

**Efficacy of Imagery Rescripting and Imaginal Exposure
for Nightmares: A Randomized Wait-List Controlled Trial**

Supplementary Material

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Appendix A. Therapist Protocol Adherence Checklist

This rating scale is based on the nightmare treatment protocols (Imagery Rescripting and Imaginal Exposure) presented in the study protocol by Kunze, Lancee, Morina, Kindt, and Arntz (2016).

Instructions

For each item, indicate whether the therapist displayed the behavior(s) stated below. If so, mark the item with an X. If the therapist did not demonstrate the behavior(s), do not mark the item.

Participant#: _____

Session#: 1 / 2 / 3

Duration treatment session (total): _____(min:sec)

Duration imagery exercise (reactivation): _____(min:sec)

Duration IR/IE exercises (total): _____(min:sec)

Duration mental imagery during IR/IE exercises (mental imagery only): _____(min:sec)

Imagery Exercise

- Instruction imagery exercise (“...the same way as you did last time.”)
- Therapist does not ask additional questions, unless NM is clearly not sufficiently reactivated (as indicated by e.g. very low SUDs).
- Therapist terminates the imagery exercise at the same moment as during pre-assessment.

Treatment

General treatment variables

- If necessary, therapist reminds patient to close his/her eyes.
- Patient describes the mental images in the ‘here and now’, and therapist corrects the patient if necessary (present-tense).
- Patient describes the mental images from his/her perspective, and therapist corrects the patient if necessary (first-person perspective).
- Therapist repeatedly asks patient to report his/her sensory experiences (at least two of the following: see, hear, feel, smell). Note that if the patient spontaneously reports sensory experiences, there is no need for the therapist to repeatedly ask for them (this also holds for emotions and cognitions).
- Therapist repeatedly asks patient to report his/her emotions (“What do you feel?”).

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- Therapist repeatedly asks patient to report his/her cognitions (“What are you thinking?”).
- Duration IR/IE exercises (acceptable range 30-45 min).

Imaginal Exposure

- Therapist reinforces the negative emotions experienced by the patient (e.g., by focusing on the sensory details of the NM).
- Therapist lets patient focus on the hotspot(s) of the NM (most aversive part(s) of the NM).
- Therapist only rewinds the NM if necessary (i.e., if emotions decrease; vividness decreases; patient starts talking/thinking about something other than the NM, etc.).
- Therapist encourages patient to relive the most aversive part(s) of the NM, if necessary (positive reinforcement).
- Therapist continues to expose patient to the NM either until the patient’s emotions significantly decrease, or until the end of the session.
- Feedback*: Therapist asks patient whether he/she avoided certain aspects of the NM or any accompanying emotions/cognitions.

Imagery Rescripting

- Therapist asks patient to rescript the image (“What would you like to do?”).
- Therapist lets patient actively change the image (“Imagine this as vividly as possible.” “Ok, do it!”).
- Therapist asks patient about his/her needs (“What do you need right now?”).
- If necessary, therapist gives examples of possible changes to the script.
- Therapist continues with the rescripting either until the patient (and therapist) is fully satisfied with the new script, or until the end of the session. If necessary, therapist rewinds the NM script in order to try different kinds of interventions.
- Feedback*: Therapist asks patient whether he/she is satisfied with the new script and/or whether he/she has thought of any other changes he/she would like to try out.

Which treatment did the participant receive?

- Imaginal Exposure (IE)
- Imagery Rescripting (IR)
- Not clear

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Table A. Means and standard deviations (in parentheses) for all variables assessed during the imagery exercise

