Gellersen, HM, Kedzior, KK. Antidepressant outcomes of high-frequency repetitive transcranial magnetic stimulation (rTMS) with F8-coil and deep transcranial magnetic stimulation (DTMS) with H1-coil in major depression: a systematic review and meta-analysis. BMC Psychiatry. 2019; doi: https://doi.org/10.1186/s12888-019-2106-7

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**Studies in meta-analysis**

$k=19$ with $k=20$ independent subgroups

**A. DTMS with H1-coil ($k=8$)**
- Levkovitz et al., 2009 [1]
- Rosenberg et al., 2010a [2]
- Rosenberg et al., 2010b [3]
- Isserles et al., 2011 [4]
- Harel et al., 2014 [5]
- Levkovitz et al., 2015 [6]
- Rapinesi et al., 2015a [7]
- Rapinesi et al., 2015b [8]

**B. rTMS with F8-coil ($k=12$)**
- George et al., 1997 [9]
- Berman et al., 2000 [10]
- Catafau et al., 2001 [11]
- Garcia-Toro et al., 2001a [12]
- Garcia-Toro et al., 2001b [13]
- Boutros et al., 2002 [14]
- Bajbouj et al., 2005 [15]
- Yukimasa et al., 2006 [16]
- Luborzewski et al., 2007 [17]
- Bakim et al., 2012a [18] 80%
- Bakim et al., 2012b [18] 110%
- Chen et al., 2013 [19]
Figure S1. Depression severity: outlier analysis and one-study removed analysis

A. Outlier analysis

| Study name                        | Outcome | Statistics for each study | Hedge's g and 95% CI |
|-----------------------------------|---------|---------------------------|----------------------|
| George et al., 1997               | F8      | 0.76 (0.02, 1.54)        | 0.0065               |
| Berman et al., 2000               | F8      | 1.15 (0.39, 1.91)        | 0.0030               |
| Catafau et al., 2001              | F8      | 0.31 (-0.42, 1.03)       | 0.407                |
| Garcia-Toro et al., 2004          | F8      | 1.02 (0.45, 1.58)        | 0.0002               |
| Garcia-Toro et al., 2006          | F8      | 1.28 (0.52, 2.04)        | 0.0011               |
| Bautista et al., 2006             | F8      | 0.89 (0.26, 1.53)        | 0.0012               |
| Babajing et al., 2005             | F8      | 0.95 (0.53, 1.38)        | 0.0000               |
| Yacine et al., 2006               | F8      | 0.76 (0.35, 1.20)        | 0.025                |
| Lubrowicki et al., 2008A          | F8      | 0.59 (0.10, 1.09)        | 0.019                |
| Bakim et al., 2012, 80%           | F8      | 1.23 (0.51, 1.95)        | 0.0012               |
| Bakim et al., 2012, 110%          | F8      | 1.46 (0.86, 2.13)        | 0.0000               |
| Chen et al., 2013                 | F8      | 6.00 (3.54, 9.26)        | 0.0000               |
| Levkovitz et al., 2009            | H1      | 0.97 (0.70, 1.25)        | 0.0000               |
| Rosenberg et al., 2010            | H1      | 1.05 (0.86, 2.06)        | 0.0000               |
| Rosenberg et al., 2010M           | H1      | 1.36 (1.02, 1.70)        | 0.0000               |
| Isserles et al., 2011             | H1      | 2.36 (1.93, 2.80)        | 0.0000               |
| Harel et al., 2014                | H1      | 1.61 (1.04, 2.19)        | 0.0000               |
| Levkovitz et al., 2015            | H1      | 1.22 (0.96, 1.48)        | 0.0000               |
| Rapinesi et al., 2015a            | H1      | 1.16 (0.93, 1.42)        | 0.0000               |
| Rapinesi et al., 2015b            | H1      | 1.23 (0.98, 1.47)        | 0.0000               |
| George et al., 1997               | F8      | 1.22 (0.96, 1.47)        | 0.0000               |
| Berman et al., 2000               | F8      | 1.21 (0.96, 1.46)        | 0.0000               |
| Catafau et al., 2001              | F8      | 1.24 (1.01, 1.48)        | 0.0000               |
| Garcia-Toro et al., 2004          | F8      | 1.22 (0.97, 1.47)        | 0.0000               |
| Garcia-Toro et al., 2006          | F8      | 1.20 (0.96, 1.45)        | 0.0000               |
| Boutros et al., 2002              | F8      | 1.22 (0.97, 1.47)        | 0.0000               |
| Babajing et al., 2005             | F8      | 1.23 (0.97, 1.48)        | 0.0000               |
| Yukimasa et al., 2006              | F8      | 1.24 (0.99, 1.49)        | 0.0000               |
| Lubrowicki et al., 2007            | F8      | 1.24 (1.00, 1.48)        | 0.0000               |
| Bakim et al., 2012, 80%            | F8      | 1.20 (0.95, 1.45)        | 0.0000               |
| Bakim et al., 2012, 110%          | F8      | 1.19 (0.94, 1.43)        | 0.0000               |
| Chen et al., 2013                 | F8      | 1.15 (0.94, 1.35)        | 0.0000               |

