorded was then divided by the duration of the log (in days) and converted to number of dreams/week. However, since participants' logs only included the days for which dreams were reported, they always began and ended with a dream report. Consequently, the formula was adjusted to avoid overestimating their Diary DRF. Specifically, the first day of the log was excluded from the calculation of the total number of dreams reported and of the log's duration.

The final duration of participants' dream log (i.e., from the first to the last recorded dream) varied from 2 to 5 weeks ($M = 21$ days, SD = 6.7 days). The duration was not correlated with Estimated DRF nor Attitude Towards Dreams. However, it was negatively correlated with Diary DRF ($r = -0.31$, $p < 0.01$), which indicates that participants who reported many dreams per week tended to hand in their dream log sooner. Since the correlation between dream logs' duration and Diary DRF was negative and only moderate, no floor effect or important distortion was expected for shorter dream logs. The dream log data were thus considered an appropriate measure of Diary DRF.

Systematic Error and Random Error were calculated to evaluate the adequacy of the Estimated DRF as a measure of Diary DRF. Each participant's Systematic Error was calculated by subtracting Diary DRF from Estimated DRF. A positive value represents an overestimation of the DRF while a negative value represents an underestimation. The Random Error was calculated, first, by subtracting the mean Systematic Error from the Estimated DRF (to remove the Systematic Error from the error term) and, second, by taking the absolute value of the difference between each participant's adjusted Estimated DRF and Diary DRF. A value close to zero represents a small Random Error of estimation while larger values reflect larger Random Errors of estimation.

3. Results

Descriptive statistics and confidence intervals for the Attitude Towards Dreams and DRF variables are presented in Table 1. The distribution of Estimated DRF, Diary DRF, and Random Error were all positively skewed. Estimated DRF also showed a positive kurtosis. The distribution of Systematic Error was normal. To normalize the distributions, a square root transformation was used for Diary DRF and Random Error data while a natural logarithm transformation was used for Estimated DRF. While the original data were used for the main linear regressions, a second set of regressions was performed with the transformed variables to insure that the results were not affected by the variables' distributions. Similarly, *t*-tests were also calculated with the transformed variables.

3.1. Relation between Attitude Towards Dreams and DRF

The hypothesized relation between Attitude Towards Dreams and DRF was confirmed. Attitude Towards Dreams was positively correlated with Estimated DRF ($r = 0.35$, $p < 0.01$) but not with Diary DRF ($r = 0.00$, $p > 0.10$) although Diary DRF was positively correlated with Estimated DRF ($r = 0.52$, $p < 0.01$). A comparison between the first two correlations using Fisher's *z*-transformation (Minium, King, & Bear, 1993) confirmed that the correlation between Attitude Towards Dreams and Estimated DRF was significantly higher than the correlation between Attitude Towards Dreams and Diary DRF ($z = 2.30$, $p < 0.05$).

Regression analyses indicated that the portion of the variance in Estimated DRF explained by Attitude Towards Dreams (semi-partial corr. = 0.35, $p < 0.01$) was independent from the portion explained by Diary DRF (semi-partial corr. = 0.52, $p < 0.01$). Diary DRF and Attitude were thus independently related to Estimated DRF (total adjusted $r^2 = 0.38$, $p < 0.01$). Using the transformed variables, the regression yielded a nearly identical pattern with slightly larger correlations. A closer examination of the residuals for both regressions indicated that they were normally distributed and that none of the standardized residuals was statistically too large. This indicates that the predicted relations are valid and appropriate for all response patterns.

3.2. Adequacy of the Estimated DRF

A one-sample *t*-test was used to verify the prediction that the mean Systematic Error was significantly different from zero. As shown in Table 2, a statistically significant underestimation bias was found ($M = -0.58$, $p < 0.001$) for the group as a whole.