| Group | Pre-assessment | | Week 1 | | Week 2 | | Week 3 | | Post-assessment | |
|------------------------------------|----------------|---------------|----------|---------------|----------|---------------|----------|---------------|-----------------|---------------|
| | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> |
| Before the imagery exercise | | | | | | | | | | |
| Core NM frequency | | | | | | | | | | |
| IR | 29 | 2.38 (1.92) | 31 | 1.90 (2.60) | 28 | 1.30 (1.80) | 27 | .67 (1.11) | 27 | .98 (1.66) |
| IE | 30 | 1.73 (1.37) | 30 | 1.73 (1.42) | 28 | 1.11 (1.47) | 28 | 1.23 (1.66) | 28 | .93 (1.44) |
| WL | 32 | 2.77 (2.39) | | | | | | | 31 | 1.15 (1.64) |
| Fear of the exercise | | | | | | | | | | |
| IR | 30 | 3.75 (2.73) | 29 | 4.24 (2.78) | 27 | 3.35 (2.74) | 26 | 2.89 (2.98) | 27 | 2.50 (2.56) |
| IE | 31 | 4.26 (2.80) | 30 | 4.60 (2.79) | 28 | 5.36 (2.69) | 27 | 5.24 (2.58) | 28 | 4.48 (2.47) |
| WL | 35 | 3.90 (2.68) | | | | | | | 32 | 4.67 (3.36) |
| After the imagery exercise | | | | | | | | | | |
| NM vividness | | | | | | | | | | |
| IR | 30 | 7.55 (1.38) | 31 | 7.71 (1.33) | 28 | 7.21 (1.63) | 27 | 7.07 (2.07) | 27 | 7.06 (2.07) |
| IE | 31 | 8.03 (1.68) | 30 | 7.73 (1.42) | 28 | 7.29 (1.28) | 28 | 6.86 (1.90) | 28 | 7.11 (1.91) |
| WL | 35 | 7.37 (1.17) | | | | | | | 32 | 7.44 (1.47) |
| Subjective Distress | | | | | | | | | | |
| IR | 30 | 6.78 (2.14) | 31 | 6.81 (1.99) | 28 | 5.71 (2.14) | 27 | 5.04 (2.79) | 27 | 5.02 (2.60) |
| IE | 31 | 6.82 (2.07) | 30 | 7.10 (1.77) | 28 | 5.86 (1.76) | 28 | 4.61 (1.95) | 28 | 4.82 (2.11) |
| WL | 34 | 6.65 (2.03) | | | | | | | 32 | 6.19 (2.84) |
| Tolerability of negative emotions | | | | | | | | | | |
| IR | 30 | 6.18 (2.21) | 31 | 5.44 (2.32) | 28 | 6.82 (2.45) | 26 | 6.96 (2.73) | 28 | 7.89 (1.50) |
| IE | 30 | 6.20 (2.22) | 30 | 6.37 (1.99) | 28 | 6.89 (1.91) | 28 | 7.95 (1.47) | 26 | 7.27 (2.76) |
| WL | 35 | 5.60 (2.34) | | | | | | | 31 | 6.52 (2.32) |

Note. IE = Imaginal Exposure; IR = Imagery rescripting; WL = Wait-list; all variables (except core NM frequency) were measured by means of verbal report on a scale ranging from 0 to 10

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Table B. Cronbach's alpha for NDIQ, NBQ, ISI, and ZIL for all assessments

| | NDIQ | NBQ | ISI | ZIL |
|------|------|------|------|------|
| Pre | .752 | .714 | .767 | .903 |
| Post | .902 | .822 | .797 | .888 |
| FU3 | .932 | .851 | .855 | .916 |
| FU6 | .902 | .833 | .852 | .901 |

Note. Pre = Pre-assessment; Post = Post-assessment; FU3 = 3-months follow-up assessment; FU6 = 6-months follow-up assessment; ISI = Insomnia Severity Index; NBQ = Nightmare Beliefs Questionnaire; NDIQ = Nightmare Distress and Impact Questionnaire; ZIL = Zelf-inventarisatielijst

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Table C. Means and standard deviations (in parentheses) of the treatment adherence questionnaire subscales

| | Rater 1 | | Rater 2 | | Average R1,R2 | | Test statistic |
|-------------------|----------------|------------|----------------|------------|----------------------|------------|----------------------------|
| | IR | IE | IR | IE | IR | IE | |
| Imagery exercise | 2.81 (.48) | 2.93 (.26) | 2.81 (.48) | 2.89 (.31) | 2.81 (.48) | 2.91 (.27) | $t(53) = .91, p = .367$ |
| General variables | 6.35 (.69) | 6.63 (.49) | 6.48 (.70) | 6.68 (.48) | 6.43 (.68) | 6.66 (.47) | $t(53) = 1.50, p = .140$ |
| Rescripting | 5.56 (1.19) | .00 (.00) | 5.63 (1.18) | .00 (.00) | 5.59 (1.16) | .00 (.00) | $t(26) = -25.04, p < .001$ |
| Exposure | .11 (.32) | 5.11 (.51) | .22 (.58) | 5.21 (.57) | .17 (.39) | 5.16 (.47) | $t(53) = 42.71, p < .001$ |