B. One-study removed analysis
Note. Figures A-B are forest plots of the random-effects meta-analyses of the primary antidepressant outcome (depression severity at baseline (pre) – session 10 (post)) in all studies with either coil (F8-coil and H1-coil). Figure S1A shows the results of an outlier analysis. The effect size (Hedges’ \( g \)) in one study (Chen et al., 2013) was significantly \( (p<.01) \) higher than all other effects in rTMS studies with F8-coil. The removal of this study did not change the interpretation of the pooled mean weighted effect that was 1.20 with and 1.15 without the study by Chen et al., 2013, respectively (Figure S1B).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); Hedges’ \( g \) (effect size), standardised paired difference in means corrected for the sample size; rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.
**Figure S2. Depression severity: subgroup analysis**

**A. Study design (RCT vs. open-label)**

| Group by Study design | Study name             | Outcome | Statistics for each study | Hedge's g and 95% CI     |
|-----------------------|------------------------|---------|---------------------------|--------------------------|
|                       |                        |         | Hedge's g | Lower limit | Upper limit | p-Value | Total |
| open-label            | Levkovitz et al., 2009| H1      | 1.65       | 0.98        | 2.31        | 0.000   | 20    |
| open-label            | Rosenberg et al., 2010a| H1      | 1.48       | 0.47        | 2.49        | 0.004   | 7     |
| open-label            | Rosenberg et al., 2010b| H1      | 1.94       | 0.65        | 3.23        | 0.003   | 6     |
| open-label            | Isantes et al., 2011  | H1      | 2.36       | 1.52        | 3.20        | 0.000   | 20    |
| open-label            | Harel et al., 2014    | H1      | 1.61       | 1.04        | 2.19        | 0.000   | 26    |
| open-label            | Rapinesi et al., 2015a| H1      | 2.71       | 1.33        | 4.09        | 0.000   | 9     |
| open-label            | Rapinesi et al., 2015b| H1      | 0.94       | 0.21        | 1.66        | 0.009   | 12    |
| open-label            | Califa et al., 2009   | F8      | 0.31       | 0.42        | 0.13        | 0.407   | 5     |
| open-label            | Ballou et al., 2005   | F8      | 0.65       | 0.53        | 1.38        | 0.000   | 30    |
| open-label            | Yukimasa et al., 2006 | F8      | 0.76       | 0.35        | 1.20        | 0.000   | 26    |
| open-label            | Luborzewski et al., 2007| F8      | 0.59      | 0.10        | 1.09        | 0.019   | 17    |
| open-label            |                         |         | 1.24       | 0.87        | 1.61        | 0.000   |       |
| RCT                   | Levkovitz et al., 2015 | H1      | 1.12       | 0.85        | 1.40        | 0.000   | 83    |
| RCT                   | George et al., 1987    | F8      | 0.78       | 0.02        | 1.54        | 0.046   | 7     |
| RCT                   | Barron et al., 2000    | F8      | 1.15       | 0.39        | 1.91        | 0.003   | 10    |
| RCT                   | Garcia-Toro et al., 2001a| F8      | 1.02       | 0.45        | 1.58        | 0.000   | 17    |
| RCT                   | Garcia-Toro et al., 2001b| F8      | 1.28       | 0.52        | 2.04        | 0.001   | 11    |
| RCT                   | Boulva et al., 2012    | F8      | 0.89       | 0.26        | 1.53        | 0.006   | 12    |
| RCT                   | Bakhit et al., 2012, 30%| F8      | 1.23       | 0.51        | 1.95        | 0.001   | 12    |
| RCT                   | Bakim et al., 2012, 110%| F8      | 1.48       | 0.66        | 2.31        | 0.000   | 11    |
| RCT                   | Chen et al., 2013      | F8      | 0.60       | 0.34        | 0.93        | 0.000   | 10    |
| RCT                   |                         |         | 1.17       | 0.86        | 1.48        | 0.000   |       |
B. Therapy type (add-on to antidepressants vs. monotherapy)

