**Supplementary Online Material**

Table S1

Age, Participant Characteristics and Intervention type of the studies included in the meta-analysis

|  |  |  |  |
| --- | --- | --- | --- |
| Study author (year) | Age of whole sample | Participant characteristics | Intervention type |
| Alloway et al. (2013), comparison 1 | 10.90 | Learning difficulties | Jungle Memory |
| Alloway et al.(2013), comparison 2 | 10.66 | Learning difficulties | Jungle Memory |
| Alloway (2012) | 12.95 | Learning difficulties | Jungle Memory |
| Borella et al. (2010) | 69.80 | Healthy older adults | Verbal WM task |
| Brehmer et al. (2012), comparison 1 | 25.95 | Healthy younger adults | Cogmed |
| Brehmer et al. (2012), comparison 2 | 63.75 | Healthy older adults | Cogmed |
| Brehmer et al. (2011) | 63.60 | Healthy older adults | Cogmed |
| Carretti, Borella, Fostinelli, et al. (2013) | 71.20 | Healthy older adults | Verbal WM task |
| Carretti, Borella, Zavagnin, et al. (2013) | 69.69 | Healthy older adults | Verbal WM task |
| Chacko et al. (2014) | 8.40 | ADHD | Cogmed |
| Chein & Morrison (2010) | 20.35 | Healthy younger adults | Verbal and spatial complex WM measures |
| Chooi et al. (2012), comparison 1 | 19.87 | Healthy younger adults | Dual n-back training |
| Chooi et al. (2012), comparison 2 | 19.80 | Healthy younger adults | Dual n-back training |
| Colom et al. (2013) | 18.12 | Healthy younger adults | Dual n-back training |
| Dahlin, Nyberg, et al. (2008), comparison 1 | 23.88 | Healthy younger adults | 5 WM tasks requiring updating |
| Dahlin, Nyberg, et al. (2008), comparison 2 | 68.32 | Healthy older adults | 5 WM tasks requiring updating |
| Dahlin, Neely, et al. (2008) | 23.55 | Healthy younger adults | 5 WM tasks requiring updating |
| Dunning et al. (2013), comparison 1 | 8.05 | Children with low wm | Cogmed |
| Dunning et al. (2013), comparison 2 | 8.34 | Children with low wm | Cogmed |
| Egeland et al. (2013) | 10.40 | ADHD | Cogmed |
| Gray et al. (2012) | 14.30 | LD/ADHD | Cogmed |
| Harrison et al. (2013) | 19.70 | Healthy younger adults | Complex WM tasks |
| Heinzel et al. (2014), comparison 1 | 25.75 | Healthy younger adults | Single (verbal) n-back training |
| Heinzel et al. (2014), comparison 2 | 65.84 | Healthy older adults | Single (verbal ) n-back training |
| Holmes et al. (2013), comparison 1 | 9.42 | Low academic | Cogmed |
| Holmes et al. (2013), comparison 2 | 10.50 | Low academic | Cogmed |
| Holmes et al. (2009) | 10.00 | Low verbal WM | Cogmed |
| Horowitz-Kraus & Breznitz (2009) | 25.20 | Treatment group with dyslexia | Cognifit Personal Coach Program |
| Hovik et al. (2013) | 10.40 | ADHD | Cogmed |
| Hubacher et al. (2013) | 41.95 | Patients with chronic schizophrenia | Training tool BrainStim |
| Jaeggi et al. (2014), comparison 1 | 24.58 | Healthy younger adults | Dual n-back training |
| Jaeggi et al. (2014), comparison 2 | 25.55 | Healthy younger adults | Single (verbal) n-back training |
| Jaeggi et al. (2011) | 8.98 | Healthy children | Single (spatial) n-back training |
| Jaeggi, Studer-Luethi, et al. (2010), comparison 1 | 19.25 | Healthy younger adults | Dual n-back training |