Note. IE = Imaginal Exposure ($n = 28$); IR = Imagery Rescripting ($n = 27$); R1 = Rater 1; R2 = Rater 2; item range imagery exercise subscale = 0-3, general treatment variables subscale = 0-7, rescripting-specific subscale = 0-6, exposure-specific subscale = 0-6

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Table D. Multilevel regression analysis for IR, IE, and WL on all outcome measures at pre- and post-assessment

| | Nightmare Frequency ¹ | NDIQ | Nights with nightmares | NBQ | ISI | ZIL |
|--|----------------------------------|---------------|------------------------|---------------|-----------------|---------------|
| Fixed Coefficients, <i>b</i> (SE) | | | | | | |
| Intercept | 1.73 (.29)*** | 2.75 (.17)*** | .08 (.19) | 2.63 (.25)*** | 7.95 (2.66)** | 3.75 (.14)*** |
| Contrast WL/IR | .08 (.15) | .03 (.07) | -.07 (.08) | -.06 (.11) | .55 (1.25) | .09 (.06) |
| Contrast WL/IE | -.01 (.14) | .10 (.07) | -.14 (.08) | -.02 (.10) | .61 (1.23) | .02 (.06) |
| Time | -.27 (.07)*** | -.33 (.05)*** | -.23 (.07)** | -.29 (.05)*** | -3.03 (.52)*** | -.12 (.02)*** |
| Education | -.09 (.10) | .04 (.05) | -.01 (.05) | -.06 (.08) | 1.20 (.80) | -.04 (.04) |
| NM frequency baseline | | .10 (.05)* | .68 (.05)*** | .12 (.07) | 2.33 (.79)** | .06 (.04) |
| $\Delta WL \times \Delta IR$ | -.42 (.15)** | -.34 (.12)** | -.30 (.15)* | -.33 (.12)** | -3.49 (1.25)** | -.12 (.05)* |
| $\Delta WL \times \Delta IE$ | -.40 (.16)* | -.45 (.13)*** | -.29 (.17) | -.40 (.12)** | -4.59 (1.27)*** | -.08 (.05) |

Note. IE = Imaginal exposure; IR = Imagery rescripting; ISI = Insomnia Severity Index; NDIQ = Nightmare Distress and Impact Questionnaire; NBQ = Nightmare Beliefs Questionnaire; ZIL = Zelf-inventarisatielijst; WL = Wait-list; Contrast WL/IR, Contrast WL/IE, Time, Education, and NM frequency baseline represent linear slopes across all conditions; $\Delta WL \times \Delta IR$ and $\Delta WL \times \Delta IE$ represent interactions of Contrast WL/IR and Contrast WL/IE with Time, indicating the change in differences between the contrasted groups from pre- to post-assessment

* $p < .05$; ** $p < .01$; *** $p < .001$

¹log-transformed

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Table E. Piecewise multilevel regression results for IR and IE on all outcome measures

| | Nightmare Frequency ¹ | NDIQ | Nights with nightmares | NBQ | ISI | ZIL |
|--|----------------------------------|---------------|------------------------|---------------|----------------|---------------|
| Fixed Coefficients, <i>b</i> (SE) | | | | | | |
| Intercept | 1.27 (.32)*** | 2.31 (.20)*** | -.17 (.23) | 2.12 (.31)*** | 4.64 (3.00) | 3.52 (.15)*** |
| Condition | .14 (.21) | .10 (.17) | .11 (.20) | .05 (.19) | 1.57 (1.43) | .07 (.07) |
| Education | -.07 (.11) | .03 (.06) | -.02 (.06) | -.07 (.09) | 1.10 (.86) | .00 (.04) |
| NM frequency baseline | | .08 (.06) | .62 (.06)*** | .12 (.10) | 1.80 (.98) | .05 (.05) |
| Slope1 | -.10 (.02)*** | -.13 (.02)*** | -.09 (.03)*** | -.13 (.02)*** | -1.16 (.18)*** | -.04 (.01)*** |
| Slope2 | -.00 (.00) | -.01 (.00)*** | -.00 (.00) | .00 (.00) | -.03 (.03) | -.003 (.00)* |
| Slope1 × Condition | .01 (.04) | .04 (.04) | .01 (.05) | .02 (.04) | .46 (.35) | -.00 (.01) |
| Slope2 × Condition | .01 (.01) | .02 (.01) | .01 (.01) | .01 (.01) | .06 (.06) | .00 (.00) |

