

Retest reliability study of the Mannheim Dream Questionnaire (MADRE)

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Summary. The Mannheim Dream Questionnaire (MADRE) is an instrument used to retrospectively measure various aspects of dreaming. The aim of the current study was to determine its retest reliability. Altogether, 110 participants completed the three-week study protocol including four measurement points. The findings of the present study indicated that the retest reliabilities of the MADRE questionnaire items were adequate. In addition, internal consistency for the “Attitude towards dreams” scale was high. Future studies should focus on longer retest intervals.

Keywords: Dream questionnaire, retest reliability, MADRE

1. Introduction

Dreaming is defined as a personal and subjective phenomenon that occurs during sleep (Schredl, 2010). Even though the empirical findings suggest that everyone dreams every night (Wittmann & Schredl, 2004), there is a large variability in variables associated with dreaming; for instance, dream recall frequency, attitude towards dreams, frequency of telling or recording dreams, the effects of dreams on daily life, nightmare frequency and frequency of lucid dreaming (Schredl et al., 2014).

Over the years, numerous questionnaires have been developed and tested in respect of their psychometric properties (overview: Schredl, Berres, Klingauf, Schellhaas, & Göritz, 2014). One particular important methodological issue in retrospective measures, aiming at relatively stable variables, is the retest reliability — i.e. do the answers match if the same participant is presented twice with the same questions some time apart. Previous findings suggest that for a seven-point dream recall frequency scale the retest reliability is high: $r = .85$ (Schredl, 2004). Similar, retest reliabilities of lucid dream frequency and nightmare frequency scales have been adequate: $r = .89$ and $r = .717$, respectively (Stumbrys, Erlacher, & Schredl, 2013). An attitude towards dreams scale also showed a high retest reliability: $r = .73$ (Schredl, Brenner, & Faul, 2002). Typically reliability indices of about 0.80 are considered to be high (Groth-Marnat, 2009).

One instrument that has been developed recently, the Mannheim Dream questionnaire (MADRE), measures various aspects of dreaming such as frequencies of dream recall, telling dreams, nightmares, lucid dreams, reading about dreams, effects of dreaming on future waking life as

well as attitude towards dreams and overall emotional intensity of dreams, (Schredl et al., 2014). The MADRE showed a high retest reliability for all items with values between $r = .717$ and $r = .842$ (Schredl et al., 2014). The reliability testing on a Persian adaptation of the MADRE has also shown good internal consistency for all items: Cronbach's alpha $r = .75$ (Shahabian et al., 2017). So far, there have only been two studies on the retest reliability of the MADRE questionnaire (Schredl et al., 2014; Shahabian et al., 2017).

The aim of the current study was to replicate the retest reliability coefficients of the MADRE questionnaire in a new independent sample.

2. Method

2.1. Participants

Overall, 110 persons (57 women and 53 men) with a mean age of 22.75 ± 4.68 years (range: 18 to 56 years) participated in the present study; 84 were psychology students and 26 were from the personal environment of the first author. The students were taking part in an experimental university course and received course credit for participating. One participant did not complete all questionnaires resulting in a reduction in sample size.

2.2. Measurement instruments

Participants were asked to fill in the three-page Mannheim Dream questionnaire (MADRE) (Schredl et al., 2014), eliciting socio-demographic variables, dream recall frequency, lucid dream recall frequency and different aspects of dream content. The full German and English versions of the questionnaire are available online:

(http://journals.ub.uni-heidelberg.de/index.php/IJoDR/article/view/16798/pdf_73).

Measurement of dream frequency was made using a 7-point scale (coded as 0 = never, 1 = less than once a month, 2 = about once a month, 3 = about two to three times a month, 4 = about once a week, 5 = several times a week, 6 = almost every morning). For measuring overall emotional intensity, a five-point scale (0 = not at all intense,

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1 = not that intense, 2 = somewhat intense, 3 = quite intense, 4 = very intense) was presented. The overall emotional tone was characterized and measured in five categories (-2 = very negative, -1 = somewhat negative, 0 = neutral, +1 = somewhat positive, +2 = very positive). For measuring nightmare frequency and lucid dreaming frequency eight-point scales were used (0 = never, 1 = less than once a year, 2 = about once a year, 3 = about two - four times a year, 4 = about once a month, 5 = about two to three times a month, 6 = about once a week, and 7 = several times a week).