| Jaeggi, Studer-Luethi, et al. (2010), comparison 2 | 19.20 | Healthy younger adults | Single (spatial) n-back training |
| Jaeggi et al. (2008) | 25.60 | Healthy younger adults | Dual n-back training |
| Jaušovec & Jaušovec (2012) | 20.40 | Healthy younger adults | Five different task types taxing WM |
| Karbach et al. (2014) | 8.40 | Healthy children | Dual span tasks |
| Klingberg et al. (2005) | 9.85 | ADHD, IQ < 80 | Cogmed |
| Klingberg et al. (2002) | 11.20 | ADHD | Four different subtests |
| Lilienthal et al. (2013), comparison 1 | 19.85 | Healthy younger adults | Dual n-back training |
| Lilienthal et al. (2013), comparison 2 | 19.75 | Healthy younger adults | Dual n-back training |
| Loosli et al. (2012) | 10.00 | Healthy children | Complex WM task |
| Nutley et al. (2011) | 4.27 | Healthy children | Cogmed |

*(Table continues)*

Table S1 (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| Study author (year) | Age of whole sample | Participant characteristics | Intervention type |
| Penner et al. (2012), comparison 1 | 39.60 | Healthy adults | Training tool BrainStim |
| Penner et al. (2012), comparison 2 | 40.73 | Healthy adults | Training tool BrainStim |
| Redick et al. (2013), comparison 1 | 20.90 | Healthy younger adults | Dual n-back training |
| Redick et al. (2013), comparison 2 | 21.15 | Healthy younger adults | Dual n-back training |
| Richmond et al. (2011) | 66.00 | Healthy adults (old age 60 - 80years) | Verbal and spatial complex WM measures |
| Salminen et al. (2012) | 24.45 | Healthy (students) | Dual n-back training |
| Schmiedek et al. (2010), comparison 1 | 25.40 | Healthy younger adults | 12 tasks taxing WM, episodic memory and perceptual speed |
| Schmiedek et al. (2010), comparison 2 | 70.95 | Healthy older adults | 12 tasks taxing WM, episodic memory and perceptual speed |
| Shavelson et al. (2008) | 13.52 | Healthy (young adults) | Cogmed |
| Shiran & Breznitz (2011), comparison 1 | 25.10 | Healthy younger adults | Cognifit Personal Coach Program |
| Shiran & Breznitz (2011), comparison 2 | 24.80 | Dyslexic | Cognifit Personal Coach Program |
| St Clair-Thompson et al. (2010) | 6.88 | children (healthy and with special needs) | Memory booster |
| Stepankova et al. (2014), comparison 1 | 68.16 | Healthy older adults | Single (verbal) n-back training) |
| Stepankova et al. (2014), comparison 2 | 68.20 | Healthy older adults | Single verbal n-back training) |
| Thompson et al. (2013), comparison 1 | 21.25 | Healthy younger adults | Dual n-back training |
| Thompson et al. (2013), comparison 2 | 22.15 | Healthy younger adults | Dual n-back training |
| Thorell et al. (2009), comparison 1 | 4.72 | Healthy children | Visuospatial task from Cogmed |
| Thorell et al. (2009), comparison 2 | 4.80 | Healthy children | Visuospatial task from Cogmed |
| Van der Molen et al. (2010), comparison 1 | 15.16 | IQ 55-85 | Dual (visuospatial) task |
| Van der Molen et al. (2010), comparison 2 | 15.37 | IQ 55-85 | Dual (visuospatial) task |
| Westerberg et al. (2007) | 54.00 | Stroke patients | Cogmed |

*Note.* WM = working memory; ADHD = attention-deficit/hyperactivity disorder; LD = learning disabilities; IQ = intelligence.