Note. Figures A-B are forest plots of mixed-effects meta-analyses comparing the antidepressant outcomes (depression severity) based on the study designs (RCTs vs. open-label, Figure A) or the therapy type (add-on to antidepressants vs. monotherapy, Figure B) in studies with either coil (F8-coil and H1-coil).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); Hedges’ $g$ (effect size), standardised paired difference in means corrected for the sample size; rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.

| Group by Any antidepressants | Study name | Outcome | Statistics for each study | Hedge's g and 95% CI | p-Value | Total |
|-----------------------------|------------|---------|---------------------------|----------------------|---------|-------|
| no                          | Levkovitz et al., 2009 | H1    | 1.65 | 0.98 | 2.31 | 0.000 | 20 |
| no                          | Rosenberg et al., 2010a | H1    | 1.48 | 0.47 | 2.49 | 0.004 | 7 |
| no                          | Bermejo et al., 2003 | F8    | 1.13 | 0.39 | 1.86 | 0.030 | 10 |
| no                          | Levkovitz et al., 2015 | H1    | 1.12 | 0.35 | 1.48 | 0.030 | 82 |
| yes                         | Levkovitz et al., 2010b | H1    | 1.94 | 0.85 | 2.32 | 0.003 | 6 |
| yes                         | Isserles et al., 2011 | H1    | 2.38 | 1.52 | 3.20 | 0.000 | 20 |
| yes                         | Harati et al., 2014 | H1    | 1.63 | 1.04 | 2.19 | 0.000 | 20 |
| yes                         | Reppas et al., 2015a | H1    | 2.71 | 1.33 | 4.09 | 0.000 | 9 |
| yes                         | Reppas et al., 2015b | H1    | 0.84 | 0.21 | 1.46 | 0.039 | 12 |
| yes                         | George et al., 1997 | F8    | 0.79 | 0.30 | 1.46 | 0.049 | 7 |
| yes                         | Calvacciari et al., 2001 | F8    | 0.37 | -0.42 | 1.03 | 0.47 | 5 |
| yes                         | Garcia-Toro et al., 2016 | H1 | 1.62 | 0.66 | 2.59 | 0.000 | 17 |
| yes                         | Garcia-Toro et al., 2016b | F8 | 1.32 | -0.32 | 2.97 | 0.000 | 11 |
| yes                         | Badiani et al., 2005 | F8    | 0.89 | 0.36 | 1.43 | 0.000 | 12 |
| yes                         | Badiani et al., 2005 | F8    | 0.90 | 0.35 | 1.46 | 0.000 | 30 |
| yes                         | Yuldashev et al., 2008 | F8    | 0.78 | 0.35 | 1.20 | 0.000 | 28 |
| yes                         | Lubinovskis et al., 2008 | H1    | 0.59 | 0.10 | 1.09 | 0.019 | 17 |
| yes                         | Badiani et al., 2012 | H1    | 1.23 | 0.51 | 1.95 | 0.001 | 12 |
| yes                         | Badiani et al., 2012 | H1    | 1.48 | 0.68 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
| yes                         | Bakim et al., 2012, 80% | F8 | 1.20 | 0.66 | 1.50 | 0.000 | 12 |
| yes                         | Bakim et al., 2012, 110% | F8 | 1.48 | 0.66 | 2.31 | 0.000 | 11 |
| yes                         | Chen et al., 2013 | F8    | 6.40 | 3.54 | 9.26 | 0.000 | 10 |
Figure S3. Depression severity: publication bias analysis