Table 1
Descriptive statistics and confidence intervals (CI) for Attitude Towards Dreams and DRF variables

	Mean	SD	Range	CI (95%)
Attitude Towards Dreams	4.94	1.15	2.3–7.0	4.69–5.20
Estimated DRF	4.32	2.30	1.0–12.0	3.82–4.83
Diary DRF	4.90	2.20	0.82–11.31	4.42–5.39
Systematic Error	−0.58	2.20	−4.75 to 5.86	−1.06 to −0.10
Random Error	1.71	1.38	0.02–6.44	1.41–2.01

Table 2
Mean Systematic Error for the whole sample and for the three sub-samples of Attitude Towards Dreams

Subgroup	*n*	*M* (attitude)	*M* (error)	CI (95%)	*p*
All participants	82	4.94	−0.58	−1.06 to −0.10	0.020
Low Attitude	27	3.57	−1.40	−2.17 to −0.62	0.001
Average Attitude	27	5.09	−0.64	−1.41 to 0.14	0.105
High Attitude	28	6.12	0.26	−0.67 to 1.19	0.568

Note. CI = confidence interval for the Systematic Error.

The hypothesized relations between Attitude Towards Dreams and the adequacy of the Estimated DRF were only confirmed for Systematic Error. While Random Error was not significantly correlated to Attitude Towards Dreams ($r = 0.11$, $p > 0.10$), Systematic Error was significantly and positively correlated with Attitude Towards Dreams ($r = 0.36$, $p < 0.001$).

One-sample *t*-tests were used to verify the prediction that the mean Systematic Error was significantly different from zero for individuals with a high or low Attitude score. Individuals were first ranked according to their Attitude score. Then, starting with the lowest score, the first third ($n = 27$) was categorised as Low Attitude, the second ($n = 27$) as Average Attitude and the third ($n = 28$) as High Attitude. As shown in Table 2, a statistically significant underestimation bias was found for the Low Attitude subgroup ($M = -1.40$, $p < .001$) while no statistically significant difference was found for either of the two other subgroups. Overall, these results indicate that the estimation bias for DRF is related to Attitude Towards Dreams. However, only those individuals with a relatively low score on the Attitude scale systematically produced biased Estimated DRFs.

4. Discussion

As predicted, Attitude Towards Dreams and Diary DRF were independently related to Estimated DRF. These results have both theoretical and methodological implications. At a theoretical level, the data suggest a reinterpretation of the often shown positive relation between attitude towards dreams and DRF. While not related to DRF per se, a negative attitude towards dreams appears to bias one's estimate of DRF. It is our contention that in comparison to individuals with a positive attitude towards dreams, individuals with a negative attitude pay less attention to the dreams they recall and this, in turn, impedes their encoding into long-term memory. Consequently, the task of estimating DRF, which depends on one's long-term memory of dream experiences, appears to be influenced both by the process of dream recall itself and by the general interest to remember dream experiences (as measured by one's Attitude Towards Dreams).

Methodologically, the data reveal some of the negative consequences of using Estimated DRF as a measure of Diary DRF. The data indicate that correlates of Estimated DRF are not necessarily correlates of Diary DRF. In fact, these variables shared only 27% of their variance. In addition, the data suggest that Estimated DRF is not a pure measure of DRF but rather a mixed measure of DRF and Attitude Towards Dreams. While Estimated DRF might remain a useful way of operationalizing DRF in exploratory research, its mixed nature prevents its use as a confirmatory measure of DRF. Furthermore, this study highlights the importance of taking into account the method used to measure or infer DRF as well as the psychological processes (e.g.,

retrospective assessment, selective attention, memory retrieval) believed to be involved in each method before generalizing findings to the concept of DRF. The results also underscore the importance of using converging measures of DRF to improve our understanding of the processes involved in the recall of everyday dreams. These observations are consistent with a recent study (Levin, Fireman, & Rackley, 2003) showing that fantasy-proneness, psychological absorption, and imaginative involvement are correlated with retrospective measures of DRF but not with dream log measures. They are also consistent with the results of another study (Hill et al., 1997) showing a differential relationship for retrospective measures and dream log measures with predictions of who volunteered for a dream interpretation session and who profited from such sessions.