Table S2

Outcomes with their measures and effect sizes with sample sizes (analyzed data) for the studies included in the meta-analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Alloway et al. (2013)  Comparison 1 | Verbal WM (average of processing letter recall and digit span backward) | 1.05 | 23 (39) | 1.27 | 11 (24) |
|  | Visuospatial WM (shape recall test) | 0.77 |  | 1.72 |  |
|  | Verbal ability (vocabulary | 0.50 |  | 1.41 |  |
|  | test (WASI))  Mathematical abilities (WOND) | 0.18 |  | 0.37 |  |
| Alloway et al. (2013)  Comparison 2 | Verbal WM (average of processing letter recall and digit span backward) | 0.17 | 32 (29) | -0.20 | 9 (24) |
|  | Visuospatial WM (shape recall test) | 0.04 |  | 0.30 |  |
|  | Verbal ability (vocabulary test (WASI)) | -0.26 |  | -0.18 |  |
|  | Mathematical abilities (WOND) | -0.11 |  | -0.01 |  |
| Alloway (2012) | Verbal WM (AWMA) | 1.49 | 8 (7) |  |  |
|  | Verbal ability (vocabulary test (WAS) | 1.12 |  |  |  |
|  | Mathematical abilities (WOND) | 0.58 |  |  |  |
| Borella et al. (2010) | Verbal STM (average of digit span forward and backward) | 2.03 | 20 (20) | 0.25 | 20 (20) |
|  | Visuospatial WM (dot matrix Task (adapted from Miyake et al., 2001)) | 1.34 |  | 0.11 |  |
|  | Nonverbal ability (CFT, scale 3)) | 1.14 |  | 0.75 |  |
| Brehmer et al. (2012)  Comparison 1 | Verbal STM (average of digit span f. and b.) | 0.76 | 29 (26) | 0.68 | 29 (26) |
|  | Visuospatial STM (average of span board forward and backward)  Nonverbal ability (Raven) | 1.71  -0.12 |  | 1.67 |  |
| Brehmer et al. (2012)  Comparison 2 | Verbal STM (average of digit span f. and b.) | 0.44 | 26 (19) | 0.28 | 26 (19) |
|  | Visuospatial STM (average of span board forward and backward)  Nonverbal ability (Raven) | 1.02  -0.36 |  | 1.25 |  |
| Brehmer et al. (2011) | Visuospatial STM (average of span board forward and backward) | 0.68 | 12 (11) |  |  |
|  | Nonverbal ability (Raven) | -0.28 |  |  |  |
| Carretti, Borella, Fostinelli, et al. (2013) | Verbal STM (average of digit span f. and b.) | -0.20 | 10 (10) |  |  |
|  | Visuospatial WM (dot matrix Task (adapted from Miyake et al., 2001)) | 0.66 |  |  |  |
|  | Nonverbal ability (CFT, scale 3) | 0.87 |  |  |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Carretti, Borella, Zavagnin, et al. (2013) | VWM (working memory updating word  span test)  Nonverbal ability (CFT, scale 3) | 0.98  0.56 | 17 (19) | 0.79  0.53 | 17 (19) |
| Chacko et al. (2014) | Verbal STM (digit recall) | 0.28 | 44 (41) |  |  |
|  | Verbal WM (listening recall) | 0.07 |  |  |  |
|  | Visuospatial STM (dot matrix) | 1.15 |  |  |  |
|  | Visuospatial WM (spatial recall) | 0.28 |  |  |  |
|  | Verbal ability (average of comprehension and spelling (WRAT4-PMV) | 0.21 |  |  |  |
|  | Mathematical abilities (mathematical computations (WRAT4-PMV) | 0.10 |  |  |  |
|  | Word decoding (word reading (WRAT4-PMV) | -0.05 |  |  |  |
| Chein & Morrison (2010) | Nonverbal ability (Raven) | 0.28 | 22 (20) |  |  |
| Chooi et al. (2012)  Comparison 1 | Verbal WM (operation span task) | 0.15 | 22 (26) |  |  |
|  | Nonverbal ability (Raven) | 0.20 |  |  |  |
|  | Verbal ability (Mill-Hill vocabulary test, word beginning and ending test) | 0.16 |  |  |  |
| Chooi et al. (2012) Comparison 2 | Verbal WM (operation span task) | 0.12 | 22 (45) |  |  |
|  | Nonverbal ability (Raven) | 0.27 |  |  |  |