Classic fail-safe N

- Z-value for observed studies: 16.34911
- P-value for observed studies: 0.00000
- Alpha: 0.05000
- Tab: 2.00000
- Z for alpha: 1.95996
- Number of observed studies: 20.00000
- Number of missing studies that would bring p-value to > alpha: 1372.00000

Orwin’s fail-safe N

- Hedges’s g in observed studies: 1.10522
- Criterion for a ‘trivial’ Hedges’s g: 0.20000
- Mean Hedges’s g in missing studies: 0.10000
- Number missing studies needed to bring Hedges’s g under 0.2: 182.00000

Note. The funnel plot shows a distribution of all effect sizes (the unfilled circles) around the pooled mean weighted effect of all studies (the unfilled diamond). Four studies theoretically missing from the analysis (the filled circles) are required to make the plot symmetric. The interpretation of the analysis including the missing studies (the filled diamond) is the same as without these studies (the unfilled diamond). If the missing studies indicate that publication bias occurred, such bias has no effect on the interpretation of the results of this analysis.
Figure S4. Response rates: subgroup analysis
A. Study design (RCT vs. open-label)

| Group by Study design | Study name | Outcome | Event rate | Lower limit | Upper limit | Total |
|-----------------------|------------|---------|------------|-------------|-------------|-------|
| open-label            | Levkovitz et al., 2009 H1 | 0.45 | 0.25 | 0.66 | 9 / 20 |
| open-label            | Rosenberg et al., 2010a H1 | 0.29 | 0.07 | 0.67 | 2 / 7 |
| open-label            | Rosenberg et al., 2010b H1 | 0.50 | 0.17 | 0.83 | 3 / 6 |
| open-label            | Rapinesi et al., 2015a H1 | 0.05 | 0.00 | 0.47 | 0 / 19 |
| open-label            | Rapinesi et al., 2015b H1 | 0.04 | 0.00 | 0.40 | 0 / 12 |
| open-label            | Cabanal et al., 2001 F8 | 0.40 | 0.10 | 0.60 | 2 / 5 |
| open-label            | Bajouj et al., 2005 F8 | 0.33 | 0.19 | 0.52 | 10 / 30 |
| open-label            | Yukimasa et al., 2006 F8 | 0.35 | 0.17 | 0.60 | 6 / 17 |
| open-label            | Luborzewski et al., 2007 F8 | 0.32 | 0.23 | 0.42 | |
| RCT                   | Levkovitz et al., 2015 H1 | 0.15 | 0.06 | 0.24 | 13 / 89 |
| RCT                   | George et al., 1997 F8 | 0.14 | 0.02 | 0.58 | 1 / 7 |
| RCT                   | Berman et al., 2000 F8 | 0.10 | 0.01 | 0.47 | 1 / 10 |
| RCT                   | Garcia-Toro et al., 2001 F8 | 0.36 | 0.14 | 0.56 | 4 / 11 |
| RCT                   | Boutros et al., 2002 F8 | 0.25 | 0.08 | 0.55 | 3 / 12 |
| RCT                   | Chen et al., 2013 F8 | 0.70 | 0.38 | 0.90 | 7 / 10 |
| RCT                   |                | 0.26 | 0.13 | 0.47 | |

Event rate and 95% CI
B. Therapy type (add-on to antidepressants vs. monotherapy)