Note. IE = Imaginal exposure; IR = Imagery rescripting; ISI = Insomnia Severity Index; NBQ = Nightmare Beliefs Questionnaire; NDIQ = Nightmare Distress and Impact Questionnaire; Slope1 = Linear slope of time from pre- to post-assessment across all conditions; Slope2 = Linear slope of time over post-, FU3-, and FU6-assessment across all conditions; WL = Wait-list; ZIL = Zelf-inventarisatielijst; Condition, Education, and NM frequency baseline represent linear slopes across all conditions

* $p < .05$; ** $p < .01$; *** $p < .001$

¹log-transformed

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Table F. Observed means and standard deviations (in parentheses) for all outcome measures

| | Group | Pre-assessment | | Post-assessment | | 3-months FU | | 6-months FU | |
|--|-------|----------------|---------------|-----------------|---------------|-------------|---------------|-------------|---------------|
| | | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> | <i>n</i> | <i>M (SD)</i> |
| Nightmare frequency | IR | 31 | 5.19 (6.14) | 29 | 3.95 (6.56) | 28 | 4.43 (6.59) | 25 | 3.24 (3.18) |
| | IE | 29 | 3.98 (3.47) | 28 | 2.71 (2.96) | 22 | 1.91 (2.02) | 27 | 2.07 (2.27) |
| | WL | 35 | 4.00 (2.86) | 35 | 4.13 (3.17) | | | | |
| Log-transformed Nightmare frequency | IR | 31 | 1.58 (.66) | 29 | 1.18 (.86) | 28 | 1.22 (.96) | 25 | 1.16 (.81) |
| | IE | 29 | 1.47 (.49) | 28 | 1.05 (.72) | 22 | .84 (.69) | 27 | .87 (.73) |
| | WL | 35 | 1.46 (.55) | 35 | 1.46 (.61) | | | | |
| NDIQ | IR | 31 | 20.02 (6.09) | 29 | 13.02 (8.03) | 27 | 10.93 (8.95) | 25 | 10.32 (7.52) |
| | IE | 30 | 21.33 (4.97) | 28 | 12.68 (7.66) | 22 | 7.50 (6.37) | 27 | 7.44 (6.32) |
| | WL | 35 | 19.47 (5.39) | 34 | 18.09 (6.57) | | | | |
| Nights with nightmares | IR | 31 | 3.40 (1.78) | 29 | 2.50 (2.04) | 28 | 2.50 (2.44) | 25 | 2.28 (1.90) |
| | IE | 30 | 2.80 (1.35) | 28 | 2.00 (1.68) | 22 | 1.59 (1.71) | 27 | 1.59 (1.72) |
| | WL | 35 | 3.26 (1.83) | 35 | 3.17 (1.82) | | | | |
| NBQ | IR | 30 | 14.07 (6.36) | 29 | 9.10 (5.47) | 27 | 6.96 (6.44) | 25 | 7.80 (5.50) |
| | IE | 30 | 13.87 (5.37) | 28 | 9.13 (6.41) | 22 | 6.23 (6.32) | 26 | 7.15 (6.41) |
| | WL | 31 | 14.35 (5.33) | 34 | 13.71 (6.34) | | | | |
| ISI | IR | 31 | 14.77 (5.13) | 28 | 10.91 (5.51) | 27 | 11.19 (6.00) | 25 | 10.28 (5.79) |
| | IE | 30 | 15.27 (4.87) | 28 | 10.17 (5.43) | 22 | 7.91 (5.25) | 26 | 8.12 (5.91) |
| | WL | 33 | 14.50 (5.02) | 33 | 14.18 (4.59) | | | | |
| ZIL | IR | 31 | 45.19 (12.40) | 28 | 37.66 (9.83) | 27 | 37.52 (11.04) | 25 | 35.88 (9.50) |
| | IE | 30 | 41.60 (10.03) | 28 | 36.57 (8.97) | 22 | 32.82 (9.40) | 26 | 33.12 (8.82) |
| | WL | 34 | 40.42 (9.75) | 34 | 37.87 (8.97) | | | | |

Note. FU = follow-up assessment; IE = Imaginal exposure; IR = Imagery rescripting; ISI = Insomnia Severity Index; NBQ = Nightmare Beliefs Questionnaire; NDIQ = Nightmare Distress and Impact Questionnaire; WL = Wait-list; ZIL = Zelf-inventarisatielijst