|  | Verbal ability (Mill-Hill vocabulary test, word beginning and ending test) | 0.11 |  |  |  |
| Colom et al. (2013) | Verbal WM (composite of reading span, computation span and dot matrix) | 0.00 | 28 (28) |  |  |
|  | Nonverbal ability (composite of RAPM, abstract reasoning subtest from the DAT(-AR); inductive reasoning subtest from PMA(-R)) | 0.24 |  |  |  |
|  | Verbal ability (average of verbal reasoning  subtest from the DAT (DAT-VR) and vocabulary subtest  from the PMA (PMA-V) | -0.24 |  |  |  |
| Dahlin, Nyberg, et al. (2008)  Comparison 1 | Verbal STM (average of digit span f. and b.) | 0.03 | 15 (11) | 0.21 | 11 (7) |
|  | Verbal WM (computation span) | -0.42 | 15 (10) | 0.20 |  |
|  | Nonverbal ability (Raven) | 0.30 | 15 (11) | -0.14 |  |
|  | Verbal ability (a Swedish version of  the Controlled Oral Word Association Test, average of letter and category fluency) | -0.07 | 15 (11) | 0.33 |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Dahlin, Nyberg, et al. (2008)  Comparison 2 | Verbal STM (average of digit span f. and b.) | 0.27 | 13 (16) | 0.05 | 13 (7) |
|  | Verbal WM (computation span) | 0.11 |  | 0.18 |  |
|  | Nonverbal ability (Raven) | 0.06 |  | 0.28 |  |
|  | Verbal ability (a Swedish version of  the Controlled Oral Word Association Test, average of letter and category fluency) | 0.31 |  | -0.09 |  |
| Dunning et al. (2013)  Comparison 1 | Verbal STM (Average of Digit recall and Word Recall)  Verbal VWM (Average of Backward Digit Recall and Counting Recall)  Visuospatial STM (AWMA)  Visuospatial WM (AWMA)  Nonverbal ability (WASI)  Verbal ability (Vocabulary and Similarities (WASI)  Word decoding (WORD)  Mathematical abilities (WOND) | 0.10  1.57  1.08  1.04  -0.35  0.17  0.11  -0.15 | 34 (30)  34 (30)  34 (30)  34 (30)  34 (27)  34 (26)  34 (29)  33 (29) | -0.18  1.29  0.74  0.21  -0.13  -0.09  -0.02  -0.05 | 15 (19)  15 (19)  15 (19)  15 (19)  14 (17)  14 (17)  14 (17)  15 (16) |
| Dunning et al. (2013)  Comparison 2 | Verbal STM (average of digit recall and word recall)  Verbal WM (average of backward digit recall and counting recall)  Visuospatial STM (AWMA)  Visuospatial WM (AWMA)  Nonverbal ability (WASI)  Word decoding (WORD)  Mathematical abilities (WOND) | -0.21  2.26  0.65  1.07  -0.29  -0.27  -0.14 | 34 (30)  34 (30)  34 (30)  34 (30)  34 (30)  34 (30)  33 (30)  34 (30) |  |  |
| Egeland et al. (2013) | Mathematical abilities (two subtests of Key Math) | 0.28 | 33 (34) | 0.23 | 33 (34) |
| Word decoding (word decoding speed and quality of Coding (LOGOS) | 0.55 |  | 0.61 |  |
| Gray et al. (2012) | Visuospatial WM (CANTAB SWM)  Verbal ability (sentence level and spell level (WRAT-4PM))  Mathematical abilities (math  level (WRAT-4PM)  Word decoding (WRAT 4 Read LE) | -0.05  -0.01  -0.23  -0.02 | 32 (20) |  |  |
|  |  |  |
| Harrison et al. (2013) | Verbal STM (word span task) | 2.15 | 21 (17) |  |  |
| Verbal WM (average of reading span task and running-letter span task) | 4.00 |  |  |  |
| Visuospatial STM (arrow-span task) | 1.40 |  |  |  |
| Visuospatial VWM (average of rotation span task and running matrix span task) | 5.67 |  |  |  |
|  | Nonverbal ability (Raven) | 0.83 |  |  |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
|  |  |  |  |  |  |
| Heinzel et al. (2014)  Comparison 1 | Verbal STM (average of digit span f. and b.) | 0.14 | 15 (15) |  |  |