Note. Figures A-B are forest plots of mixed-effects meta-analyses comparing the antidepressant outcomes (response rates) based on the study designs (RCTs vs. open-label, Figure A) or the therapy type (add-on to antidepressants vs. monotherapy, Figure B) in studies with either coil (F8-coil and H1-coil).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.
Figure S5. Response rates: publication bias analysis

Classic fail-safe N

- Z-value for observed studies: 5.95254
- P-value for observed studies: 0.00000
- Alpha: 0.05000
- Tau: 2.00000
- Z for alpha: 1.95996
- Number of observed studies: 15,000
- Number of missing studies that would bring p-value to α: 124,000

Orwin's fail-safe N

- Event rate in observed studies: 0.27178
- Criterion for a 'trivial' event rate: 0.10000
- Mean event rate in missing studies: 0.05000
- Number missing studies needed to bring event rate under 0.1: 25,000

Note. The funnel plot shows a distribution of all effect sizes (the unfilled circles) around the pooled mean weighted effect of all studies (the unfilled diamond). Two studies theoretically missing from the analysis (the filled circles) are required to make the plot symmetric. The interpretation of the analysis including the missing studies (the filled diamond) is the same as without these studies (the unfilled diamond). If the missing studies indicate that publication bias occurred, such bias has no effect on the interpretation of the results of this analysis.
Figure S6. Remission rates: subgroup analysis

A. Study design (RCT vs. open-label)

| Group by Study design | Study name          | Outcome | Event rate | Lower limit | Upper limit | Total |
|-----------------------|---------------------|---------|------------|-------------|-------------|-------|
| open-label Levkovitz et al., 2009 | H1              | 0.20    | 0.08       | 0.43        | 4 / 20      |
| open-label Rosenberg et al., 2010a | H1             | 0.14    | 0.02       | 0.58        | 1 / 7       |
| open-label Rosenberg et al., 2010b | H1             | 0.17    | 0.02       | 0.63        | 1 / 6       |
| open-label Rapinesi et al., 2015a | H1             | 0.11    | 0.02       | 0.50        | 1 / 9       |
| open-label Rapinesi et al., 2015b | H1             | 0.04    | 0.00       | 0.40        | 0 / 12      |
| open-label Catafau et al., 2001  | F8             | 0.08    | 0.01       | 0.62        | 0 / 5       |
| open-label Yukimasa et al., 2006  | F8             | 0.27    | 0.13       | 0.47        | 7 / 26      |
| open-label Lubozenski et al., 2007F6 |     | 0.29    | 0.13       | 0.54        | 5 / 17      |
| RCT Levkovitz et al., 2015       | H1             | 0.07    | 0.03       | 0.14        | 6 / 89      |
| RCT George et al., 1997          | F8             | 0.14    | 0.02       | 0.58        | 1 / 7       |
| RCT Berman et al., 2000          | F8             | 0.10    | 0.01       | 0.47        | 1 / 10      |
| RCT Boutros et al., 2002         | F8             | 0.08    | 0.01       | 0.41        | 1 / 12      |

Event rate and 90% CI
B. Therapy type (add-on to antidepressants vs. monotherapy)

| Group by | Study name                  | Outcome | Event rate | Lower limit | Upper limit | Total |
|----------|-----------------------------|---------|------------|-------------|-------------|-------|
| no       | Levkovitz et al., 2009      | H1      | 0.20       | 0.08        | 0.43        | 20    |
| no       | Rosenberg et al., 2010      | H1      | 0.14       | 0.02        | 0.56        | 1/7   |
| no       | Levkovitz et al., 2013      | H1      | 0.07       | 0.03        | 0.14        | 8/69  |
| no       | Berman et al., 2000         | F8      | 0.10       | 0.01        | 0.47        | 10    |
| no       |                            |         | 0.11       | 0.06        | 0.19        |       |
| no       | Rosenberg et al., 2019      | H1      | 0.17       | 0.02        | 0.63        | 1/6   |
| yes      | Rapinesi et al., 2015b     | H1      | 0.11       | 0.02        | 0.60        | 1/9   |
| yes      | Rapinesi et al., 2015       | H1      | 0.04       | 0.00        | 0.40        | 1/12  |
| yes      | George et al., 1997        | F8      | 0.14       | 0.02        | 0.55        | 1/7   |
| yes      | Caffau et al., 2001         | F8      | 0.08       | 0.01        | 0.42        | 1/5   |
| yes      | Boutris et al., 2002        | F8      | 0.08       | 0.01        | 0.41        | 1/12  |
| yes      | Yukimasa et al., 2006       | F8      | 0.27       | 0.13        | 0.47        | 2/26  |
| yes      | Luborawski et al., 2008     | F8      | 0.29       | 0.13        | 0.54        | 1/17  |
| yes      |                            |         | 0.20       | 0.13        | 0.31        |       |