Schredl et al. (2014) used a definition for nightmares based on the ICSD-3 (American Academy of Sleep Medicine, 2014): "Nightmares are dreams with strong negative emotions that result in awakening from the dreams. The dream plot can be recalled very vividly upon awakening." The definition of Schredl and Erlacher (2004) for lucid dreaming was adopted: "In a lucid dream, one is aware that one is dreaming during the dream. Thus, it is possible to wake up deliberately, or to influence the action of the dream actively, or to observe the course of the dream passively."

Nightmare distress was presented using a five-point scale (0 = not at all distressing, 1 = not that distressing, 2 = somewhat distressing, 3 = quite distressing, and 4 = very distressing). Furthermore, the participants were asked if they had experienced recurrent nightmares related to a waking-life situation (Yes/No) and what percentage of their nightmares are recurrent ones. In addition, there were questions concerning nightmare frequency during childhood, common topics of childhood nightmares, and the age of lucid dreaming onset.

Participants' attitudes towards dreams were measured by six five-point scales, e. g., "I want to know more about dreams." (0 = not at all, 1 = not that much, 2 = partly, 3 = somewhat, and 4 = totally). The total score for the attitude measure was derived as a mean of the six items. Further-

more, an item was constructed in a similar format, also in a five-point format to measure the personal meaning of one's own dreams and an item measuring the impression that dreams provide impulses or signs for waking life.

In addition to items measuring frequency of dream sharing, recording dreams, dreams affecting day-time mood, creative dreams, problem-solving dreams, and déjà vu experiences, (same eight-point format like nightmare frequency), the participants were asked if they ever read literature on the topic of dreams (0 = no, 1 = one to two times, 2 = several times). If they had read literature about dreams and/or dream interpretation, the participants were asked whether this helped them to better understand their dream content (0 = not at all, 1 = not that much, 2 = somewhat, 3 = quite, and 4 = very much).

2.3. Procedure

The participants took part in a lucid dream induction study (Dyck, Schredl, & Kühnel, 2017). The participants completed the MADRA at the beginning of the study, (baseline), and after each week of the three-week study period. Altogether, there were four measurement points. The questionnaires were returned to the first author at the end of the study period.

Statistical analysis was performed using SPSS for macOS Sierra 10.12.04. Most of the MADRE items are ordinal, except the percentage of recurring nightmares and the items of the attitude towards dreams scale (interval scales). For descriptive purposes, means and standard deviations for all items have been calculated and depicted. Spearman rank correlations between all 4 measurement points (1-2, 1-3, 1-4, 2-3, 2-4, 3-4) have been computed and averaged. A Pearson correlation was used for "Attitude towards dreams" scale. Non-parametric Friedman tests were used to compare means of the four measurement point with the exception of the percentage of recurring nightmares and the items