|  | Nonverbal ability (average of Raven and Leistungsprüfsystem ) | 0.45 |  |  |  |
|  | Verbal ability (German  version of the Controlled Oral Word Association Test) | 1.27 |  |  |  |
| Heinzel et al. (2014)  Comparison 2 | Verbal STM (average of digit span f. and b.) | 0.69 | 15 (15) |  |  |
|  | Nonverbal ability (average of Raven and Leistungsprüfsystem ) | 0.26 |  |  |  |
|  | Verbal ability (German  version of the Controlled Oral Word Association Test) | 0.08 |  |  |  |
| Holmes & Gathercole (2013)  Comparison 1 | Mathematical abilities (national Standard  Assessment Test) | 1.06 | 25 (25) |  |  |
| Holmes & Gathercole (2013)  Comparison 2 | Mathematical abilities (national Standard  Assessment Test) | 0.58 | 25 (25) |  |  |
| Holmes et al. (2009) | Verbal STM (average of word recall and digit recall) | 0.40 | 22 (20) |  |  |
|  | Verbal WM (average of counting recall, backward digit recall and listening recall) | 2.34 |  |  |  |
|  | Visuospatial STM (average of dot matrix and block recall) | 1.34 |  |  |  |
|  | (average of Mr. X and spatial recall) | 0.86 |  |  |  |
|  | Nonverbal ability (performance IQ (WASI)) | -0.18 |  |  |  |
|  | Verbal ability (vocabulary test (WASI)) |  |  |  |  |
|  | Mathematical abilities (WOND) | -0.11 |  |  |  |
|  | Word decoding (WORD) | -0.09 |  |  |  |
| Horowitz-Kraus & Breznitz (2009) | Verbal STM (average of digit span f. and b.)  Verbal WM (the opposites test ) | -0.15  -0.16 | 27 (34) | 0.09  -0.51 | 27 (34) |
| Hovik et al. (2013) | Verbal WM (composite of Digit of span f. and b.) | 0.60 | 33 (34) | 0.48 | 33 (34) |
|  | Visuospatial STM (composite of Leiter forward and backward (Leiter International Performance Scale - Revised) | 0.67 |  | 0.96 |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
|  |  |  |  |  |  |
| Hubacher et al. (2013) | Verbal STM (average of digit span f. and b.)  Visuospatial STM (average of Corsi blocks backward and forward) | 0.41  0.20 | 15 (14) |  |  |
| Jaeggi et al. (2014)  Comparison 1 | Nonverbal ability (average of Raven , BOMAT, CFT, Form Board Test, Space Relations, Surface Development Test, average of BOMAT and CFT for pre-follow-up-comparison) | 0.36 | 25 (27) | 0.27 |  |
|  | Verbal ability (average of Inferences Test and Reading Comprehension Test) | 0.01 |  |  |  |
| Jaeggi et al. (2014)  Comparison 2 | Nonverbal ability (average of Raven , BOMAT, CFT, Form Board Test, Space Relations, Surface Development Test; average of BOMAT and CFT for pre-follow-up-comparison ) | 0.27 | 26 (27) | 0.11 |  |
|  | Verbal ability (average of Inferences Test and Reading Comprehension Test) | 0.07 |  |  |  |
| Jaeggi et al. (2011) | Nonverbal ability (average of Raven and TONI) | 0.06 | 32 (30) | -0.04 | 29 (27) |
| Jaeggi, Studer-Luethi, et al. (2010)  Comparison 1 | Verbal WM (operation span task) | -0.28 | 25 (40) |  |  |
|  | Nonverbal ability (average of Raven and BOMAT) | 0.52 | 25 (43) |  |  |
| Jaeggi, Studer-Luethi, et al. (2010)  Comparison 2 | Verbal WM (operation span task) | -0.42 | 21 (40) |  |  |
|  | Nonverbal ability (average of Raven and BOMAT) | 0.53 | 21 (43) |  |  |
| Jaeggi et al. (2008) | Verbal STM (average of digit span f. and b.) | 0.67 | 34 (35) |  |  |
|  | Verbal WM (reading span task) | -0.07 | 26 (27) |  |  |
|  | Nonverbal ability (composite of Raven and BOMAT) | 0.40 | 34 (35) |  |  |