Note. Figures A-B are forest plots of mixed-effects meta-analyses comparing the antidepressant outcomes (remission rates) based on the study designs (RCTs vs. open-label, Figure A) or the therapy type (add-on to antidepressants vs. monotherapy, Figure B) in studies with either coil (F8-coil and H1-coil).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.
Figure S7. Remission rates: meta-regression analysis

Note. The figure is a scatterplot of random-effects meta-regression. The plot shows the relationships between remission rates expressed as weighted effect size in each study (logit event rate depicted as circles - the larger the circle, the higher the study weight) on the Y-axis and predictor on the X-axis (stimulation intensity, %MT, per study) using data from studies with either coil (F8-coil and H1-coil).

Abbreviations: DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); %MT, percent of the resting motor threshold; rTMS, repetitive transcranial magnetic stimulation.
Figure S8. Remission rates: publication bias analysis

### Classic fail-safe N

| Parameter                                      | Value      |
|------------------------------------------------|------------|
| Z-value for observed studies                   | -7.96174   |
| P-value for observed studies                   | 0.00000    |
| Alpha                                          | 0.05000    |
| Tails                                          | 2.90000    |
| Z for alpha                                    | 1.95996    |
| Number of observed studies                      | 12.00000   |
| Number of missing studies that would bring p-value to > alpha | 167.00000 |

### Orwin's fail-safe N

| Parameter                                      | Value      |
|------------------------------------------------|------------|
| Event rate in observed studies                 | 0.15313    |
| Criterion for a trivial event rate             | 0.10000    |
| Mean event rate in missing studies             | 0.05000    |
| Number missing studies needed to bring event rate under 0.1 | 0.00000    |

Note. The funnel plot shows a distribution of all effect sizes (the unfilled circles) around the pooled mean weighted effect of all studies (the unfilled diamond). Six studies theoretically missing from the analysis (the filled circles) are required to make the plot symmetric. The interpretation of the analysis including the missing studies (the filled diamond) is the same as without these studies (the unfilled diamond). If the missing studies indicate that publication bias occurred, such bias has no effect on the interpretation of the results of this analysis.
**Figure S9. Depression severity: subgroup analysis (H1-coil vs. F8-coil)**

### A. Open-label studies

| Group by Outcome | Study name           | Outcome | Statistics for each study | Hedge's $g$ and 95% CI |
|------------------|----------------------|---------|---------------------------|------------------------|
| F8               | Catafau et al., 2001| F8      |                           | 0.31 -0.42 1.03 0.497 5 |
| F8               | Bajbouj et al., 2005| F8      |                           | 0.95 0.53 1.38 0.000 30 |
| F8               | Yukimasa et al., 2006| F8      |                           | 0.78 0.36 1.20 0.000 26 |
| F8               | Lubrano et al., 2007| F8      |                           | 0.59 0.10 1.09 0.019 17 |
| F8               |                     |         |                           | 0.74 0.49 -0.98 0.000  |
| H1               | Levkovitz et al., 2009| H1      |                           | 1.65 0.98 2.31 0.000 20 |
| H1               | Rosenberg et al., 2010a| H1      |                           | 1.48 0.47 2.49 0.004 7  |
| H1               | Rosenberg et al., 2010b| H1      |                           | 1.94 0.65 3.23 0.003 6  |
| F8               | Isserles et al., 2011| H1      |                           | 2.36 1.52 3.20 0.000 20 |
| H1               | Hand et al., 2014    | H1      |                           | 1.61 1.04 2.19 0.000 20 |
| H1               | Rapinesi et al., 2015a| H1      |                           | 2.71 1.33 4.09 0.000 9  |
| H1               | Rapinesi et al., 2015b| H1      |                           | 0.84 0.21 1.46 0.000 12 |
| H1               |                     |         |                           | 1.67 1.23 2.11 0.000  |