As predicted, the systematic tendency to overestimate or underestimate DRF was positively correlated with Attitude Towards Dreams. The random error of estimation, however, was not correlated with Attitude Towards Dreams. Participants in the Low Attitude group showed a statistically significant and systematic tendency to underestimate their DRF (−1.40 dreams/week) while participants in the other groups did not show a significant estimation bias. These results suggest that even though most individuals' estimation bias is not greatly influenced by their attitude towards dreams, individuals with a relatively negative attitude towards dreams show a clear pattern of DRF underestimation.

The present study has several limitations and three factors need be taken into account when trying to generalise the results. First, possible measurement errors with Diary DRF were not taken into account. Although daily dream logs are probably one of the best measures of everyday dream recall frequency, the use of dream logs can significantly increase DRF (e.g., Cartwright, 1977; Cohen, 1969; Schredl, 1991 in Schredl & Montasser, 1996–1997; Zadra & Donderi, 2000). However, the fact that Estimated DRF was used as the reference point in most of these studies renders the argument circular in nature. It therefore becomes difficult to determine whether the systematic underestimation represents an underestimation of actual DRF or simply an increase of DRF through the use of a diary. This methodological concern, however, does not impact the validity of the correlational analyses performed on Diary DRF or on the Systematic Error since these analyses were not affected by a possible overestimation bias. Furthermore, this concern becomes a nonissue if the goal is to predict Diary DRF instead of True DRF. The second limitation relates to the fact that different scales have been used across studies to measure Attitude Towards Dreams. Without experimental replication, we cannot be certain that the present findings are valid for other attitude scales. Third, although the systematic bias was clearly related to a general interest in dreams as measured by the attitude scale, the assumption that attitude affects the estimation bias by impacting on the amount of attention devoted to dream experiences is only suggested by the data. Additional studies are required to clarify this issue.

5. Conclusion

Due primarily to practical considerations, most correlates of DRF have been established exclusively with retrospective estimates of DRF. However, our results indicate that Estimated DRF is in fact a measure comprised of DRF as well as one's interest in remembering dreams. Estimated DRF is thus a poor measure of DRF and using it to generalize to Diary DRF rates can be

misleading unless a direct measure of DRF is also employed. There seems to be no valid way to evaluate everyday DRF without measuring it prospectively.

This study also shows that Attitude Towards Dreams is not, as suggested by previous studies, related to DRF per se. It is, however, related to Estimated DRF, potentially through a process of selective attention associated to a general interest to remember one's dreams. This conclusion is consistent with the recommendation that Schonbar's (1965) life-style theory be revised (Schredl et al., 2003). For instance, the present study suggests that what is part of a broader life-style is not people's dream recall frequency as such but rather their favourable Attitude Towards Dreams. Although Schredl et al. (2003) argue that traditional attitude scales are confounded with DRF, our data indicate that traditional attitude scales are confounded with people's impression of dreaming frequently but not with DRF.

Finally, our findings suggest that the nature of some accepted correlates of DRF should be reassessed. One example is the relation between gender and DRF, established primarily with retrospective estimates of DRF (e.g., Giambra, Jung, & Grodsky, 1996; Schredl, Kronenberg, Nonnell, & Heuser, 2001; Schredl, Sahin, & Schäfer, 1998). If gender is related to Estimated DRF but not to Diary DRF, the relation could prove to be an artefact due to a differential attitude towards dreams between genders. This hypothesis is supported by a recent study showing that the relation between gender and Estimated DRF is partly mediated by interest in dreams (Schredl, 2002–2003). Such reassessments of the correlates of DRF would contribute to our understanding of the processes underlying dream recall.

References

Belicki, K. (1986). Recalling dreams: an examination of daily variation and individual differences. In J. Gackenbach (Ed.), *Sleep and dreams, a sourcebook* (pp. 187–206). New York: Garland Publishing.