| Jaušovec & Jaušovec (2012) | Verbal STM (digit span f. and b. from WAIS-R)  Nonverbal ability (Raven)  Verbal ability (the verbal analogy test) | 0.38  0.55 | 14 (15) |  |  |
| Karbach et al. (2014) | Mathematical abilities (German Mathematics Test) | -0.97 | 14 (14) | -0.38 | 14 (12) |
| Klingberg et al. (2005) | Verbal WM (average of digit span f. and b.) | 0.57 | 20 (24) | 0.59 | 18 (23) |
|  | Visuospatial STM (span-board task) | 0.78 |  | 0.81 | 18 (24) |
|  | Nonverbal ability | 0.23 |  | 0.05 |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Klingberg et al. (2002) | Visuospatial STM (span-board task) | 1.64 | 7 (7) |  |  |
|  | Nonverbal ability (Raven) | 2.17 |  |  |  |
| Lilienthal et al. (2013)  Comparison 1 | Verbal STM (cued recall span task) | 0.65 | 13 (13) |  |  |
|  | Verbal WM (operation span) | 0.17 |  |  |  |
|  | Visuospatial STM (grid task) | -0.07 |  |  |  |
| Lilienthal et al. (2013)  Comparison 2 | Verbal STM (cued recall span task) | 0.50 | 13 (26) |  |  |
|  | Verbal WM (operation span) | 0.20 |  |  |  |
|  | Visuospatial STM (grid task) | 0.34 |  |  |  |
| Loosli et al. (2012) | Nonverbal ability (TONI) | 0.11 | 20 (20) |  |  |
|  | Word decoding (Salzburg  Reading Test, words and nonwords accuracy) | -0.11 |  |  |  |
| Nutley et al. (2011) | Verbal STM (Word span test) | 0.22 | 24 (25) |  |  |
|  | Visuospatial STM (grid task) | 1.56 |  |  |  |
|  | Visuospatial WM (odd-one out) | 0.89 |  |  |  |
|  | Nonverbal ability (composite of  variable set A, AB, and B (  Raven CPM) and block design WPPSI)) | -0.16 |  |  |  |
| Penner et al. (2012)  Comparison 1 | Verbal STM (average of digit span f. and b.) | 0.18 | 12 (12) |  |  |
|  | Verbal WM (average of 2- and 3- back (correct responses) | 0.18 |  |  |  |
|  | Visuospatial STM (average of block span f. and b.) | 0.12 |  |  |  |
|  | Verbal ability (Regensburger Word Fluency Test) | 0.34 |  |  |  |
| Penner et al. (2012)  Comparison 2 | Verbal STM (average of digit span f. and b.) | 0.65 | 12 (12) |  |  |
|  | Verbal WM (average of 2- and 3- back (correct responses) | 0.35 |  |  |  |
|  | Visuospatial STM (average of block span f. and b.) | 1.05 |  |  |  |
|  | Verbal ability (Regensburger Word Fluency Test) | 0.41 |  |  |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Redick et al. (2013)  Comparison 1 | Verbal WM (running letter span) | 0.11 | 24 (29) |  |  |
|  | Visuospatial WM (Symmetry span) | -0.34 |  |  |  |
|  | Nonverbal ability (average of Raven Culture-Fair Test Cattel and Paper Folding | -0.18 |  |  |  |
|  | Verbal ability  (vocabulary from Shipley Institute of Living Scale) | 0.24 |  |  |  |
| Redick et al. (2013)  Comparison 2 | Verbal WM (running letter span) | -0.02 | 24 (20) |  |  |
|  | Visuospatial WM (Symmetry span) | 0.26 |  |  |  |
|  | Nonverbal ability (average of Raven Culture-Fair Test Cattel and Paper Folding | 0.05 |  |  |  |
|  | Verbal ability  (vocabulary from Shipley Institute of Living Scale) | -0.07 |  |  |  |
| Richmond et al. (2011) | Verbal STM (average of digit span f. and b.) | -1.42 | 21 (19) |  |  |
|  | Verbal WM (Reading Span Task) | 3.02 |  |  |  |
|  | Nonverbal ability (Raven) | -1.83 |  |  |  |
| Salminen et al. (2012) | Nonverbal ability (Raven) | -0.7 | 20 (18) |  |  |
| Schmiedek et al. (2010)  Comparison 1 | Verbal WM (reading span task) | 0.00 | 101 (44) |  |  |
|  | Visuospatial WM (rotation span task) | 0.08 | 101 (44) |  |  |