-8.00 | -4.00 | 0.00 | 4.00 | 8.00

pre<post | pre>post
B. Add-on studies

Note. Figures A-B are forest plots of mixed-effects meta-analyses comparing the antidepressant outcomes (depression severity) in studies with F8-coil vs. H1-coil (Figure A: open-label studies; Figure B: studies with patients on concurrent antidepressants).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); Hedges’ g (effect size), standardised paired difference in means corrected for the sample size; rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.
### Figure S10. Response rates: subgroup analysis (H1-coil vs. F8-coil)

#### A. Open-label studies

| Group by Outcome | Study name             | Outcome | Event rate | Lower limit | Upper limit | Total |
|------------------|------------------------|---------|------------|-------------|-------------|-------|
| F8               | Catafau et al., 2001   | F8      | 0.40       | 0.10        | 0.80        | 2 / 5 |
| F8               | Bajbouj et al., 2005   | F8      | 0.33       | 0.19        | 0.52        | 10 / 30 |
| F8               | Yukimasa et al., 2006  | F8      | 0.19       | 0.08        | 0.39        | 5 / 26 |
| F8               | Luborzewski et al., 2007 | F8  | 0.20       | 0.17        | 0.60        | 6 / 17 |
| F8               |                        |         |            |             |             |       |
| H1               | Levkovitz et al., 2009 | H1      | 0.45       | 0.25        | 0.66        | 9 / 20 |
| H1               | Rosenberg et al., 2010a | H1    | 0.29       | 0.07        | 0.67        | 2 / 7 |
| H1               | Rosenberg et al., 2010b | H1    | 0.50       | 0.17        | 0.83        | 3 / 6 |
| H1               | Rapinesi et al., 2015a | H1     | 0.05       | 0.00        | 0.47        | 0 / 9 |
| H1               | Rapinesi et al., 2015b | H1     | 0.04       | 0.00        | 0.40        | 0 / 12 |
| H1               |                        |         |            |             |             |       |

Event rates and 95% CI are shown in the graph.
B. Add-on studies

Note. Figures A-B are forest plots of mixed-effects meta-analyses comparing the antidepressant outcomes (response rates) in studies with F8-coil vs. H1-coil (Figure A: open-label studies; Figure B: studies with patients on concurrent antidepressants).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.
**Figure S11. Remission rates: subgroup analysis (H1-coil vs. F8-coil)**

A. Open-label studies

| Group by Outcome | Study name         | Event rate | Lower limit | Upper limit | Total |
|------------------|--------------------|------------|-------------|-------------|-------|
| F8               | Catafau et al., 2001 | 0.08       | 0.01        | 0.62        | 0 / 5 |
| F8               | Yukimasa et al., 2006 | 0.27       | 0.13        | 0.47        | 7 / 26 |
| F8               | Luborzewski et al., 2007 | 0.23       | 0.13        | 0.45        | 5 / 17 |
| H1               | Levkovitz et al., 2009 | 0.20       | 0.08        | 0.43        | 4 / 20 |
| H1               | Rosenberg et al., 2010a | 0.14       | 0.02        | 0.56        | 1 / 7 |
| H1               | Rosenberg et al., 2010b | 0.17       | 0.02        | 0.63        | 1 / 6 |
| H1               | Rapinesi et al., 2015a | 0.11       | 0.02        | 0.50        | 1 / 9 |
| H1               | Rapinesi et al., 2015b | 0.04       | 0.00        | 0.40        | 0 / 12 |
| H1               |                    | 0.15       | 0.08        | 0.28        |       |

-1.00 -0.50 0.00 0.50 1.00
B. Add-on studies

Note. Figures A-B are forest plots of mixed-effects meta-analyses comparing the antidepressant outcomes (remission rates) in studies with F8-coil vs. H1-coil (Figure A: open-label studies; Figure B: studies with patients on concurrent antidepressants).