Table 1. Means and retest reliabilities for dream variables

Variable	Baseline (N=110)	Week 1 (N=110)	Week 2 (N=110)	Week 3 (N=110)	Statistical testing ¹	Retest reliability ² Mean (Range)
Dream recall frequency	4.15 ± 1.42	4.09 ± 1.54	4.15 ± 1.56	4.35 ± 2.25 (N=109)	$\chi^2 = 2.6, p = .450$	.826 (.751 to .883)
Emotional intensity	2.45 ± 0.85	2.38 ± 0.82	2.38 ± 0.93	2.40 ± 0.88	$\chi^2 = 1.2, p = .756$	.745 (.598 to .825)
Overall emotional tone	-0.12 ± 0.95	-0.06 ± 0.88	0.04 ± 0.89	-0.02 ± 0.89	$\chi^2 = 9.8, p = .021$	.764 (.708 to .797)
Nightmare frequency (current)	3.71 ± 1.85	3.58 ± 2.02	3.63 ± 1.95	3.61 ± 2.05	$\chi^2 = 2.5, p = .476$	.876 (.843 to .918)
Nightmare frequency (childhood)	4.06 ± 1.86 (N=108)	4.05 ± 1.80 (N=108)	4.14 ± 1.80 (N=107)	4.10 ± 1.86 (N=108)	$\chi^2 = 2.5, p = .479$	.917 (.907 to .929)
Nightmare distress	1.72 ± 1.13 (N=94)	1.62 ± 1.17 (N=95)	1.71 ± 1.15 (N=96)	1.76 ± 1.16 (N=97)	$\chi^2 = 2.6, p = .461$	.823 (.754 to .901)
Recurring nightmares (Yes/No)	27.8 % (N=108)	33.0% (N=109)	31.8% (N=107)	32.4% (N=107)	$\chi^2 = 6.0, p = .112$	.899 (.825 to .958)
Percentage of recurring nightmares	17.43 ± 27.14 (N=98)	19.82 ± 29.21 (N=96)	19.00 ± 28.02 (N=96)	18.94 ± 27.92 (N=95)	$F = 0.9, p = .425$	.971 (.962 to .984)
Lucid dream frequency	2.25 ± 2.03 (N=109)	2.28 ± 2.08 (N=109)	2.36 ± 2.13 (N=109)	2.31 ± 2.10 (N=109)	$\chi^2 = 4.5, p = .209$	.902 (.862 to .959)
Age of first lucid dream	15.62 ± 5.70 (N=69)	15.49 ± 5.79 (N=70)	15.69 ± 5.77 (N=72)	15.95 ± 5.90 (N=75)	$\chi^2 = 5.1, p = .165$	.967 (.936 to .991)

¹ Friedman test (χ^2), ANOVA with repeated measures (F); ² Retest correlations between all measurement points

Table 2. Means and retest reliabilities for dream variables

Variable	Baseline (N=110)	Week 1 (N=110)	Week 2 (N=110)	Week 3 (N=110)	Statistical testing ¹	Retest reliability ² Mean (Range)
Meaningfulness	2.03 ± 1.01 (N=109)	2.06 ± 0.95 (N=109)	2.12 ± 0.98 (N=109)	2.20 ± 0.98 (N=109)	$\chi^2 = 8.8, p = .032$	.775 (.687 to .869)
Attitudes towards dreams	2.88 ± 0.72 (N=109)	2.83 ± 0.73 (N=109)	2.87 ± 0.72 (N=109)	2.87 ± 0.70 (N=109)	$F = 1.0, p = .391$	.883 (.841 to .924)
Telling dreams	4.29 ± 2.02 (N=109)	4.49 ± 2.07 (N=109)	4.52 ± 2.04 (N=109)	4.61 ± 2.07 (N=109)	$\chi^2 = 5.6, p = .130$	.784 (.628 to .860)
Recording dreams	1.00 ± 2.02 (N=109)	1.93 ± 2.83 (N=109)	2.19 ± 2.94 (N=109)	2.15 ± 2.91 (N=109)	$\chi^2 = 43.5, p = .001$	.706 (.502 to .973)
Dreams affecting daytime mood	3.01 ± 2.16 (N=108)	3.12 ± 2.28 (N=108)	3.18 ± 2.34 (N=108)	3.27 ± 2.37 (N=107)	$\chi^2 = 9.8, p = .021$	.853 (.787 to .921)
Creative dreams	1.83 ± 1.76 (N=109)	1.84 ± 1.76 (N=109)	1.98 ± 1.86 (N=109)	1.98 ± 1.83 (N=109)	$\chi^2 = 5.6, p = .135$	.873 (.811 to .910)
Problem solving dreams	2.01 ± 1.94 (N=109)	2.23 ± 1.90 (N=109)	2.10 ± 1.88 (N=109)	2.23 ± 1.98 (N=109)	$\chi^2 = 5.0, p = .173$	.827 (.719 to .902)
Deja vu experience	3.14 ± 1.56 (N=109)	3.18 ± 1.70 (N=109)	3.20 ± 1.64 (N=109)	3.11 ± 1.64 (N=109)	$\chi^2 = 1.3, p = .718$	.843 (.767 to .918)
Reading about dreams	0.92 ± 0.70 (N=109)	1.06 ± 0.98 (N=109)	0.93 ± 0.70 (N=109)	0.95 ± 0.71 (N=109)	$\chi^2 = 5.7, p = .126$	.837 (.763 to .954)
Helpful dream literature	1.64 ± 1.07 (N=92)	1.69 ± 1.01 (N=91)	1.78 ± 1.03 (N=90)	1.85 ± 1.07 (N=91)	$\chi^2 = 11.6, p = .009$	.841 (.772 to .913)