|  | Nonverbal ability (Raven) | 0.34 | 100 (43) |  |  |
|  | Verbal ability (verbal ability from  Berlin Intelligence structure test) | 0.13 | 101 (44) |  |  |
| Schmiedek et al. (2010)  Comparison 2 | Verbal WM (reading span task) | 0.21 | 103 (39) |  |  |
|  | Visuospatial WM (rotation span task) | 0.55 | 103 (39) |  |  |
|  | Nonverbal ability (Raven) | 0.54 | 100 (39) |  |  |
|  | Verbal ability (verbal ability from  Berlin Intelligence Structure Test) | -0.01 | 103 (39) |  |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Shavelson et al. (2008) | Verbal STM (sum of digit span f. and b.) | 1 | 18 (19) |  |  |
|  | Verbal WM (average of operation span and reading span)  Visuospatial STM (sum of span-board f. and b.) | 0.27 |  |  |  |
|  | Visuospatial STM (span-board total) | 0.51 |  |  |  |
|  | Nonverbal ability (Raven) | 0.01 |  |  |  |
| Shiran & Breznitz (2011)  Comparison 1 | Verbal WM (average auditory and visual verbal WM (Cognifit personal coach measures)) | 0.39 | 35 (15) |  |  |
|  | Visuospatial WM  (Cognifit test) | 0.49 |  |  |  |
|  | Word decoding (average of One minute tests of reading words and pseudowords) | 0.37 |  |  |  |
|  | Verbal ability (comprehension in context (Breznitz, 2006)) | 0.59 |  |  |  |
| Shiran & Breznitz (2011)  Comparison 2 | Verbal WM (average auditory and visual verbal WM (Cognifit personal coach measures)) | 0.55 | 26 (15) |  |  |
|  | Visuospatial WM  (Cognifit test) | 0.37 |  |  |  |
|  | Word decoding (average of One minute tests of reading words and pseudowords) | 0.39 |  |  |  |
|  | Verbal ability (comprehension in context (Breznitz, 2006)) | 0.87 |  |  |  |
| St Clair-Thompson et al. (2010) | Verbal STM (digit recall f. from WMTB-C) | 0.21 | 117 (137) |  |  |
|  | Verbal WM (listening recall from WMTB-C) | 1.28 |  |  |  |
|  | Visuospatial STM (block recall from WMTB-C) | 0.34 |  |  |  |
|  | Mathematical abilities (arithmetic subtest of WISC-IV) | 0.25 |  | 0.22 | 44 (26) |
| Stepankova et al. (2014)  Comparison 1 | Verbal STM (average of digit span f. and b.) | 0.16 | 20 (25) |  |  |
|  | Verbal WM (letter number sequencing from WMS-III) | 0.51 |  |  |  |
|  | Nonverbal ability (average of block design and matrix reasoning from WAIS-III) | 0.44 |  |  |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Stepankova et al. (2014)  Comparison 2 | Verbal STM (average of digit span f. and b.) | 0.17 | 20 (25) |  |  |
|  | Verbal WM (letter number sequencing from WMS-III) | 0.66 |  |  |  |
|  | Nonverbal ability (average of block design and matrix reasoning from WAIS-III) | 0.14 |  |  |  |
| Thompson et al. (2013)  Comparison 1 | Verbal WM (combined span task (sum score of automated operation span and automated reading span) | 0.49 | 19 (19) |  |  |
|  | Nonverbal ability (average of Raven and WASI/WAIS matrices) | -0.31 | 20 (19) |  |  |
|  | Verbal ability (WASI/WAIS vocabulary) | 0.00 | 20 (19) |  |  |
|  | Word decoding (Nelson Denny Reading Rate) | -0.04 | 20 (19) |  |  |
| Thompson et al. (2013)  Comparison 2 | Verbal WM (combined span task (sum score of automated operation span and automated reading span) | 0.20 | 19 (14) |  |  |
|  | Nonverbal ability (average of Raven and WASI/WAIS matrices) | -0.05 | 20 (19) |  |  |
|  | Verbal ability (WASI/WAIS vocabulary)  Word decoding (Nelson Denny Reading Rate) | -0.05  0.25 | 20 (19)  20 (18) |  |  |