Abbreviations: CI, 95% confidence interval; DTMS, deep transcranial magnetic stimulation; F8, figure-of-eight coil (rTMS); H1, H1-coil (DTMS); rTMS, repetitive transcranial magnetic stimulation; Total, sample size per study.
Table S1. Risk of bias assessment

| Study                          | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding of participants and personnel (performance bias) | Blinding of outcome assessment (detection bias) | Incomplete outcome data (attrition bias) | Selective reporting (reporting bias) | Other bias |
|-------------------------------|--------------------------------------------|----------------------------------------|----------------------------------------------------------|------------------------------------------------|----------------------------------------|--------------------------------------|------------|
| DTMS (H1-coil)                |                                            |                                        |                                                           |                                                |                                        |                                      |            |
| Levkovitz et al., 2009 [1]    | H                                          | H                                      | H                                                        | L                                              | L                                      | L                                    |            |
| Rosenberg et al., 2010a [2]   | H                                          | H                                      | H                                                        | L                                              | L                                      | L                                    |            |
| Rosenberg et al., 2010b [3]   | H                                          | H                                      | H                                                        | L                                              | L                                      | L                                    |            |
| Isserles et al., 2011 [4]     | H                                          | H                                      | H                                                        | L                                              | U²                                    | L                                    |            |
| Harel et al., 2014 [5]        | H                                          | H                                      | H                                                        | H                                              | L                                      | L                                    | L          |
| Levkovitz et al., 2015 [6]    | L                                          | L                                      | L                                                        | L                                              | L                                      | L                                    | L          |
| Rapinesi et al., 2015a [7]    | H                                          | H                                      | H                                                        | L                                              | L                                      | L                                    | L          |
| Rapinesi et al., 2015b [8]    | H                                          | H                                      | H                                                        | H                                              | L                                      | L                                    | L          |
| rTMS (F8-coil)                |                                            |                                        |                                                           |                                                |                                        |                                      |            |
| George et al., 1997 [9]       | U¹                                         | U¹                                     | L                                                        | L                                              | L                                      | L                                    | L          |
| Berman et al., 2000 [10]      | U¹                                         | U¹                                     | L                                                        | L                                              | L                                      | L                                    | L          |
| Catafau et al., 2001 [11]     | H                                          | H                                      | H                                                        | H                                              | L                                      | L                                    | L          |
| Garcia-Toro et al., 2001a [12]| U¹                                         | U¹                                     | L                                                        | L                                              | U²                                    | L                                    | L          |
| Garcia-Toro et al., 2001b [13]| U¹                                         | U¹                                     | L                                                        | L                                              | U²                                    | L                                    | L          |
| Boutros et al., 2002 [14]     | L                                          | L                                      | L                                                        | L                                              | L                                      | L                                    | L          |
| Bajbouj et al., 2005 [15]     | H                                          | H                                      | H                                                        | H                                              | L                                      | L                                    | L          |
| Yukimasa et al., 2006 [16]    | H                                          | H                                      | H                                                        | H                                              | L                                      | L                                    | L          |
| Luborzewski et al., 2007 [17] | H                                          | H                                      | H                                                        | H                                              | L                                      | L                                    | L          |
| Bakim et al., 2012a [18]      | L                                          | L                                      | L                                                        | L                                              | L                                      | L                                    | L          |
| Chen et al., 2013 [19]        | U¹                                         | U¹                                     | L                                                        | L                                              | L                                      | L                                    | L          |

Note. Coding criteria:

- **U¹** indicates that the random sequence generation and/or the allocation concealment were not described in the double-blind randomised controlled-trials with inactive sham groups (both risks are likely to be low)
- **U²** indicates that studies reported outcomes for completers only meaning that the risk of attrition bias is unclear
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