¹ Friedman test (χ^2), ANOVA with repeated measures (F); ² Retest correlations between all measurement points

of the attitude towards dreams scale. The means of these two variables were tested with an ANOVA for repeated measurements. Internal consistency of the six-item attitude towards dreams scale was determined by Cronbach's alpha.

3. Results

The means and standard deviations of all items can be seen in Tables 1 and 2. There was a significant increase regarding recording dreams over the study period, (see Table 2). Other effects were found for overall emotional tone of dreams, meaningfulness of dreams, frequency of dreams affecting day-time mood, and helpful dream literature; all these variable showed an increase (see Tables 1 and 2). The averaged retest-reliability coefficients ranged from .775 to .971 with the exception of the recording dreams variable ($r = .706$). Interestingly, the correlations between baseline and all three measurements for this variable were relative low (range: .502 to .568) but the retest reliabilities within the study were high (Week 1-Week 2: $r = .883$; Week 1-Week 3: $r = .808$; Week 2-Week 3: .973). Internal consistency of the attitude towards dreams scales for the four measurement points varied from .831 to .847 (Cronbach's alpha).

4. Discussion

The findings of the present study indicated that the retest reliabilities of the MADRE questionnaire scales were high; even higher compared to the coefficients reported in the original MADRE publication (Schredl et al., 2014). The internal consistencies for the "Attitude towards dreams" scale were slightly smaller than the coefficient of the original study ($r = .910$) but still very high (.831 to .847). Specifically, retest reliabilities for dream recall frequency, lucid dream frequency, nightmare frequency, and attitude towards dreams are comparable to those reported in previous studies ranging

from .717 to .89 (Schredl et al., 2002; Schredl, 2004; Stumbrys et al., 2013).

From a methodological viewpoint it has to be noted that participants were part of a lucid dream induction study over a three week period (Dyck et al., 2017). Despite the increased focus on dreams, most of the MADRE variables did not change and showed high retest reliability. This reflects a high trait component of these variables in addition to the satisfactory psychometric properties of the questionnaire. Further evidence for this temporal stability was provided by Schredl and Göritz (2015) showing that dream recall frequency, lucid dream frequency and nightmare frequency still presented high correlations ranging between $r = .567$ and $r = .663$ over a three-year period. The increase in dream recording frequency was expected as the participants were asked to record their dreams during the study period several times. This also explains the lower correlation coefficients between baseline and the later measurements. Interestingly, the emotional tone of dreams also improved slightly over the study period, similar to meaningfulness of dreams, frequency of dreams affecting day-time mood and helpfulness of reading dream literature, i.e., focusing on dreams had a slight but measurable effect on the participants. As the retest correlations are quite high for these variables, the effect of participating in an induction study must have been similar for all participants.

To summarize, the Mannheim Dream Questionnaire (MADRE) was proved to be a reliable instrument for measuring different aspects of dream behavior. It would be very interesting to correlate the retrospective data elicited by the MADRE with prospective diary studies. For dream recall frequency and nightmare frequency, the correlations between diary measures and retrospective questionnaires are in the range of about $r = .30$ to .55 (Schredl, 2002; Zunker et al., 2015), keeping in mind that means generally increases in

dream recall can either explained by retrospective underestimation or by the stimulating effect of focusing on dreams by keeping a dream diary, or both (Aspy, Delfabbro, & Provee, 2015). It would be interesting to carry out similar studies for other MADRE variables like frequency of sharing dreams or problem solving dreams.

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