| Thorell et al. (2009)  Comparison 1 | Verbal WM (average of word span task f. and b.) | 1.10 | 16 (13) |  |  |
|  | Visuospatial STM (the span board task) | 0.44 |  |  |  |
|  | Nonverbal ability (block design from WPPSI-R) | -0.03 |  |  |  |
| Thorell et al. (2009)  Comparison 2 | Verbal WM (average of word span task f. and b.) | 1.06 | 16 (16) |  |  |
|  | Visuospatial STM (the span board task) | 0.70 |  |  |  |
|  | Nonverbal ability (block design from WPPSI-R) | 0.33 |  |  |  |
| Van der Molen et al. (2010)  Comparison 1 | Verbal STM (average of digit recall, backward digit recall, nonword recall) | 0.02 | 41 (26) | 0.16 | 39 (25) |
|  | Verbal WM (listening recall) | 0.04 |  | 0.06 |  |

*(Table continues)*

Table S2 (continued)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Study author (year) | Outcome (measure) | Effect size *g* (pretest-posttest difference in gain) | Sample size pretest-posttest training (control)a | Effect size *g* (pretest-follow-up test difference in gain) | Sample size pretest-follow-up test training (control)a |
| Van der Molen et al. (2010)  Comparison 1 | Visuospatial STM (average of block recall and patterns test) | 0.08 |  | 0.01 |  |
|  | Visuospatial WM (spatial span) | 0.15 |  | 0.03 |  |
|  | Nonverbal ability (Raven) | 0.03 |  | -0.07 |  |
|  | Mathematical abilities (Arithmetic test (De Vos, 1992)) | -0.05 |  | -0.07 |  |
|  | Word decoding (the Reading test (Brus & Voeten 1973) | 0.06 |  | 0.04 |  |
| Van der Molen et al. (2010)  Comparison 2 | Verbal STM (average of digit recall, backward digit recall, nonword recall) | 0.24 | 41 (26) | 0.22 | 39 (25) |
|  | Verbal WM (listening recall) | 0.09 |  | 0.05 |  |
|  | Visuospatial STM (average of block recall and patterns test) | -0.13 |  | 0.13 |  |
|  | Visuospatial WM (spatial span) | 0.16 |  | 0.41 |  |
|  | Nonverbal ability (Raven) | -0.22 |  | -0.22 |  |
|  | Mathematical abilities (Arithmetic test (De Vos, 1992)) | 0.00 |  | 0.09 |  |
|  | Word decoding (the Reading test (Brus & Voeten 1973) | 0.09 |  | 0.17 |  |
| Westerberg et al. (2007) | Verbal STM (digit span f. and b. from WAIS-R) | 1.50 | 9 (9) |  |  |
|  | Visuospatial STM (span board task from WAIS-R) | 0.78 |  |  |  |
|  | Nonverbal ability (Raven) | -0.10 |  |  |  |

*Note.* STM = short-term memory; WM = working memory; AWMA = Automated Working Memory Assessment; BOMAT = Bochumer Matrices Test; CANTAB SSP = Cambridge Neuropsychological Testing Automated Battery Spatial Working Memory Spatial Span,; CANTAB SWM = Cambridge Neuropsychological Testing Automated Battery Spatial Working Memory; CFT = CFT; CPM = Colored Progressive Matrices; DAT-AR = Differential Aptitude Test; PMA = Primary Mental Abilities Battery; TONI = Test of Nonverbal Intelligence; WAIS = Wechsler Adult Intelligence Scale; WAIS-III = Wechsler Adult Intelligence Scale third edition; WASI = Wechsler Abbreviated Scale of Intelligence; WISC = Wechsler Intelligence Scale for Children; WISC–IV = Wechsler Intelligence Scale for Children ‒ Fourth Edition; WMS-III = Wechsler Memory Scale–III; WMTB = Working Memory Test Battery for Children; WOND = Wechsler Objective Numerical Dimensions; WORD = Wechsler Objective Reading Dimensions; WPPSI = Wechsler Preschool and Primary Scale of Intelligence; WRAT4-PMV = Wide Range Achievement Test 4 Progress Monitoring Version.

aSample sizes that differ between constructs are listed.