Belicki, K., Hunt, H., & Kelly, P. (1978). The function of dream and dreamer variables in the question of dream recall. *Sleep Research, 7*, 167.

Cartwright, R. D. (1977). *Night life: explorations in dreaming*. Englewood Cliffs, NJ: Prentice Hall.

Cernovsky, Z. Z. (1984). Dream recall and attitude toward dreams. *Perceptual and Motor Skills, 58*, 911–914.

Cohen, D. B. (1969). Frequency of dream recall estimated by three methods and related to defence preference and anxiety. *Journal of Consulting and Clinical Psychology, 33*, 661–667.

Giambra, L. M., Jung, R. E., & Grodsky, A. (1996). Age changes in dream recall in adulthood. *Dreaming, 6*, 17–31.

Herman, S., & Shows, W. D. (1984). How often do adults recall their dreams?. *International Journal of Aging and Human Development, 18*, 243–254.

Hill, C. E., Diemer, R., & Heaton, K. J. (1997). Dream interpretation sessions: Who volunteers, who benefits, and what participants view as most and least helpful. *Journal of Counseling Psychology, 44*, 59–62.

Levin, R., Fireman, G., & Rackley, C. (2003). Personality and dream recall: still further negative findings. *Dreaming, 13*, 155–162.

Lord, F. M., & Novick, M. R. (1968). *Statistical theories of mental test scores*. Reading, MA: Addison-Wesley.

Minium, E. W., King, B. M., & Bear, G. (1993). *Statistical reasoning in psychology and education*. New York: John Wiley & Sons Inc.

Robbins, P. R., & Tanck, R. H. (1988). Interest in dreams and dream recall. *Perceptual and Motor Skills, 66*, 291–294.

Rochlen, A. B., Ligiero, D. P., Hill, C. E., & Heaton, K. J. (1999). Effects of training in dream recall and dream interpretation skills on dream recall, attitudes, and dream interpretation outcome. *Journal of Counseling Psychology, 46*, 27–34.

Schonbar, R. A. (1965). Differential dream recall frequency as a component of "life-style". *Journal of Consulting Psychology, 29*, 465–474.

Schredl, M. (1991). *Dream recall frequency and dream content in patients with sleep disorders, psychiatric patients and healthy controls*. Unpublished Master's Thesis. University of Mannheim, Germany.

Schredl, M. (2002–2003). Factors influencing the gender difference in dream recall frequency. *Imagination, Cognition and Personality, 22*, 33–39.

Schredl, M., Ciric, P., Götz, S., & Wittman, L. (2003). Dream recall frequency, attitude towards dreams and openness to experience. *Dreaming, 13*, 145–153.

Schredl, M., Kronenberg, G., Nonnell, P., & Heuser, I. (2001). Dream recall, nightmare frequency, and nocturnal panic attacks in patients with panic disorder. *Journal of Nervous and Mental Disease, 189*, 559–562.

Schredl, M., & Montasser, A. (1996–1997). Dream recall: state or trait variable, Part I: model, theories, methodology and trait factors. *Imagination, Cognition and Personality, 16*, 181–210.

Schredl, M., Nuernberg, C., & Weiler, S. (1996). Dream recall, attitude toward dreams, and personality. *Personality and Individual Differences, 20*, 613–618.

Schredl, M., Sahin, V., & Schäfer, G. (1998). Gender differences in dreams: do they reflect gender differences in waking-life? Personality and Individual Differences*, 25*, 433–442.

Spearman, C. (1907). Demonstration of formulae for true measurement of correlation. *American Journal of Psychology, 18*, 161–169.

Stickel, E. G., Hall, C. S. (1963). The relation of reported frequency of dreaming to some personality variables. Research Report No.1, Institute of Dream Research, Miami. pp. 1–11.

Zadra, A., & Donderi, D. C. (2000). Nightmares and bad dreams: their prevalence and relationship to well-being. *Journal of Abnormal Psychology, 109*, 210–219.